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ACKNOWLEDGEMENTS

Thank you to the Parapsychological Association for bestowing the honour of being Program Chair for this year and to the members of the Program Committee for all their hard work in reviewing the unexpectedly large number of submissions received this year. Thank you to everyone who submitted and helped to shape the program. It was a pleasure to work alongside SPR Program Chair, Bernard Carr, who was always so enthusiastic about the project. I appreciate all his help with integrating and combining the PA and SPR elements of the convention and for sharing his wealth of knowledge and experience of organising conventions. Many thanks to the Arrangements Chairs, Richard Broughton and Peter Johnson, for all of their hard work in sorting out the practicalities. Particular thanks to, Roger Nelson, Richard Broughton, Chris Roe, John Palmer, Rex Stanford and Susie Demarinis-Radin for their advice, support and words of wisdom with regard to the role of PA Program Chair. Special thanks to my partner, Liz, for her support and understanding these last months!

I would like to dedicate this convention to the late Professor Bob Morris. During the banquet at the Vienna PA Convention, in probably my last conversation with him, Bob was teasing me about not yet having been Program Chair and indicating that my time would come – during the dinner, as well as slicing olives with his knife and fork, I'm sure he also deliberately took his bread roll from the wrong side plate to cause a bit of mischief! Sadly, he's not here to see that I made it to Program Chair but I think he would have liked the fact that this is a joint PA/SPR convention that brings people together.

I hope that both PA and SPR members and those who are new to these conventions are able to learn from each other and forge further links with one another. This one's for you Bob!

Simon Sherwood, PA Program Chair

A joint meeting between the SPR and PA is a very special event, so it is a great honour to serve as SPR Program Chair. This is only our third joint conference - the first was at Cambridge in 1982 and the second in Brighton in 1997 – so this is a rare opportunity for our two organizations to join forces and the SPR greatly welcomes this. Many delegates are members of both organizations and attend both conferences anyway, so there are many rationales for such a collaboration.

Whereas the PA papers appear in full in these Proceedings, we have followed the usual tradition of only including abstracts for the SPR talks. SPR presenters who are aggrieved by this should take consolation in the fact that the PA papers have gone through a more rigorous refereeing process, which entails much more work for the presenters! The SPR abstracts are also available for free to PA participants as a special booklet but it is sensible to incorporate them in the PA Proceedings, so as to have an integrated record of the whole meeting. Apart from a joint session on Sunday morning, the SPR and PA sessions are separate, but we have tried to sequence them to ensure the logical coherence of the overall programme. All the SPR talks are scheduled for Friday afternoon to Sunday morning, since this is the usual SPR conference period.

I would like to thank Peter Johnson who - besides being the SPR Arrangements Chair - has collated the SPR abstracts and helped to put them into the required PA format, and Richard Broughton, who - as the PA Arrangements Chair -has coordinated with myself and Peter throughout. I am also very indebted to the other members of the SPR Program Committee - Tony Cornell, Alan Gauld, Chris Roe and Donald West - for all their hard work in selecting the SPR presentations and, where appropriate, improving them. Finally, I would like to acknowledge the indispensable support of Simon Sherwood, the PA Program Chair. Our excellent working relationship has helped to ensure what we hope is an outstanding program combining the strengths of both our organizations. Simon had a much bigger task than me, since he had to oversee a more extensive refereeing process, but he always found time to coordinate with me and respond positively and diplomatically to all my program suggestions.

Bernard Carr, SPR Program Chair

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AN INVESTIGATION INTO THE CORTICAL ELECTROPHYSIOLOGY OF REMOTE STARING DETECTION

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ABSTRACT

A series of three experiments examining the potential electrocortical processing of remote staring detection are presented, followed by a fourth experiment to examine a potential artifact. The first experiment provides an initial exploration of this effect, finding primarily that "remote staring detection" has no evident time-locked processing associated with it on its own, but rather acts upon other processes occurring at the same time. The second experiment provides evidence that this effect is not related specifically to face processing, but can impact on other forms of processing as well. The third experiment uncovers evidence of a potential artifact that could explain the "remote staring effect", which is verified in the final experiment. The overall results are discussed in light of an interesting and subtle psychophysics effect that could potentially have an impact upon a wide variety of experiments that employ event-related measures of electrocortical processing.

INTRODUCTION

Remote staring detection has been defined as "…the purported ability to detect when one is being watched or stared at by someone situated beyond the range of the conventional senses." (Braud, Shafer, & Andrews, 1993a, p. 391). Remote staring detection involves the measurement of a behavioural or physiological reaction in the *staree* when they are stared at by the *starer*, even though it should be impossible for the staree to know through any conventional sensory means that the starer is staring at them at any particular instance. Belief in this phenomenon as an everyday experience is considerably widespread, with incidences of belief ranging from approximately 70% to 94% of the populations sampled (Braud et al., 1993a; Coover, 1913; Cottrell, Winer, & Smith, 1996; Rosenthal, Soper, & Tabony, 1994; Sheldrake, 1994, 2003; Thalbourne & Evans, 1992).

However, it is difficult to evaluate the basis of anecdotal experiences and beliefs of this type and therefore over the past 100 years there have been attempts to examine this phenomenon under more controlled conditions. The earliest research in this area used relatively simple and direct behavioural measures that demonstrated an evolution of methodological sophistication over time as greater controls over extraneous variables were introduced (Coover, 1913; Peterson, 1978; Poortman, 1959; Titchener, 1898; Williams, 1983). Although there has been some discussion that such methods provide stronger results (Sheldrake, 2005), others have suggested that it is at the cost of methodological rigor (Baker, 2005; Blackmore, 2005).

The introduction of the use of electrodermal activity (EDA) as a measure of autonomic nervous system (ANS) activity and as a potential indicator of a "fight-or-flight" response to being stared at remotely, was a significant methodological development. This was particularly true when the EDA method was combined with the use of CCTV systems to separate the starer and staree (Braud et al., 1993a, 1993b). Collectively referred to as the "EDA-CCTV" studies (Baker, 2005), several researchers found very interesting results utilizing this method, including potential experimenter effects (Schlitz & LaBerge, 1994; Schlitz, Wiseman, Watt, & Radin, 2006; Watt, Schlitz, Wiseman, & Radin, 2005; Watt,

Wiseman, & Schlitz, 2002; Wiseman & Schlitz, 1999, 1997; Wiseman & Smith, 1994; Wiseman, Smith, Freedman, Wasserman, & Hurst, 1995). A meta-analysis (Schmidt, Schneider, Utts, & Walach, 2004) of the 15 EDA-CCTV experiments that had been conducted at that time found a small, but significant effect (d = .13, p = .01), suggesting evidence of an intriguing effect that requires further investigation.

This was the primary objective of the body of research presented in this paper. Firstly, it was important to expand upon the previous EDA-CCTV method to include central nervous system (CNS) activity, namely; is there brain activity associated with the processing of a remote stare? It would be expected that, if this phenomenon was genuine, then any stimulus processing or awareness of a remote stare should result in corresponding activity at some point and in some location in the brain. Secondly, it was important to embed the potential effect within a wider theoretical framework. Assuming that remote staring detection is producing brain activity as the information is processed, does this processing follow similar systems to those that have already been identified as processing face information or the gaze of others?[1]

The significance of various forms of eye-based nonverbal communication in humans has been long established in the social psychology literature (e.g., Argyle & Cook, 1976; Ellsworth, Carlsmith, & Henson, 1972; Kirkland & Lewis, 1976). It is notable that the significance of this behaviour extends even to very young babies (Batki, Baron-Cohen, Wheelwright, Connellan, & Ahuluwalia, 2000; Farroni, Csibra, Simion, & Johnson, 2002; Robson, 1967), and that the human eye has the largest ratio of exposed, white sclera to dark iris compared to any other primate (Kobayashi & Kohshima, 1997; Riccardelli, Baylis, & Driver, 2000). The impact of the gaze of another also extends to its effects on electrodermal measures of arousal (Leavitt & Donovan, 1979; McBride, King, & James, 1965; Nichols & Champness, 1971; Strom & Buck, 1979). The impact of face and gaze processing on electrical brain activity has been well-studied over the past decade. Different components have been identified, but there appears to be significant activation surrounding the T_5 (or P_7) and T_6 (or P_8) electrodes, particularly a negative component in the right (i.e., T_6/P_8) hemisphere at approximately 170 milliseconds after stimulus onset (Allison, Puce, Spencer, & McCarthy, 1999; Bentin, Allison, Puce, Perez, & McCarthy, 1996; Carmel & Bentin, 2002; McCarthy, Puce, Belger, & Allison, 1999), with the subtle differences between eyes-only and face processing as a whole being under debate (see Farroni et al., 2002; Taylor, Itier, Allison, & Edmonds, 2001; Watanabe, Kensaku, & Ryusuke, 2002).

It was this extensive literature exploring both conventional reactions to the gaze or stares of others, combined with the curious effects noted for remote staring detection in the parapsychological literature that inspired the first study reported here. This first study had two main objectives; (a) was there any evidence of global electrocortical processing of remote staring detection, and (b) did any such processing vary in any way when administered at the same time as more conventional face processing? Such an approach was designed to act as an initial step in a program of research to examine if remote staring detection and face/gaze processing were potentially utilizing the same brain processes.

The method and analysis procedure for each of the experiments was identical unless otherwise noted. A series of planned and *post-hoc* analyses were conducted on the electroencephalographic (EEG) data from each experiment, including Event Related Potentials (ERPs), topographical analyses, Fast Fourier Transforms (FFTs), evoked and induced Event Related Band Power (ERBP) and Partial-Least Squares (PLS). Additionally, extensive analysis was conducted on the skin conductance (SC) data and questionnaire data. However, due to space limitations only the primary ERP analysis – as reflected by the Global Field Power (GFP) analysis – is reported here. All of the experiments received ethical approval from the Ethics Committee of the School of Philosophy, Psychology and Language Sciences at the University of Edinburgh. All participants provided informed consent.

[1] The term "gaze" is used to refer to a multitude of visual social interactions in the cognitive and cognitive neuroscience literature. As argued previously (Baker, 2001, 2005, 2007), it is not technically an accurate term as staring is invariant upon the staree's behaviour, but gaze is a form of social interaction (Argyle & Cook, 1976). However, gaze is used here in order to be consistent with the previously published literature, and is effectively interchangeable with "staring" in this context.

EXPERIMENT ONE

This first experiment was examining if remote staring detection was revealed in global electrocortical processing, and if this processing may have an interaction with more conventional forms of face processing. In order to do this, participants were exposed to four different conditions; (a) conventional face processing, (b) a remote stare, (c) both face and remote stare processing together, and (d) no stimulus as a control condition.

Method

Participants: 20 participants[2] (seven males and 13 females) took part in this experiment with an average age of 26.0 years old (range: 21 – 41 years old). The participants were not paid and were selected using an opportunity sampling method. The majority of the participants were right-handed (two were left-handed).

Materials, Equipment and Procedure: The experiment broadly followed the procedure outlined in previous remote staring detection and DMILS experiments (Braud et al., 1993a, 1993b; Braud & Schlitz, 1991), with additional elements due to the use of more complex electrophysiological methods. The schematic of the set-up of the experimental equipment is shown in figure 1. Participants were initially oriented in the testing laboratory and asked to complete three questionnaires: a general demographics questionnaire, a 23-item Self Consciousness Questionnaire (Burnkrant & Page, 1984; Fenigstein, Scheier, & Buss, 1975; Mittal & Balasubramanian, 1987) and a 20-item non-clinical paranoia questionnaire (Fenigstein & Vanable, 1992). The skin conductance (SC) electrodes were then applied to the medial phalanges of digits II and III of the participant's non-dominant hand (as per the guidelines set out by Fowles et al., 1981).[3] The EEG cap was then fitted according to the 10-20 system (Jasper, 1958).[4] The EEG cap was connected to the NeuroScan NuAmps Amplifier, which was connected to the EEG recording computer. Triggers for the EEG were sent via an optically-isolated connection from the experimental computer.

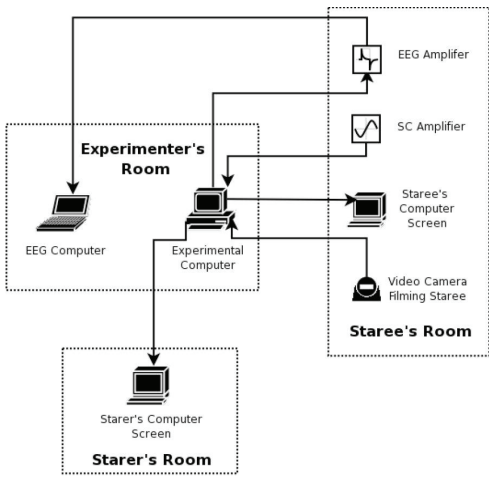

Fig. 1 Schematic of the equipment set-up for all three experiments

[2] 21 participants took part in total, however one participant was removed due to technical difficulties and an additional participant was recruited as 20 was the pre-specified number.

[3] The analysis of the questionnaire and skin conductance data is not reported in this paper.

[4] The recording electrodes were as follows: F_{p1}, F_{p2}, F_{T9}, F_{T10}, F_7, F_8, F_3, F_4, F_z, F_{T7}, F_{T8}, F_{C3}, F_{C4}, F_{Cz}, T_7, T_8, C_3, C_4, C_z, T_{P7}, T_{P8}, C_{P3}, C_{P4}, C_{Pz}, P_7, P_8, P_3, P_4, P_z, P_1, P_2, O_1, O_2, O_z, A_1, A_2, V_{EOG+}, V_{EOG-}, H_{EOGL}, H_{EOGR} and the non-recorded ground (GNR).

During the experiment, the participant was exposed to four separate conditions. Each condition was repeated 48 times in a pseudo-randomised5 and counterbalanced order that was automatically changed by the computer for each participant. During certain conditions the staree was presented with a static picture of the starer on the screen in front of them, at other times it was blank. In addition, during these times the staree may also be stared at remotely by the starer via the computer-controlled CCTV system, depending on the condition. These four conditions are summarised in table 1.

		Staree's screen	
		Face Displayed	Blank Screen
Action of Starer	Remote Stare	*Face + Remote Stare Condition*	*Remote Staring Condition*
	No Remote Stare	*Face Condition*	*Control Condition*

Table 1: 2 × 2 table of the independent variable manipulation for experiment one

The participants' EEG was recorded at 500Hz sample rate, with a bandpass filter at 0.5Hz (High Pass) and 100Hz (Low Pass) with a 50Hz notch filter. Each condition lasted for 5000ms followed by a 5000ms rest period.

Results and Discussion

The EEG data was preprocessed to remove muscle and ocular artifacts, epoched and averaged into event-related potential (ERP) data for each condition (-100ms to 500ms epochs). The data from all of the electrodes was then summarised using Global Field Power (GFP) (Lehmann & Skrandies, 1980; Nunez & Srinivasan, 2006; Skrandies, 2002). GFP can be expressed as the following (taken from Lehmann & Skrandies, 1980):

$$GFP = \sqrt{\frac{1}{2n}\sum_{i=1}^{n}\sum_{j=1}^{n}\left(U_i - U_j\right)^2}$$

This formula represents the root-mean-square deviations between all electrodes (i.e., for each of the voltages U for an i × j array of n electrodes) for each time point (based on Skrandies, 1995). Essentially, the GFP values represent the spatial standard deviation between all electrodes over time. It is a highly robust measure that uses the data from all of the recording electrodes, and it is also independent of the reference site. It is partly due to these reasons that it is the primary method for peak identification as recommended in the Society for Psychophysiological Research recording standards and publication criteria (Picton et al., 2000). As a function of the calculation, all values are positive.

The peak detection method was then used to examine differences in GFP activity between conditions at the same temporal peak (Picton et al., 2000). There are a variety of potential methods that can be used to investigate *regions of interest* (ROIs) in event-related GFP data of this type (see van Boxtel, 1998; Hoormann, Falkenstein, Schwarzenau, & Hohnsbein, 1998). However, the peak detection method was selected because many other methods rely upon potentially arbitary ways for identifying ERP components or previous literature to define particular cortical locations and temporal windows that a particular effect can be found in. For example, the *P300* (i.e., a positive waveform deflection at 300 milliseconds) is a well-established ERP processing component associated with the processing of a cognitive oddball task (see Polich, 2007). Because this has been investigated since the mid-1960's, researchers using this paradigm clearly know both the temporal latency and electrode sites that they would expect this effect to be, and are able to target the relevant analyses accordingly.

[5] The randomisation sequence was generated via a seed from the computer clock at the program start.

As this is the first time that electrocortical data has been gathered on the potential brain processing associated with remote staring detection, there was no prior literature to base this assessment on. Therefore, the peak detection method using GFP was used because peaks represent easily and discretely identifiable features of the GFP waveform that minimise the ambiguity over the length of the time window and the area of the cortex activity to be examined. In other words, it is more conservative as there is no "fishing" for a particular time period or selection of electrodes in order to obtain the best possible effect. In addition, by using peak identification from the averaged GFP of all for conditions (representing data from *all* electrode sites, from *all* participants in *all* conditions), it minimises the possibility of any particular electrode site or participant "driving" a particular peak.[6] As stated above, with the use of GFP as an optimal and recommended method for peak detection, any potential peak has to be robust due to the sheer amount of data contained within the waveform. The GFP data for all participants and for all four conditions can be seen in figure 2. Two primary temporal peaks were identified as being of interest: 134ms and 222ms. *Shapiro-Wilk* analyses revealed that the data was not normally distributed and therefore non-parametric analyses were conducted.[7]

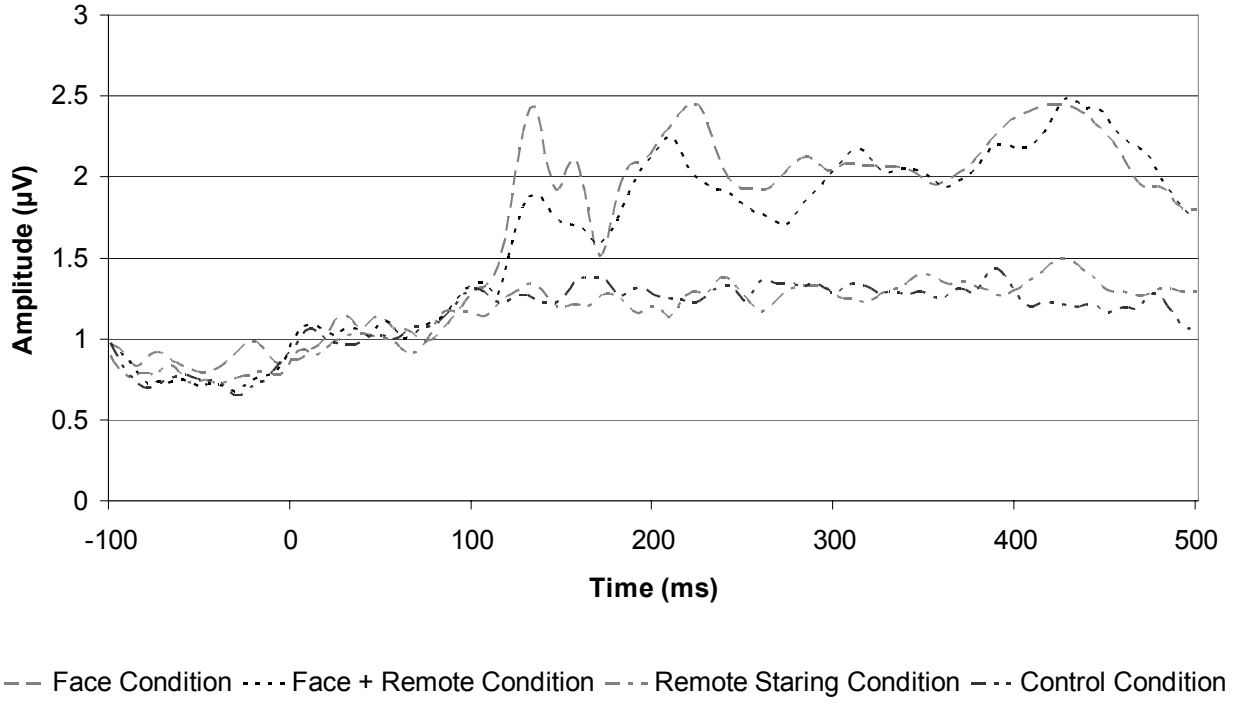

Fig. 2 Global Field Power (GFP) results from all 20 participants for all conditions in experiment one

The analyses focused upon demonstrating a potential remote staring detection effect by comparing the *remote stare* and *control* conditions, and the potential relationship between face processing and remote staring detection (by comparing the *face* and the *face* + *remote stare* conditions). The analysis

[6] We appreciate the advice from Professor Dietrich Lehmann in suggesting this approach (Personal Communication).

[7] Alpha levels were corrected using a modified Bonferroni procedure (Keppel, 1982; Russel, 1990), giving an α_{MB} = .01 in this instance.

demonstrated that there was a significant difference between the peak GFP amplitudes for the *face* and the *face + remote stare* conditions for both the 134ms (*Wilcoxon* $T = -2.88$, $p = .004$) and 222ms peaks ($T = -2.43$, $p = .01$). There were no significant differences between the peak GFP amplitudes for the *remote stare* and *control* conditions for either peak (134ms: $T = -.60$, $p = .550$, 222ms: $T = -.30$, $p = .77$). In addition to the findings above, there was also a clear and highly significant effect of face processing when the *face* and *control* conditions were compared (134ms: $T = -3.81$, $p < .001$, 222ms: $T = 3.92$, $p < .001$), although these results need to be treated with caution due to the difference in stimulus types.

The results suggested that there was a significant effect of remote staring detection on global measures of brain activity. However, this effect was only present when the remote staring stimulus was administered in conjunction with the face perception stimulus, where it apparently significantly reduced peak GFP associated with face processing. There was no significant difference between the global brain activity of the remote staring stimulus compared to the control stimulus.

EXPERIMENT TWO

The results from the first study were particularly curious as they suggested that remote staring detection does not cause any apparent distinct brain activity in its own right, but rather appears to be dependent upon other stimulus processing that is occurring concurrently. However, it was unclear from the findings of the first study if this finding represented a unique relationship between face/gaze processing and remote staring detection, or if remote staring detection acted upon any concurrent process.

In order to examine this further, the second experiment exploited the debate concerning *cortical domain specificity* associated with face processing compared to the processing of other objects. Due to the fact that faces are processed so significantly differently to objects, some researchers have suggested it is due to the specific social importance of faces to humans (e.g., Bentin & Carmel, 2002; Carmel & Bentin, 2002; Kanwisher, 2000). However, others have disagreed suggesting that it is merely due to practice and not a result of specific "hard-wired" cortical structures associated with the processing of faces (e.g., Rossion, Curran, & Gauthier, 2002; Tarr & Cheng, 2003; Tarr & Gauthier, 2000). Regardless of the potential resolution to this debate, both sides agree that faces are processed in a markedly different way to objects. Therefore, by examining how remote staring detection may impact upon the processing of both faces and objects, it was possible to discern if the process involved in remote staring detection was a face-specific interaction, or it can act upon a far wider range of stimulus processing that is occurring concurrently.

Method

Participants: 20 participants[8] (seven males and 13 females) took part in this experiment with an average age of 25.3 years old (range: 20 – 38 years old). The participants were paid five pounds for taking part and were all staff or students at the University of Edinburgh. All but one of the participants was right-handed.

Materials, Equipment and Procedure: Apart from relatively minor equipment upgrades, all of the equipment was identical to that used in experiment one. The relevant EEG and skin conductance electrodes were attached in the same manner. The same personality questionnaires were administered.

[8] 34 participants were tested during the experiment. The data from 10 participants was removed due to system latency issues, and the data from four participants was removed due to excessive noise artefacts. Additional participants were recruited in order to reach 20 pre-specified valid datasets.

The overall procedure was the same as that used in experiment one, except that the conditions that the participant was exposed to were different. Each condition was repeated 60 times in a pseudo-randomised and counterbalanced order. Apart from during the rest periods, the participant was presented with either a static picture of the starer on the screen in front of them, or by the picture of an object.9 In addition, during these times the staree may also have been stared at remotely by the starer via the computer-controlled CCTV system, depending upon the condition. These four conditions are summarised in table 2.

		Staree's screen	
		Face Displayed	Object Displayed
Action of Starer	Remote Stare	*Face + Remote Stare Condition*	*Object + Remote Stare Condition*
	No Remote Stare	*Face Condition*	*Object Condition*

Table 2: 2 × 2 table of the independent variable manipulation for experiment two

The participants' EEG was recorded at 500Hz (32-bit) sample rate, with a high-pass filter at 0.5Hz and no low-pass filter (system maximum range was 262.5Hz) and no notch filter. Each condition lasted for 5000ms followed by a 5000ms rest period.

Results and Discussion

As experiment one, the EEG data was preprocessed to remove muscle and ocular artifacts, epoched and averaged into event-related potential (ERP) data for each condition. These epochs were slightly longer than in experiment one in order to encapsulate any potentially later effects (-100ms to 800ms). As in the last experiment, Global Field Power was the main measure used, and two temporal peaks were identified as being of interest: 150ms and 208ms. The GFP data for all participants and for all four conditions can be seen in figure 3. *Shapiro-Wilk* analyses revealed that the data did not violate any assumptions of normality and parametric analyses were conducted.[10]

Separate 2 × 2 (image type × remote staring manipulation) repeated measures ANOVAs were conducted on the two peaks of interest. The initial 150ms component demonstrated a significant effect for remote staring processing ($F_{(1,19)} = 6.95$, $p = .016$), but no significant difference between face and object processing ($F_{(1,19)} = .18$, $p = .68$) and no significant interaction effects ($F_{(1,19)} = .002$, $p = .97$). The second (208ms) component mirrors these findings, with a significant effect for remote staring processing ($F_{(1,19)} = 23.23$, $p < .001$), no significant difference between face and object processing ($F_{(1,19)} = .45$, $p = .51$), and no significant interaction effects ($F_{(1,19)} = .02$, $p = .90$).[11]

The results suggest that remote staring detection has an effect upon the global processing of both faces and objects – increasing the GFP in both cases – and does not appear to be a face-specific effect. In conjunction with the results of the first study, it suggests that remote staring detection apparently does not have an electrocortical processing in its own right, but rather acts upon any concurrent processing that is occurring.

The lack of any processing of remote staring detection on its own and the fact that the impact of remote staring detection on faces reversed between the two studies (in the first study it *reduced* the peak GFP, in the second study it *increased* the peak GFP) was concerning. This reversal might be due to the

[9] The picture was an image of a chair taken from the *International Affective Picture Set* (IAPS) database (image code: 7235). A chair was used in order to reflect the maximum degree of processing differences between faces and objects (Itier & Taylor, 2004).

[10] $\alpha_{MB} = .025$ in this instance.

[11] Additional analyses revealed that the differences in face and object processing were broadly localised to the right temporal lobe region (i.e., P_8/T_6) as expected (Eimer, 2000; Itier & Taylor, 2004).

subtle methodological differences between the two studies[12], or it may have revealed a potential artifact that is causing this significant "remote staring effect". The third experiment was designed to replicate the previous effects and test for the possibility of an artifact.

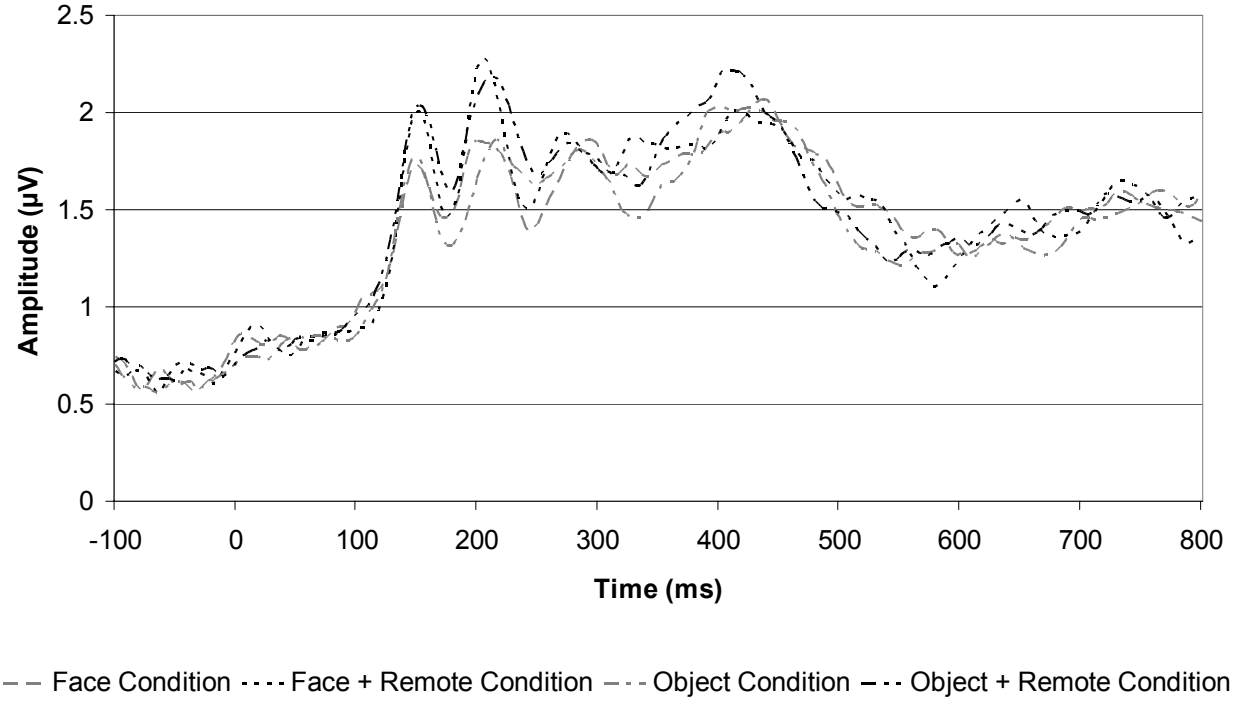

Fig. 3 Global Field Power (GFP) results from all 20 participants for all conditions in experiment two

EXPERIMENT THREE

The third experiment replicated the conventional face processing condition and the face and remote stare condition used in the two previous experiments, in order to examine the reversal of the effects between experiments one and two in more detail. In addition to this, the third experiment also examined the possibility that the effect of the remote staring detection was an artifact. This was done by simply removing the remote staring stimulus altogether for half of the experiment, but otherwise conducting the experiment as before. The rationale behind this was simple: remove the remote stare, and – if it is a genuine effect – this should remove the effect itself.

[12] In the first experiment, the randomisation sequence resulted in participants effectively being presented with an image at fairly random intervals, whereas in the second experiment the image presentation was very regular. This may have altered alpha activity generation between the experiments and produced different effects (Shaw, 2003).
[15] 26 participants were tested during the experiment. The data from one participant was removed due to self-removal from the experiment, and the data from five participants was removed due to excessive noise artefacts. Additional participants were recruited in order to reach 20 pre-specified valid datasets.

Method

Participants: 20 participants[15] (10 males and 10 females) took part in this experiment with an average age of 27.8 years old (range: 18 – 50 years old). The participants were paid five pounds for taking part and were all staff or students at the University of Edinburgh. All but two of the participants were right-handed.

Materials, Equipment and Procedure: All of the EEG and skin conductance equipment, the other experimental hardware, and the questionnaires were the same as the last experiment. The overall procedure was the same as the last two experiments, apart from some minor alterations due to the type of conditions that the participants were exposed to in this experiment. In order to examine the effect of the removal of the starer on the remote staring effect, a pseudo-randomised and counterbalanced *split-half* design was used. For 50% of the sessions, the starer was physically present for the first half of the session and absent for the second other half of the session. For the other 50% of the sessions, this was reversed. The order in which this occurred was randomised (without replacement) by an independent party (PS), and the experimenter (IB) was not aware of the order of any session prior to the session beginning. Within each half of the session, the order of the *face* or the *face + remote stare* conditions was also pseudo-randomised and counterbalanced. This resulted in four conditions that are summarised in table 3.

		Staree's screen (and remote stare manipulation)	
		Face Only Displayed	Face + Remote Stare
Action of Starer	Starer Present	*Face (Starer Present) Condition*	*Face + Remote Stare (Starer Present) Condition*
	Starer Absent	*Face (Starer Absent) Condition*	*Face + Remote Stare (Starer Absent) Condition*

Table 3: 2 × 2 table of the independent variable manipulation for experiment three

The participants' EEG was recorded using the same parameters used for the second experiment.

Results and Discussion

As the two previous experiments, the EEG data was preprocessed to remove muscle and ocular artifacts, then epoched and averaged into event-related potential (ERP) data for each condition (epochs of a -100ms to 800ms duration). Once again, Global Field Power was the main measure used, and two temporal peaks were identified as being of interest: 120ms and 174ms. The GFP data for all participants and for all four conditions can be seen in figure 4. *Shapiro-Wilk* analyses revealed that the data did not violate any assumptions of normality and parametric analyses were conducted.16

Separate 2 × 2 (presence of starer × remote staring manipulation) repeated measures ANOVAs were conducted on the two peaks of interest. The initial 120ms component demonstrated a significant effect for both remote staring processing ($F_{(1,19)} = 10.18$, $p = .005$), and for the presence of a starer ($F_{(1,19)} = 12.01$, $p = .003$), but no significant interaction effects ($F_{(1,19)} = .006$, $p = .87$). The second (174ms) also suggested a significant effect for remote staring processing ($F_{(1,19)} = 54.89$, $p < .001$), but no significant

[16] $\alpha_{MB} = .025$ in this instance. The *t-tests* were not included in this adjustment as they were exploring the main effects in more detail.

effect for the presence of a starer ($F_{(1,19)}$= .03, p = .87), and no significant interaction effects ($F_{(1,19)}$ = 1.72, p = .21).

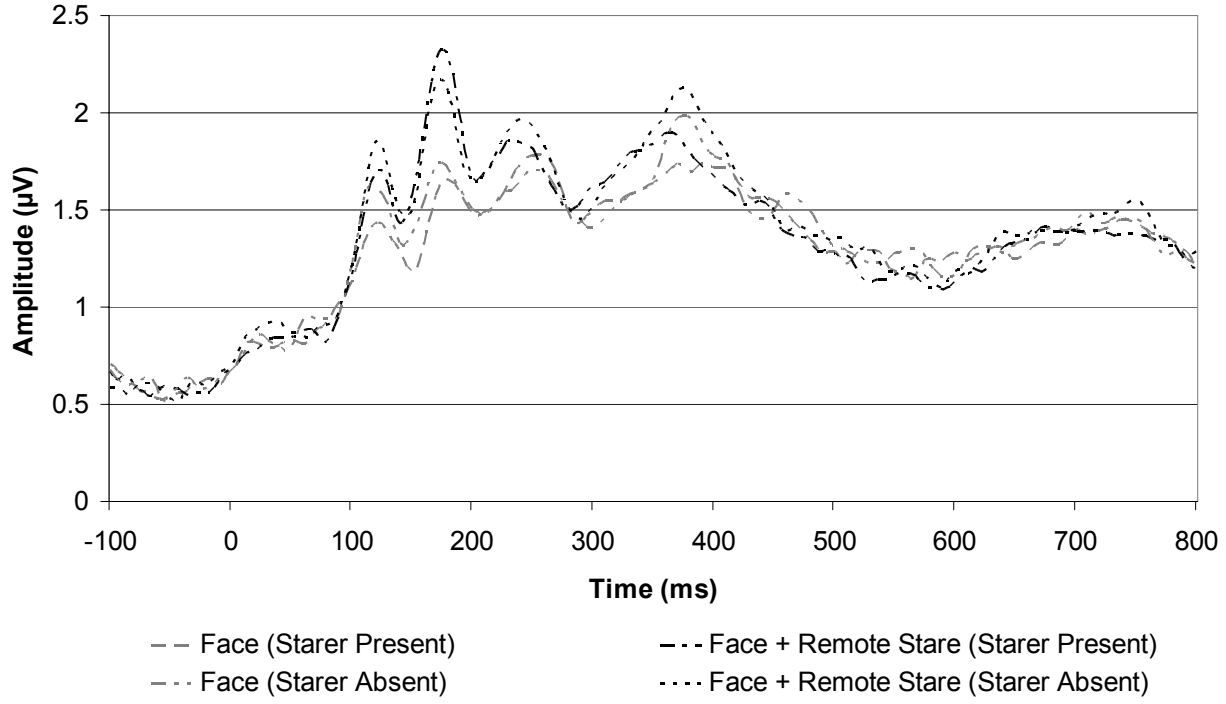

Fig. 4 Global Field Power (GFP) results from all 20 participants for all conditions in experiment three

However, these results can only be understood to their fullest extent by examining them with paired-sample *t-tests*. Two comparisons for each peak of interest were conducted. The first compared the *face (starer present)* and the *face + remote stare (starer present)* conditions. As the starer was physically present during each of these conditions, this test is equivalent to the *face* and the *face + remote stare* comparisons that were conducted in the first two experiments, and therefore ostensibly tests for the impact of remote staring detection on the global processing of faces. The second comparison examined the differences between the *face + remote stare (starer present)* and the *face + remote stare (starer absent)* conditions. The test between these two conditions examines the impact of physically removing the remote starer from the experiment. Significant effects would suggest the remote starer is important to this effect, non-significance would suggest the existence of a potential artifact.

The initial 120ms peak demonstrated a significant difference between the *face (starer present)* and the *face + remote stare (starer present)* conditions ($t_{(19)}$ = -2.16, p = .04, d = .44)[17], but it did not suggest a significant difference between the *face + remote stare (starer present*) and the *face + remote stare (starer absent)* conditions ($t_{(19)}$ = -1.21, p = .24, d = .24). The findings for the second peak (174ms) mirror these findings, with a significant difference between the *face (starer present)* and the *face + remote stare (starer present)* conditions ($t_{(19)}$ = -5.56, p = .001, d = .91), and no significant difference

[17] Cohen's d is calculated using the following formula (Becker, 2005):

$$d = \frac{M_1 + M_2}{\sigma_{pooled}}, \text{ where } \sigma_{pooled} = \sqrt{\left[\frac{\sigma_1^2 + \sigma_2^2}{2}\right]}.$$

between the *face + remote stare (starer present*) and the *face + remote stare (starer absent)* conditions ($t_{(19)} = .89$, $p = .39$, $d = .18$).

These results suggested that the "remote staring effect" was potentially caused by some form of experimental artifact. As the experiment was computer-controlled and the conditions were the same in all conditions – with the exception of whether or not the camera feed to the starer's monitor was masked or not – it suggested that there was some alteration of the images that the staree was looking at (and therefore the electrocortical processing associated with them). As the image that the staree was presented with was the same computer file for all conditions, the image presentation for the different conditions needed to be examined in case the physical properties of the image was somehow changing between conditions and the participants were reacting this change.

PHOTODIODE EXPERIMENT

In order to examine the physical properties of the image, a sensitive photodiode was used in order to examine the luminance levels of the image presentation in the different conditions. As the *starer present* and *starer absent* conditions from experiment three were equivalent from an equipment perspective, only one set of the *face* and *face + remote stare* conditions were compared. This was important because in the *face* conditions the camera feed was masked, and in the *face + remote stare* it obviously was not.

Method

Materials, Equipment and Procedure: The experimental set-up was as similar as possible to the procedure of the third experiment. The only main difference was that there was a photodiode reacting to the images on the staree's screen rather than a participant. The photodiode (BPW21: OSRAM Opto Semiconductors) was positioned 150mm away from the center of the staree's screen. The photodiode had a relative spectral sensitivity that is close to that of the human eye. It was connected to an oscilloscope in order to record the differences in output in response to the different stimuli. The stimuli tested were the *face (starer absent)* and *face + remote stare (starer absent)* conditions from experiment three. These two conditions had the same program code, except that in the former the code instructed the camera-feed to the starer's monitor to be masked, and in the latter condition it was unmasked. This code was the same regardless of whether or not the starer was physically present (as per the experimental manipulation of the third experiment). The face image displayed on the staree's screen was the identical file for both conditions (and indeed, for all of the experiments).

Results and Discussion

The first test was to examine the different stimuli for any differences in the overall output of the photodiode (and therefore the luminance) for the full 5000ms of exposure. There was no difference, with both conditions providing a mean output of 266mV.

The second test was a more specific analysis examining the luminance profiles at the onset of the image display. The test revealed a small difference between the two conditions, with the image in the *face + remote stare (starer absent)* condition taking slightly longer to step-up incrementally to full luminance than the image in the *face (starer present)* condition. This difference lasted for approximately 20ms and corresponded with a difference of approximately 2.5 cd/m^2 (candela per meter squared).[18] As revealed by the first test above, this difference did not continue beyond the first 20ms as the screen was ramping up to full luminance.

[18] This corresponds approximately to 0.2 Lux or 0.7 foot-lambert.

This result suggests that, although there was no difference between the luminance levels of the images on the staree's screen once the image reached its full luminance level, there was a small difference between the images when they were being initially presented on the screen. This may have, in turn, had an impact upon the corresponding electrocortical processing of that image, or provided the participant with some information concerning the particular condition they were experiencing at any one time.

OVERALL DISCUSSION

The body of research presented here initially began as an exploration of the potential electrocortical activity associated with the processing of remote staring detection. However, as it progressed it became an investigation of a possible artifact that has the potential to impact upon a wide range of cognitive neuroscience and psychophysics studies, particularly those that employ event-related measures of electrical brain activity.

The most parsimonious explanation for the effects reported in this paper is that they represent the ability for the human brain to process very small and rapid luminance differences between visual stimuli. The mere possibility of the luminance effect providing condition-relevant information that could be processed by the participant undermines any claims of a remote staring detection effect.[19] However, whilst it is true that the findings of the third experiment and the photodiode study do suggest a possible luminance difference between the two conditions, the differences involved are so small that they represent a potential anomaly in their own right. There is relatively little research in the psychophysics literature exploring the luminance detection threshold in isolation. This is at least partially because it is a difficult phenomenon to test and is reliant upon a multitude of other environmental and psychological factors. The absolute threshold of human luminance difference detection is approximately 0.00001 cd/m^2 after 40 minutes in absolute darkness (Kolb, Fernandez, & Nelson, 2005), but as participants in the experiments reported here were not in absolute darkness it is an inaccurate benchmark. It has been noted that luminance differences can be perceived as low as 0.75 cd/m^2 (Peli, Yang, Goldstein, & Reevesi, 1991), or even as low as 0.005 cd/m^2 (Plainis & Murray, 2000), but the authors in both studies note that due to the perception of luminance differences being logarithmic (i.e., the *Weber-Fechner Law*) and due to the artificial nature of these psychophysics studies, the reliability of these values is to be questioned. One of the main issues is that the majority of psychophysics studies use threshold detection, which involves conscious awareness. However, electrocortical processing studies such as those reported here do not necessarily involve conscious processing, and there are few studies that examine subliminal processing of luminance shifts. In fact, a study that used ERPs to examine the processing of luminance differences failed to find significant effects when comparing the processing of bright (15.5 foot-lambert) verses dim (0.4 foot-lambert) stimuli (Johannes, Münte, Heinze, & Mangun, 1995). As Johannes et al., failed to find significant differences in the processing of simple stimuli with over a 15 foot-lambert difference between them, it is problematic to understand how stimuli with approximately only a 0.7 foot-lambert difference between them for only 20ms at stimulus onset can have such a significant impact upon global electrocotrical processing. Additionally, a pure luminance processing effect is an elementary feature of a stimulus and should theoretically have an effect on only relatively early components – not on something as comparatively late as face processing (see Allison et al., 1999).

Therefore the findings presented here offer an interesting problem to parapsychologists, psychophysicists and cognitive neuroscientists. The problem for parapsychology is that ideally these experiments need to be repeated – controlling for any potential luminance differences – in case these

[19] It should be noted that this potential artifact is related specifically to the electrocortical methods utilised in this paper. As previous research into remote staring detection has used either behavioural measures or measures of electrodermal activity, this particular artifact could not have had an impact upon previous experiments in this area.

results do not represent an artifact and remote staring detection *does* have an impact upon global electrocortial processing of other stimuli. For psychophysics, these results may demonstrate the complexity of basic luminance differences and the possibility of examining these using "below-threshold" detection methods. Finally, for cognitive neuroscience, these results open the possibility that the well-published effects noted in basic face and object processing may be confounded by very small differences in the luminance levels of different stimuli.

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FEELING THE FUTURE III: ADDITIONAL EXPERIMENTAL EVIDENCE FOR APPARENT RETROACTIVE INFLUENCES ON COGNITION AND AFFECT

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ABSTRACT

Three experiments are reported that take well-established psychological effects and "time-reverse" them so that the usual stimulus procedures occur *after* rather than *before* the individual responds. The psi hypothesis is that those procedures can influence the responses *retroactively*. In the first experiment, "Precognitive Approach/Avoidance," participants were shown two matched pictures on a computer screen and asked to indicate which they preferred. The computer then randomly selected one of the two pictures to be the "target." When the participant preferred the target-to-be, a pleasant picture was flashed subliminally on the screen 3 times; when he or she preferred the non-target, an unpleasant picture was flashed. This was repeated for 36 trials. Several analyses confirmed that participants selected targets significantly more often than non-targets, thereby successfully avoiding being exposed to the subliminal unpleasant pictures. Participants who scored above the midpoint on a measure of Novelty Seeking were particularly successful. The second experiment examined "Retroactive Priming." In a typical affective priming experiment, participants are asked to judge as quickly as they can whether a picture is pleasant or unpleasant, and their response time is measured. Just before the picture appears, a positive or negative word (e.g., *Beautiful, Ugly*) is flashed briefly on the screen; this word is called the "prime." Individuals typically respond more quickly when the valences of the prime and the picture are congruent (both are positive or both are negative) than when they are incongruent. In our retroactive version of the procedure, the prime appeared after rather than before participants made their judgments. We ran both the standard "forward" priming procedure and the retroactive priming procedure in the same session. The standard procedure produced the usual result: Participants were on average 21 milliseconds faster on congruent trials than on incongruent trials, $t(96) = 4.00$, $p = .00006$, ES(r) = .38. The retroactive procedure also yielded the predicted psi effect. Participants were on average 15 milliseconds faster on congruent trials than on incongruent trials, $t(96) = 2.42$, $p = .009$, ES = .24. In the third experiment, "Precognitive Memory," participants were shown 48 common nouns one at a time on the screen for 3 seconds. They were then given a (surprise) recall test in which they were asked to type all the words they could recall in any order. The 48 words were drawn from 4 categories of 12 words each: Foods, Animals, Occupations, and Clothes. After the recall test, the computer randomly selected 24 of the words to serve as "practice" words. The participant was shown the list of practice words and asked to click on all the food words and then to retype them. This practice drill was repeated for the words in each of the 3 other categories. The results showed that participants recalled more of the practice words than the control words, $t(99) = 1.92$, $p = .03$, ES = .19. Again, participants defined as high in Novelty Seeking were significantly more successful than other participants $t_{diff}(98) = 3.25$, $p = .0009$.

INTRODUCTION

The term *precognition* typically denotes conscious cognitive knowledge of some future event that could not be anticipated through normal inferential processes. Accordingly, it is a special case of a more general phenomenon, the anomalous, retroactive influence of a future event on an individual's current responses, whether those responses are cognitive or affective, conscious or nonconscious. One experimental strategy for investigating such retroactive influence has been to "time-reverse" well-established psychological effects so that the stimulus procedures occur *after* rather than *before* the individual responds. This is illustrated by the well-known presentiment experiments in which physiological responses to emotionally arousing stimuli are shown to occur a few seconds before the

stimuli are presented (see Radin, 2006, pp. 161-180, for a review of these studies). Similarly, my own "Retroactive Habituation" experiments demonstrate that an individual's preferences for emotionally arousing pictures can be influenced by future repeated presentations of those same pictures (Bem, 2003, 2005).

In this article, I report on three additional time-reversed psychological effects: Precognitive Approach/ Avoidance, Retroactive Priming, and Precognitive Memory.

EXPERIMENT 1: PRECOGNITIVE APPROACH/AVOIDANCE

One of the most fundamental empirical generalizations in psychology is the Law of Effect. Organisms will approach or be attracted to stimuli that have been associated with positive reinforcement in the past and avoid stimuli previously associated with punishment. The precognitive approach/avoidance experiment tests whether individuals will prefer stimuli that will be associated with positive reinforcement in the *future* to stimuli that will be associated with punishment.

Method

One hundred Cornell undergraduates, 107 women and 43 men, participated in individual sessions run by six different undergraduate experimenters. Upon entering the laboratory, the participant was told that

> This is an experiment that tests for ESP (Extrasensory Perception). The experiment is run entirely by computer and takes about 15 minutes. First you will be asked to answer a few questions about yourself. Then, on each trial of the experiment you will be shown a picture and its mirror image side by side and asked to indicate which image you like better. The computer will then flash a masked picture on the screen. The way in which this procedure tests for ESP will be explained to you at the end of the session.

The participant was then seated in front of the computer. After answering a few personal questions, the participant was given a 3-minute relaxation period during which the screen displayed a slowly moving Hubble picture of the galaxy while peaceful new-age music played through stereo speakers. Then, on each of 36 trials, the participant was shown a low-arousal, emotionally neutral picture and its mirror image side by side and asked to press one of two keys on the keyboard to indicate which image he or she preferred. Using an Araneus Alea I hardware-based random number generator (RNG), the computer then designated one of the two images as the "target." If the participant had preferred the target-to-be—defined as a "hit"—the computer randomly selected a highly arousing, positively valenced picture and flashed it subliminally on the screen 3 times; if the participant had preferred the non-target, the computer flashed a highly-arousing, negatively valenced picture. New positive and negative pictures were randomly selected for each trial.

All pictures were selected from the International Affective Picture System (IAPS; Lang & Greenwald, 1993), a set of 820 digitized photographs that have been rated on 9-point scales for valence and arousal by both male and female raters. Exposure time for each flash was 33 ms followed immediately by a masking stimulus for 167 ms. Time between flashes was 500 ms. A Hubble photograph of the galaxy appeared on the screen for 3000 ms before the onset of the next trial.

The final screen told the participant the percentage of trials on which he or she selected the target picture. The psi prediction is that participants will prefer the target to the nontarget on significantly more than 50% of the trials.

The pairs of neutral pictures were presented in a fixed order for all sessions, and the RNG determined the left/right placement of the two images. For the first 100 sessions, the flashed positive and negative pictures were separately selected and sequenced randomly, as described above. A different procedure was used for selecting the positive and negative pictures in the following 50 sessions. Based on the data from the first 100 sessions, the positive and negative pictures were put in a fixed sequence

ranging from the most successful to the least successful (i.e., positive pictures "chosen" most often to least often and negative pictures "avoided" most often to least often). If the participant selected the target, the positive picture was flashed subliminally and the unflashed negative picture was retained for the next trial; if the participant selected the nontarget, the negative picture was flashed and the next positive and negative pictures in the queue were used for the next trial. In other words, no picture was flashed more than once, but an unflashed negative picture was retained over trials until it was "chosen" and flashed. The hypothesis was that the earlier trials would be "easier" and the participant might learn over trials how to select the positive picture and avoid the negative picture.

Results

The results from the last 50 sessions did not differ significantly from those obtained on the first 100 sessions nor was there any evidence of sequential "learning" across trials. Accordingly all 150 sessions have been combined for analysis.

To ensure that positive results are not artifacts of particular statistical assumptions or inadequate randomization, the data were analyzed in four different ways. The first analysis was simply a binomial test on the proportion of hits across all trials generated in the 150 sessions, tested against a null of .5. This is a legitimate analysis because the target is selected on each trial by the RNG, and hence the trials are statistically independent even within a single session. A binomial test avoids the distribution assumptions of the more commonly used *t* test.

The second analysis was the one most familiar to psychological researchers, a one-sample *t* test across the individual hit rates, testing against a null hit rate of 50%.

The third analysis protects against any potential systematic bias in the RNG by computing an empirical null baseline for each participant rather than assuming it to be 50%. The output of each session can be conceptualized as a string of 36 left/right decisions made by the participant matched against the corresponding string of 36 left/right target placements generated by the computer. The number of matches between the two strings is the number of hits. An empirical baseline can be computed for each participant by matching his or her decision string against the computer-generated target strings from the other 149 sessions and calculating the associated hit rates. The mean of those hit rates becomes the empirical baseline for that participant. Because any systematic bias in the RNG will affect the null baseline the same way it affects the actual hit rate obtained by the participant, the bias will be subtracted out of the analysis.

The fourth analysis uses an alternative index of psi performance that corrects for unequal frequencies of left/right target placements within each session. The output of a session can be represented by the following 2 x 2 table.

	Target is on Left	**Target is on Right**
Participant Prefers Left	**A (Hit)**	**B (Miss)**
Participant Prefers Right	**C (Miss)**	**D (Hit)**
	(A + C)	**(B + D)**

The usual hit rate is calculated as (A + D)/(A + B + C + D), but if there is a bias in the distribution of left/right target placements, if (A + C) ≠ (B + D), then the hit rate will not necessarily reflect actual psi performance. For example, if the RNG places a majority of the targets on the left and the participant also has a bias favoring images on the left, then the hit rate will be artifactually inflated. (Experimentally forcing equal left/right target placements is not a legitimate corrective for this problem because it destroys the statistical independence of the trials.)

An index that automatically corrects for any bias in target placement is the phi coefficient, the correlation between the participant's left/right preference and the RNG's left/right target designation. Phi ranges from -1 to +1 and is computed by the following equation:

$$\mathbf{Phi = (AD - BC)/\sqrt{(A+B)(C+D)(A+C)(B+D)}}$$

Phi was computed for each participant and a *t* test on phi across participants was calculated. The psi hypothesis is that the mean phi will be significantly above 0.

As Table 1 reveals, all 4 analyses yield comparable results, showing a significant precognitive approach/avoidant effect.[1]

TABLE 1
ANALYSIS OF PRECOGNITIVE APPROACH/AVOIDANCE RESULTS
ALL PARTICIPANTS ($N = 150$)

Binomial across All Trials	Hit Rate% across Participants	Hit Rate% using an Empirical Baseline	Phi Coefficient across Participants
2785/5400 = .516	51.6%	51.7%	.031
	(8.64)	(8.71)	(.172)
$z = 2.31$	$t(149) = 2.23$	$t(149) = 2.37$	$t(149) = 2.23$
$p = .010$	$p = .014$	$p = .010$	$p = .014$
	ES = .18	ES = .19	ES = .18

In other retroactive experiments in our laboratory, a two-item measure of Novelty Seeking has been positively correlated with enhanced psi performance (e.g., Bem, 2005). The two items are: "I am easily bored" and "I often enjoy seeing movies I've seen before" (reverse scored). Responses are recorded on 5-point scales ranging from 1 ("Very Untrue") to 5 ("Very True"). Those scoring above 2.5 on the mean of the two items combined are defined as high in Novelty Seeking. In the current experiment 48 of the 150 participants (32%) were defined as high in Novelty Seeking. Tables 2A, 2B, and 2C show that participants high in Novelty Seeking achieved strongly significant psi performances (2A); participants low in Novelty Seeking did not achieve psi performances significantly above chance (2B); and, the differences between the two groups were marginally significant ($p < .06$) in 3 of the 4 statistical tests and fully significant ($p = .016$) in the analysis that used the phi coefficient as the index of psi performance (2C).

TABLE 2A
ANALYSIS OF PRECOGNITIVE APPROACH/AVOIDANCE RESULTS
FOR PARTICIPANTS HIGH IN NOVELTY SEEKING ($N = 48$)

Binomial across All Trials	Hit Rate% across Participants	Hit Rate% using an Empirical Baseline	Phi Coefficient across Participants
919/1728 = .532	53.2%	53.3%	.074
	(8.28)	(8.25)	(.161)
$z = 2.65$	$t(47) = 2.66$	$t(47) = 2.80$	$t(47) = 3.18$
$p = .004$	$p = .005$	$p = .004$	$p = .001$
	ES =.36	ES =.38	ES =.42

[1] All *p* values in this report are one-tailed.

TABLE 2B
ANALYSIS OF PRECOGNITIVE APPROACH/AVOIDANCE RESULTS
FOR PARTICIPANTS LOW IN NOVELTY SEEKING (N = 102)

Binomial across All Trials	Hit Rate% across Participants	Hit Rate% using an Empirical Baseline	Phi Coefficient across Participants
1866/3672 = .508	50.8%	50.9%	.011
	(8.75)	(8.84)	(.174)
z = 0.99	$t(101) = 0.94$	$t(101) = 1.04$	$t(101) = 0.65$
p = .16	p = .17	p = .15	p = .26
	ES = .09	ES = .10	ES = .06

TABLE 2C
DIFFERENCES IN RESULTS BETWEEN
PARTICIPANTS HIGH AND LOW IN NOVELTY SEEKING

Differences between Proportions of Hits (Fisher's Exact test)	Differences Between Hit Rates%	Differences between Hit Rates% using an Empirical Baseline	Differences between Phi Coefficients
.024	2.4%	2.4%	.063
—	$t(96) = 1.63$	$t(98) = 1.62$	$t(98) = 2.18$
p = .056	p = .054	p = .054	p = .016

EXPERIMENT 2: RETROACTIVE PRIMING

In recent years, priming experiments have become a staple of cognitive and cognitive social psychology (Fazio, 2001, Klauer & Musch, 2003). In a typical affective priming experiment, participants are asked to judge as quickly as they can whether a picture is pleasant or unpleasant, and their response time is measured. Just before the picture appears, a positive or negative word (e.g., *Beautiful*, *Ugly*) is flashed briefly on the screen; this word is called the "prime." Individuals typically respond more quickly when the valences of the prime and the picture are congruent (both are positive or both are negative) than when they are incongruent. In the retroactive version of the procedure reported here, the prime appeared after rather than before participants made their judgments. We ran both the standard "forward" priming procedure and the retroactive priming procedure in the same session. (A similar experiment using both forward and retroactive priming was reported by deBoer and Bierman, 2006.)

Method

One hundred Cornell undergraduates, 69 women and 31 men, participated in a 15-20 minute experiment in which they were shown a picture on each of 64 trials and were asked to press one of two keys on the keyboard as quickly as they could to indicate whether the picture was pleasant or unpleasant. The participant's response time in making this judgment is the major dependent variable, and the difference in mean response times between incongruent and congruent trials is the index of a priming effect, with positive differences denoting faster responding to congruent trials.

The first 32 trials constituted the retroactive priming procedure, and participants were told that a word would be flashed on the screen just after they made their decision. The remaining 32 trials constituted the standard "forward" priming procedure, and participants were told that "from this point on, the flashed word will appear before rather than after you have made your response." Prior to

beginning the actual experimental procedure, participants first answered a few questions about themselves and were then given the 3-minute relaxation period described in the experiment reported above.

The pictures were all drawn from the IAPS set, also described above, and were randomly assigned to the forward and retroactive sections of the protocol, with the restriction that an equal number of positive and negative pictures appeared in each section. The same 32 prime words appeared in both sections but were randomized within each section. Accordingly, congruent trials and incongruent trials are randomly sequenced and do not necessarily occur in equal numbers.

Shown below is the time sequence of events for the Forward Priming and Retroactive Priming trials, respectively. In both procedures, there is a 2000 ms blank-screen interval between trials.

Forward Priming Trial

Stimulus	Fixation Spot	Prime	Blank	Picture	Starry Sky
Time (ms)	1000	150	150	Response Time	2000

Retroactive Priming Trial

Stimulus	Fixation Spot	Picture	Blank	Prime	Blank	Starry Sky
Time (ms)	1000	Response Time	300	500	1000	2000

Results

Several conventions for analyzing response-time data from priming experiments have evolved over the years, and these have been adopted here. First, response times shorter than 250 ms or longer than 2500 ms are regarded as outliers and are excluded from the data analysis, as are trials on which the participant made an error in judging the picture to be pleasant or unpleasant (the median number of errors was 3 out of 64 trials). Three participants were discarded because they made errors on more than 16 (25%) of the trials, bringing the final number of participants to 97. Finally, because response-time data are positively skewed, all response times are log-transformed prior to analysis.

The standard priming procedure produced the usual result: Participants were on average 21 milliseconds faster on congruent trials than on incongruent trials, $t(96) = 4.00$, $p = .00006$, ES = .38. The retroactive procedure also yielded the predicted psi effect. Participants were on average 15 milliseconds faster on congruent trials than on incongruent trials, $t(96) = 2.42$, $p = .009$, ES = .24.

EXPERIMENT 3: PRECOGNITIVE MEMORY

In Lewis Carroll's (1899) *Through the Looking Glass*, the White Queen explains to Alice that the inhabitants of her land are precognitive (although she doesn't use that word). She claims that "memory works both ways" in her land and that she herself remembers best "things that happened the week after next." When Alice says that "I'm sure mine only works one way…I can't remember things before they happen," the Queen remarks, "It's a poor sort of memory that only works backwards."

Inspired by the White Queen's claims, the Precognitive Memory experiment examines the claim that memory can "work both ways" by testing whether receiving practice on a set of words makes them easier to recall—even if the practice takes place after the recall test is given.

Specifically, participants were first shown a set of words and then given a free recall test of those words. They were then given a set of practice drills on a randomly selected subset of those words. The psi hypothesis is that the practice drills will retroactively facilitate the recall of those words, that participants will recall more of the to-be-practiced words than the unpracticed "control" words.

Method

One hundred Cornell undergraduates, 64 women and 36 men, participated in individual sessions run by six different undergraduate experimenters. Upon entering the laboratory, the participant was told that

> This experiment tests for ESP by administering several tasks involving common everyday words. The experiment is run completely by computer and takes about 20 minutes. The program will give you specific instructions as you go. At the end of the session, I will explain to you how this procedure tests for ESP. [Note that the participant is not told that the experiment involves a memory test.]

Participants were then seated in front of the computer and, after answering a few questions and going through the 3-minute relaxation procedure described above, were shown 48 common nouns one at a time for 3 seconds each. These words were in the same fixed order for all participants. They were asked to visualize the referent of each word (e.g., if the word was *tree*, they were to visualize a tree). They were then given a (surprise) free recall test in which they were asked to type all the words they could recall in any order.

The computer then randomly selected 24 of the words to serve as practice words, with the remaining 24 words serving as no-practice "control" words. The 24 practice words all appeared together in a randomized list on the screen. The participant was informed that the words were drawn from 4 categories (foods, animals, occupations, and clothes) and asked to click on the 6 food words in the list (which turned red when clicked) and then to retype those words into 6 empty slots on the screen. The list was re-scrambled and the same task was repeated for each of the other 3 categories of words. In all, the participant was required to scan the list of practice words 4 times, to click on the 6 words in each category, and to type out each of the 24 words.

Results

The main dependent variable in this study is a weighted Precognitive Memory (PM) score, defined as the difference between the number of practice words recalled and the number of control words recalled multiplied by the participant's overall recall score. This gives more weight to participants who "contributed more trials" (recalled more words) and is conceptually analogous to the practice of weighting studies by their sample sizes in meta-analyses. For descriptive purposes, the PM score is expressed as a percentage of 576, the maximum possible PM score—which can be achieved by recalling all 24 practice words and none of the 24 control words. Accordingly, PM scores can range from -100% to 100%, with 0% indicating that equal numbers of practice and control words were recalled. As shown in Table 3, there is a significant precognitive memory effect for all participants, with those high in Novelty Seeking again showing a significantly bigger effect than other participants.

TABLE 3
DIFFERENCES BETWEEN PRACTICE AND CONTROL WORDS RECALLED PRIOR TO PRACTICE

All Participants	**Participants High in Novelty Seeking**	**Participants Low in Novelty Seeking**	**Difference between High and Low Novelty Seeking Participants**
2.3%	6.5%	-.90%	7.36%
(11.79)	(11.28)	(11.26)	(21.59)
$t(99) = 1.92$	$t(42) = 3.76$	$t(56) = -0.60$	$t(90) = 3.25$
$p = .029$	$p = .0003$	*ns*	$p = .0008$
ES = .19	ES = .50	ES = -.08	—

Although no control group is needed for this experiment, we ran 25 control sessions interspersed among the experimental trials, with the experimenter remaining uninformed as to condition. In these

sessions, the computer still randomly selected a 24-word practice set, but the practice drills were not actually administered. This enables us to check that it is the actual practice that produces the psi effect, not just the existence of a designated practice subset that participants might be able to access clairvoyantly. As expected, the mean PM score from control sessions did not differ from zero (0.26%), $t(24) = 0.13$, *ns*. For participants high in Novelty Seeking, the mean psi score was actually negative (-.09%), $t(10) = -0.02$, *ns*.

Somewhat surprisingly, overall recall was not lower in the control sessions than in the experimental sessions nor was there any less "clustering" of words from the same category in the control sessions. ("Clustering" is a spontaneous effect observed in free recall studies in which recalling a word from a particular category (e.g., foods) is more likely to be followed by recalling another word from the same category than by a word from a different category). Because the practice drills in the experimental sessions alert participants to the fact that the words come from 4 distinct categories, they might be expected to show more clustering than participants in the control sessions. This was not the case, however.

DISCUSSION

Substantively, the three experiments reported here join my previously reported experiments on Retroactive Habituation (Bem, 2003) and Precognitive Aversion (Bem, 2005) as part of a series of studies that use time-reversed versions of well-known psychological effects to demonstrate anomalous retroactive influences on cognition and affect. But there is also a strategic agenda behind the research program.

The holy grail for many psi researchers has long been straightforward, transparent laboratory demonstrations of psi that could be replicated by any competent experimenter—including a skeptical one—using participants drawn from the general population. Discovering such replicable psi effects and developing protocols that facilitate independent replication have thus been primary strategic goals of this research program and have informed its methodological features. In particular, the experiments are designed to be as simple as possible, requiring no instrumentation beyond a desktop computer, taking less than 30 minutes to complete, and utilizing statistical analyses no more complex than a binomial test across binary choices or a *t* test across participants.

Complete replication packets for both Macintosh and Windows-based computers are available by request to anyone who wishes to try to replicate one or more of the studies or simply to examine the protocols more closely. Each replication packet contains the compiled program for the target platform, a detailed Instruction Manual, including the Experimenter's Script, a standalone Filemaker database for collecting and analyzing the data, and sample recruiting and consent forms. Those familiar with object-oriented computer programming can request copies of the REALbasic source code.

A word about random number generators. Most of the experiments in our laboratory use the hardware-based Random Number Generator (RNG) manufactured by the Araneus Company in Finland; if the program detects the presence of this RNG, it will use it. Otherwise it will use an internal software RNG that has passed the same rigorous mathematical tests for randomness as the Araneus RNG. Thus, those who wish to replicate our studies need not buy a hardware RNG to do so.

Software RNG's (sometimes called pseudo random number generators or PRNG's) utilize a mathematical algorithm to generate each subsequent number from the previous number, and the sequence of numbers is random only in the sense that it satisfies certain mathematical tests of randomness. It is not random in the sense of being indeterminate because once the initial starting number (the "seed") is set, all future numbers in the sequence are fully determined. Accordingly, one cannot do a pure precognitive experiment with a PRNG because the computer "knows" the upcoming number ahead of time, and a participant could in principle access that information clairvoyantly. In contrast, a hardware-based or "true" RNG is based on a physical process, such as radioactive decay or diode noise, and the sequence of numbers is indeterminate in the quantum mechanical sense. (Of course,

true RNG's can in principle be influenced by PK, whereas pseudo RNG's cannot be once the "seed" is determined.) With all that said, however, we have obtained positive results in our experiments using both types of RNG.

Experimenter Effects. As most psi researchers know one of the major obstacles to replication in this field is the influence of the experimenter on the results. My strategic approach to this problem has been to design experiments that minimize the role of the experimenter as much as possible, reducing him or her to a friendly greeter and leaving it to the computer program to provide standardized instructions to the participants. I deliberately use several undergraduate experimenters in each experiment, and I train them only loosely. I want the experimental protocols to be robust enough to overcome individual differences among experimenters so that the protocols have a better chance of surviving replications in other laboratories. All this is predicated on the assumption—the hope—that experimenter effects (and decline effects) are "merely" psychological, that they are not entangled with the principal investigator's own psi ability or retroactively influenced by observations of the results by future observers. If this assumption is false, then the present strategy is not likely to succeed. And I must admit that there is something oddly perverse about trying to deny the existence of anomalous psi influences on experiments designed to demonstrate anomalous psi influences.

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CONSCIOUSNESS INDUCED RESTORATION OF TIME-SYMMETRY (CIRTS), A PSYCHOPHYSICAL THEORETICAL PERSPECTIVE

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ABSTRACT

A theoretical framework is proposed that starts from the assumption that information processing by a brain, while it is sustaining consciousness, is restoring the break in time-symmetry in physics. No specifics are given with regard to which physical formalism, either quantum or classical, is at the basis of the subsequent apparently anomalous consequences. 'Apparent' because the proposed model doesn't require a radical extension or modification of existing physics. Rather it is argued that time-symmetry that is already present in current physics should be taken seriously and a simple initial mathematical formulation is given that allows for specific quantitative predictions. The elusiveness of psi phenomena, the experimenter effect, as well as the relation to other theoretical frameworks like Decision Augmentation Theory (DAT), Observational Theory (OT) and several others are discussed. One of the major advantages of CIRTS is that it offers handles to link this theory to psychological theories that might explain individual differences. Specific testable predictions are given.

1. INTRODUCTION

According to Popper (1934), substantial progress in science is obtained if theories are rejected. This argument is often used to justify the study of anomalous phenomena. However in practice most research in most sciences follows a different path where probabilistic induction, often resulting in seeking support for a theory, is sought. Although Popper has been harshly criticized, there is no doubt that seeking support of a theory does result in slower progress than refuting a theory, but this is only true if one can come up with a better theory accommodating the new data.

The progress of Parapsychology has been frustrated by the fact that after rejection of the main stream theory that all 'so called paranormal' phenomena could be explained by errors there were no generally accepted theories from which precise *falsifiable* psychological hypotheses could be derived. DAT predicted a relation of effect size with number of observations dependent on how many human decisions were involved in getting the end result. This prediction differed for RNG-PK from force-like models but did not in principle conflict with other information-based models like Observational Theories that attributed the results to instances of (meaningful) observation. The ensuing discussion about what the data actually showed, illustrates that these models lack specificity with regard to the underlying processes (Dobyns, 1993). The majority of paranormal researchers, often psychologists, are oblivious to the specialized quarrels of a few physicists and continue to find *supporting* evidence for a kind of 'magical' world view where things happen that cannot happen, even when these researchers are doing process-oriented work. The processes that are investigated are generally based upon some intuitive notion or a haphazard finding in previous work and not on a theory.

Since the psi phenomena are labeled anomalous because they *appear* to be in conflict with our present day **physical** world view, any fundamental psi theory should be an extension or a modification of **physics**. Psychology is not in conflict with psi phenomena per se, so although psychological theories like Stanford's PMIR are useful when speculating how to optimize effect size, such psychological theories do not touch upon the apparent anomalous character of psi.

Extension and modification of physical theories have been proposed by Walker (Walker,1975) and later Millar and Hartwell (1979) and Houtkooper (1983), Kornwachs and von Lucadou (1985), Josephson and Pallikari (1991), May et al. (1995) and most notably for the present proposal, a framework based upon timesymmetric thermodynamics by Donald and Martin (1976). Although originally developed to explain the genesis of forms in biology also 'Morphogenetic Field theory' can be considered as a theory that could assimilate (some) paranormal phenomena (Sheldrake, 1988).

Observational Theories (Walker, 1975) assume that the act of observation 'injects' information in the observed system, independent of time and space. This approach showed that it was possible to unify all psi phenomena in one theoretical framework. The correlations found in telepathy, clairvoyance, precognition and PK experiments all were supposed to be produced via the observation of the correlation, i.e. upon feedback. The OT's were based upon a special unpopular solution of the measurement problem in physics, a position that gave a special status to an observer. Thus these theories are intrinsically dualistic.

In the present proposal the focus is upon 'time' rather than 'information' although the two are related through the second law of thermodynamics. Like the OT's the present theory claims to unify all psi phenomena.

Based upon converging evidence from many different experimental paradigms, most notably presentiment, it will be proposed to take seriously the fact that most physical formalisms, like for instance electromagnetic theories, are inherently time-symmetric. Although in physical systems time-symmetry is not observed, it will be proposed that conscious observation does remove part of the constraints that prohibit time-symmetry to occur.

This framework results in straightforward hypotheses that can easily be tested.

2. THE DATA: EXPERIMENTAL TIME ANOMALIES

Precognition

Very many case reports in the old psi literature concern precognitive dreams (Gurney et al., 1886). In 1927 Dunne wrote a book 'An Experiment with Time' in which he described not only many experiences but also gave a theoretical framework (see: http://en.wikipedia.org/wiki/An_Experiment_with_Time). One of the most interesting cases in that book has hardly been noticed in the modern parapsychological literature. It concerns a dream in which a specific number of victims of a disaster appears in a dream. This number is later confirmed in a report in a daily newspaper. Many years later, Dunne while doing further research on the case, finds out that the number mentioned in the newspaper was incorrect. The actual number of casualties was much larger. The conclusion Dunne drew was that the precognitive dream was not on the disaster itself but on the feedback he got from the newspaper! More recently, in a remote viewing trial, the psychic Pat Price described a target location as it was on the old picture that was given as feedback while the actual target had changed after this picture had been taken (Targ, private communication).

Among the para-psychological meta-analyses databases there is a less well-known but very significant meta-analysis concerning precognitive card guessing (Honorton & Ferrari, 1989). Precognition seems to violate one of the basic assumptions of western science namely the assumption of 'causality'. The temporal order of cause and effect appears to be reversed.

Retroactive PK

Immediately after the first publication of the original Observational Theory (Walker, 1975) it was realized that this theory unified all psi phenomena by introducing the idea of retro-active psychokinesis. ESP phenomena, including precognition, were then accommodated by assuming retroactive PK at the moment of feedback on the brain state back in time when it was producing a call. Psychokinetic effects were all retro-active PK effects directly on a system having some quantum randomness as a determinant

of its behavior. The concept of retro-active Psychokinesis was ill chosen and caused a lot of confusion because the label suggested that the past could be changed. Rather there was a 'spooky correlation at a distance (in time)' whereby future and past conditions seemed to participate in a handshake that would determine the present.

Such a process should have been described as the present being contingent on future conditions, these conditions mostly being future mental states.

This phenomenon had been predicted by the Observational Theory before it ever was observed. This was the first sign that theory building in parapsychology had reached a mature state. Indeed retro-active PK experiments were done and in a review of all this work it was concluded that the effects were as strong if not stronger than in real-time PK experiments (Bierman, 2004).

Presentiment and Ganzfeld

In 1978 John Hartwell published the results of an experiment where he measured EEG activity in a cued selection task where the random stimuli consisted of a happy or sad face (Hartwell, 1978). He found (non significant) differences in the CNV preceding feedback. Since the result was non significant it took another 15 years before Dean Radin attempted a conceptual replication (Radin, 1997) using skin conductance rather than EEG. The power in this replication was much larger and the results showed a clear and significant difference in psycho-physiological behavior dependent on the future randomly chosen stimulus. The effect was labeled as 'presentiment'. Since then many conceptual replications have been undertaken. Dependent variables that have been used are Evoked Potentials (EEG), Continuous Negative Variation (CNV), BOLD (fMRI), Inter Beat Interval (ECG), Eye Movements, Eye Blinks, Pupil Dilation and Blood pressure. Stimuli that have been used were emotional and neutral pictures from the International Affective Picture System, loud and pleasant sounds, and a winning or losing simulated slotmachine. In all these cases significant results were obtained. There hasn't been a formal meta-analysis done yet but a good estimate is that significant results are obtained in 50% of the experiments.

Incidental observations of the noisy skin conductance at the trial level showed a remarkable form symmetry before and after the stimulus. For instance if the response showed a double bump there appeared to be also a double bump, though smaller in amplitude, before the stimulus. Double response bumps for instance may occur when a picture shows a lot of redness but it takes some time to find out what really causes all that color (perhaps blood). Of course these anecdotal observations are just what they are, anecdotal and therefore only have value for hypothesis- or model-generation (see 7. Predictions).

Other Time Reversal Paradigms

Presentiment can be seen as a simple time reversed stimulus-response paradigm. Actually one of the big advantages of this approach is that the experiments are identical to normal experiments in the field of emotion research with psycho-physiological variables. This time reversal idea has been extended to other standard paradigms in experimental psychology. Thus, we have retro-priming (de Boer & Bierman, 2005) where the prime is exposed after the response is recorded but nonetheless this affects the response to the target. Time reversed habituation where habituation by repetitive exposure of a picture seems to affect the judgment of the same picture at an earlier time (Bem, 2007) has also been reported. In one of the most successful Ganzfeld studies (Wezelman et al., 1997) an explicit retro-strategy was used. In this study there were no 'senders'. Rather the receivers after the Ganzfeld session was over focussed on the actual target trying to transfer the contents to their brain backward in time. Of course, judging was then later performed by independent judges. Actually also normal Ganzfeld can be interpreted in this way. In an early Ganzfeld experiment the hypothesis was that due to retro-PK the original protocol produced by the 'receiver' would contain elements of ALL targets in the target set that was observed by that receiver later. Indeed it was found that independent judging of the whole target-set

against the protocol (compared with a randomly choosen control target set) provided suggestive evidence for psi on the whole set (Bierman, 1988).

Time symmetry in main stream data

As has been noted, the presentiment paradigm is identical to most mainstream stimulus-response experiments with psycho-physiological variables such as they occur for instance in emotion research. Thus it should be easy to locate similar effects in mainstream data. However randomization in mainstream is mostly of the form of 'randomization without replacement' in order to keep some counterbalancing and have all cells in a design equally populated. This prevents strong conclusions when analyzing the data because 'randomization with replacement' is therefore required. Subjects generally pick up quickly on the distribution of trials over the conditions and start to guess what the condition of the forthcoming trial will be. One could say they fall into the trap of the gambler's fallacy but alas in the case of the generally used 'randomization without replacement' this is no trap but gives the subject an above chance possibility of guessing the next stimulus condition. Nonetheless two datasets of main stream research could be analyzed and in both indicators of presentiment, cautiously called anomalous baselines, could be assessed, be it with the caveat that possibly they could be explained by weak randomization (Bierman, 2000 on Bechara et al., 1997 and Glöbisch et al., 1999). Recently main-stream neuroscientists themselves point out that the brain behavior preceding stimuli or events seem to correlate with the type of event that will follow later. Although causal explanations are not totally excluded these phenomena do puzzle these researchers, and one of them even 'confessed' that time-symmetry looked like a more natural explanation of his data (Lamme, 2008, private communication). It concerns phenomena as diverse as: monkey brains indicating what the movement of an ambiguous stimulus will be (about 3 seconds before stimulus onset; Naotsugu Tsuchiya, 2008), subjects performing a voluntary choice between two alternatives (about 10 seconds before decision; Soon et al, 2008), TMS induced percept doubling where the illusory percept seems to act as a prime (Joly & Lamme, submitted). Other TMS induced apparent retrocausal effects in a Libet paradigm (Lua et al, 2008). Pupil dilation (Einhauser et al, 2008).

3. TIME SYMMETRY IN PHYSICS

Almost all formalisms in physics are time-symmetric. Give a specification of the initial conditions solving the equations generally results in two solutions which are identical but reflected in time: $S(t) = S(-t)$. This holds for classical particle mechanics, electromagnetic theory and depending on the type of formulation/interpretation also for quantum physics. In the transactional formulation of quantum physics this is most obvious. Formulations of quantum physics that interpret the projection postulate as a collapse of the wave function possibly introduce a break of time symmetry at the point of collapse. It should be noted at this point that several authors (Bierman, 1988; Costa de Beauregard, 1998) have already argued that, due to this fundamental time-symmetry, paranormal phenomena are natural and SHOULD be expected as a part of physics.

Thermodynamics or more generally formalisms that deal with ensembles like statistical mechanics, seem to be the only exception although several authors have argued this is only due to boundary conditions (Price, 1996). In thermodynamics it is postulated that closed dynamical systems always develop with time in such a way that the structure in the system becomes smaller.

Thus a film of the trajectory of a (frictionless) billiard ball can be played forward and backward without anyone being able to discriminate between the two. This certainly doesn't hold for dissolving a sugar cube in hot tea. Actually IF time would run backward in a thermodynamic system one would observe this as an increment in structure. For instance one could observe a sugar cube arising from a sweet solution by just stirring that solution.

EM theory, Wheeler & Feynman

Although most physicists assume that the solution S(-t) of the physical formalisms is in some way forbidden, and in spite of the fact that this solution apparently has never been observed in physical systems, some theoretical physicists, most notably Wheeler and Feynman (1945) have tried to find a reason why this solution seems to be forbidden rather than impose the restriction ad hoc.

Wheeler and Feynman focused on classical electromagnetic theory because there thermodynamic effects related to temperature are irrelevant. So the question they tried to answer was 'why do we observe a (retarded) wave going from an electromagnetic transmitter outward in space and forward in time, while we don't observe a collapsing (advanced) wave coming from far to the transmitter (acting then as an absorber) going backward in time'?

After a thorough analysis they suggested that this asymmetry is due to the cosmos being far out of equilibrium. More specifically, they postulated that there was an extreme imbalance between the number of multiple particle coherent (quantum) transmitters, like lasers, and the equivalent multiple particle and coherent absorbers (of EM radiation). Possibly a substrate known as Bose-Einstein condensate could be called a multiple particle coherent absorber. It should be remarked that Price (1996) argues that the Wheeler-Feynman treatment of time-symmetry was circular because by using the concepts of transmitter and absorber they subtly introduced some 'preferred' time direction to begin with. Price also deconstructs suggestions where the boundary condition of the Big Bang has been used to explain the fact that retarded solutions are totally dominant. The conclusion must be that this the reason for the breaking of time-symmetry is still a controversial issue. However the very reason that serious efforts have been made in theoretical physics to 'explain' which conditions do result in this asymmetry suggests that there are also conditions under which the symmetry might partially be restored.

4. CONSCIOUSNESS INDUCED RESTORATION OF TIME SYMMETRY (CIRTS)

The fundamental speculation

The fundamental assumption of CIRTS is that the brain, when it sustains consciousness, is such a special system that partially restores time-symmetry and therefore allows 'advance' waves to occur.

It should be stressed that this fundamental assumption does NOT violate any physics as we currently know it. The only thing it does, is that solutions that are allowed by the formalisms but were never observed might be observed under special conditions involving consciousness. Note further that it is not the brain per se that is supposed to be a time symmetry restoring condition but only the brain that sustains consciousness. One of the big mysteries in consciousness research has always been that different brain regions do process different aspects of an object, like color, form and movement. Nonetheless the conscious percept is an inseparable whole. Global and *coherent* synchrony in firing has been proposed as a mean to bind these different aspects again into a whole. Therefore we propose that coherence is a crucial moderating variable.

The basic assumption can further be specified by assuming that the restoration of time symmetry is proportional to some global coherence measure that also incorporates the brain volume involved in this coherence (Singer, 1999).

Thus if we present a stimulus to a subject then the 'normal' solution of the physics that eventually results in a skin conductance measure might yield a signal S = f(t) (see figure 1).

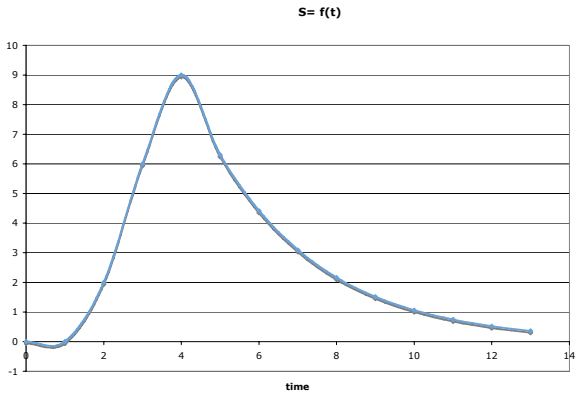


Figure 1. A typical skin conductance response. Time=0 corresponds to stimulus onset.

However if the stimulus is observed consciously time-symmetry will kick in and:

S = f(t) + A * f(-t) [1]
A = Relative-Coherence * Brain-volume/ (total-Brain-Volume) [2]

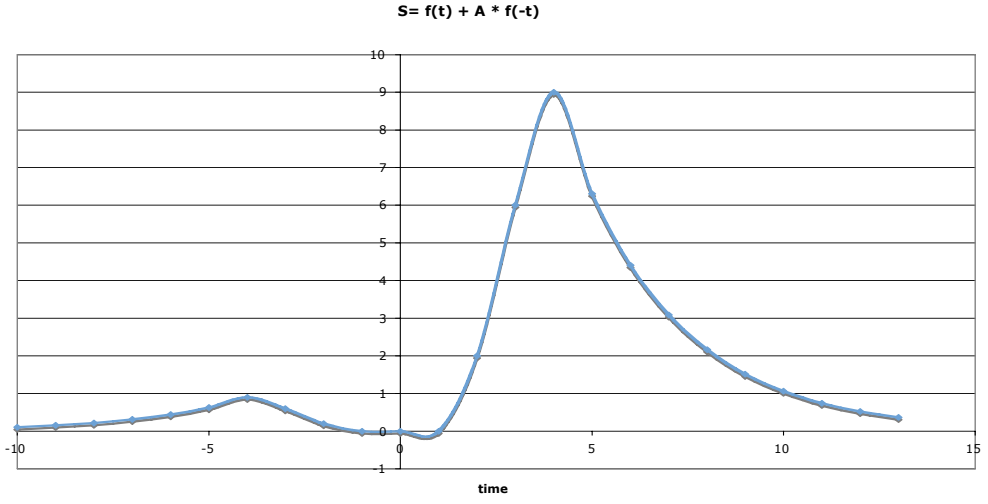


Figure 2. The theoretical skin conducance before stimulus onset is a weighted mirror image of the signal after stimulus-onset (A was set to 0.1)

This set of formula reflects the fundamental assumption which results in an time-symmetric term in [1], basically the physical part. But [2] offers a link for psychological considerations. For simplicity reasons we assume that A is not very dynamic and does not change a lot over time. This is of course an oversimplification most notably the effect of the stimulus might be a reduction in this coherence measure immediately upon the stimulus is exposed to the subject. Coherence measures can be derived objectively from EEG measures while the Brain Volume involved can be assessed using fMRI. Thus this simple approach allows us to calculate the expected signal over time using objective measures. Also it generates a simple principle: *What happens after, happens before.*

The fact that we use skin conductance as an example might seem confusing because that type of signal is delayed with respect to neural functioning. However the model that we propose where time symmetry is restored, is not limited to neural signals. All underlying physical processes are assumed to

be susceptible. Even if these processes are not neural at all. The neural aspect is brought in as the *source* of the restoration of time-symmetry, a coherent conscious experience.

In general, we argue that the dynamic characteristic of the 'advanced' part will mimic those of the 'retarded'. If we deal with a 'Slow' signal that peaks for instance 4 seconds after a conscious event we might expect the retarded part to peak about 4 seconds before the conscious event. And if the 'retarded' signal lasts a week we might expect the 'advanced' signal to start a week before the (consciously experienced) event. So it allows us to make precise predictions which will be discussed in 7.

Consciousness as the crucial variable

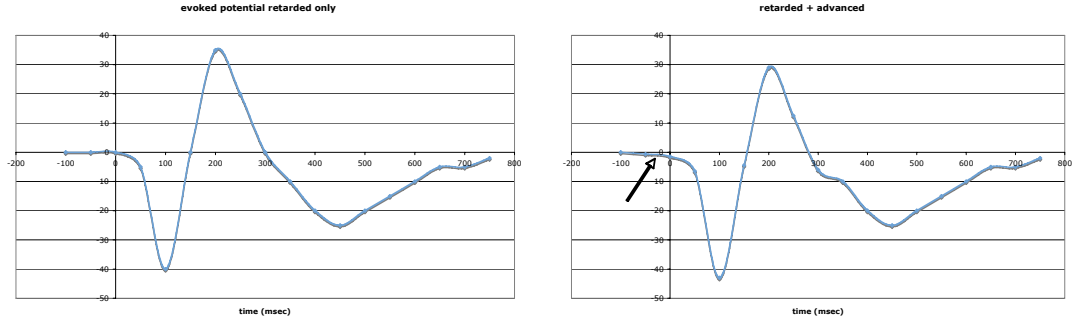
In an unpublished pilot study on presentiment with short exposure times of pictures using skin conductance it was found that no presentiment effects occurred with 100 msec masked exposures when the subject was unable to report the contents of the picture. This suggests that conscious experience is a crucial condition for presentiment to occur.

The time-symmetry point.

To arrive at more precise predictions we therefore add that the supposed time-symmetry is not around the moment of exposure but around the moment of conscious experience. This is according to Libet's famous experiments about 400 msec later (Libet, 1979). The symmetry formula becomes: $S(t+400) = S(-t+400)$. The part of the original signal that is not experienced consciously ($0<t<400$) will not be reflected in time. The consequences for the example given above with the skin conductance are not dramatic. The presentiment peak shifts about 800 msec closer to exposure time.

If the response peak is at 4000 msec then the presentiment peak is expected to be found around -3200 msec.

However for other faster psycho-physiological signals using for instance t=350 msec as mirror point has dramatic effects. In figure 3a a typical evoked potential is given. In fig 3b the theoretical sum of the normal and the time-symmetric component, as calculated from the formula [1], is given.



Figue 3. Example of evoked potential (a:left) and the same potential with the advanced component added (b:right).

The advanced part of that signal only contains a mirrored N350 component. Depending on the width of the N350 component and the difference between two stimulus conditions we might expect a small effect just preceding stimulus onset. The half width of the N350 has to be larger than 400 msec. In this evoked potential simulation we used an 'A' value of 0.3 rather than the value of 0.1 we used for skin conductance above. But even so the effect of the advanced solution BEFORE stimulus onset (arrow) is hardly observable. Adding the advanced component does also change the form of the evoked potential as well as the peak amplitudes but that is after stimulus onset and therefore is not analyzed when looking for presentiment.

Time paradoxes: Does time-symmetry imply retro-causation?

Time-symmetry actually does not imply that one can 'change the past'. Rather at any moment a signal has determinants that are from past as well as from future boundary conditions. Once the signal is there one cannot use it to decide to change future boundary conditions. Conceptually this looks very much like the transactional interpretation of Quantum Physics where the present is determined by a kind of handshake between advanced and retarded waves (Cramer, 1986).

Time paradoxes are avoided and the negative time part of the solution cannot be used to transmit signals faster than light (negative time formally can be associated with faster than light speeds). Does this imply that the restoration of time-symmetry is a useless phenomenon? Not quite. The advanced wave cannot be used to derive some behavior to avoid the retarded wave to occur. So if we have a precognitive dream where candles are foreseen to set fire to the house the next day, it results in a paradox to remove all candles from the house in order to prevent the fire happening. If the fire doesn't happen we will not have a 'retarded wave' associated with this fire and hence no 'advanced wave'. However there might be a subtle way in which the restoration of time-symmetry has helped us in evolution. Because if an emotional event, for instance the attack of a predator, happens, the retarded part of the signal (in Psychology called the response) will be strong and hence also the advance part. But that implies that the attacked animal is already aroused a few seconds before the attack which might result in slightly superior survival changes. Of course this increased arousal only occurs if a real attack will actually occur in the (near) future because it hinges on the increased future arousal. Thus consciousness (induced restoration of time-symmetry) offers an interesting evolutionary advantage.

Psychokinesis

The framework so far offers a neat unifying explanation of presentiment and precognition and also all other GESP phenomena if they are conceptualized as precognition of eventual feedback.

Psychokinesis seems to fall outside the scope of the time-symmetry framework but in fact fits in perfectly well. If in any thermodynamic system time is running backwards this will result in an increase of structure. Random systems start to show patterns. It has been speculated (Bierman, 1983) that the increase in structure might occur in the genetic code and thereby augment the evolution of species beyond the mere evolution on the basis of random permutations. Macro-PK can be explained by the chaotic behavior of air molecules around objects that generally result in an average or equilibrium 'pressure' on the object that cancels out in all directions. However if the air molecules become coherent and start to behave in a non random and coherent structured way, movement of the object might be induced. We realize that this aspect of the theoretical framework is in need of more detail and a more precise quantitative treatment. But globally we can predict that again brain coherence measures should correlate with psychokinetic phenomena.

5. ELUSIVENESS OF PSI

Experimenter effect

In a typical parapsychological experiment correlations are established. Not signals going from somewhere to somewhere. That signals seem to be transferred is an interpretation. An interpretation that is extremely strongly felt because causality is deeply ingrained in our experience. However each psi experiment is actually a complex random number generator which, if perfectly random, should give no correlations. Experimenters that run an experiment can be conceptually represented as running a PK-RNG experiment where they try to 'influence' the random system in such a way that correlations occur. In this case the experimenters are actually the subjects in their own experiment. Individual differences might arise again out of the differences in brain coherences, either short-term for instance in altered states or long-term for instance related to personality or the effects of many years of meditation.

Declines

Declines have plagued the field of Parapsychology ever since its inception. Rhine's original successful results evaporated more or less to chance levels after 60 years of experimentation (for a review of these declines: Bierman, 2001). It has been suggested that boredom of the experimenters might be the causal factor for these declines. This would indeed explain the decline within experimenters but this boredom argument seems not suitable to explain across experimenter declines. In order to understand these latter it should be realized that time anomalies are opening options for paradoxes. This is most obvious for time travel. If it would be allowed for someone to travel back in time and to kill one's own grandfather there is a paradox. But a similar argument applies for getting information from the future that can be acted upon so that the future event can be prevented to occur. But if the future event is prevented it never could be the source of the future information. This ad hoc argument of nature preventing paradoxes has also been put forward by Hawking (1992) as chronology protection in his discussion of Black Holes and time-reversal. The development of replicable experiments therefore poses a challenge because a replicable experiment opens the options for the creation of paradoxes. If this argument holds replicable evidence for psi phenomena can only be obtained from experimental data that do not allow for such paradoxes to be created. Presentiment experiments are an example because the effects are non conscious and so weak that only they are only perceivable after averaging and thus can not be used on an individual level. According to this type of reasoning, any attempt to increase the effect size such that one could act upon the presentiment signal would fail. Interestingly such an attempt was undertaken by using 100 subjects simultaneously and then detect presentiment 'warnings' by averaging over these subjects per trial (Spottiswoode 2006, private communication). As predicted this experiment yielded null-results.

6. RELATION OF CIRTS TO OTHER THEORIES

6.1 Physical inspired theories

The observational theories

Like the in the OT's, in CIRTS observation does play a crucial role. The 'absorption of information' by the coherent brain is thought to be the boundary condition that restores time-symmetry. In the OT's physics is kept intact except that observation is supposed not to be a passive process but also an active process by which information streams into the observed system, thereby allowing structure to arise in otherwise random systems. In CIRTS the creation of structure or information is indirect through consciousness induced time-reversal and the second law in reverse. The most obvious difference is that in CIRTS the required brain state for the anomalies to arise is explicit while in the original formulation of Walker (1972) this was implicit and related to a not well specified concept called the 'will-channel'. Interestingly lab-lore has it that 'willing' and 'striving' are not optimal conditions for anomalies to arise, rather the optimal attitude seems to be a passive expecting.

There are two formulations of the OT's that are worthwhile considering further.

In Millar and Hartwells' formulation (Millar & Hartwell, 1979) the interpretation that quantum physics is fundamentally a theory dealing with potentialities is extended to the OT's. Not actual observations playing a role but rather potential observations. Although this extension is elegant and seems to fit with modern interpretations of QT (Stapp, 1996) there is an intrinsic problem to assess these potentialities. Because they are dynamic they change over time so when do you determine their values? Millar and Hartwell's formulation would also predict that anomalies should relate to potentialities rather than actuality. Radin (1988) has done quite relevant precognition experiments comparing predicting the actual future with predicting the probable future. His experiments were inconclusive with one favoring the actual future as target of prediction, the other the probable future. Targ (1998) asked the same

question in the context of remote viewing experiments. This time the answer was an unequivocal 'one can only foresee an actual future'. This is of course what would be expected in CIRTS.

Balancing

The potentiality interpretation of Quantum Theory makes also explicit that in the end QT can only be tested on the basis of distributions. Hence one could think that there is some freedom for individual events to become biased (as Walker proposes). In order to have nature's predicted distributions restored it has been proposed (Pallikari, 1998) that an observed psi induced bias in the long run should be compensated or balanced by another bias so that the Quantum Theory predicted distributions are not disturbed. However Quantum Theory does predict distributions up to any order (variance, variance of variance etc.) Any balancing mechanism would result in disturbing a higher order aspect of the distribution so that balancing seems not to be able to rescue standard physics. CIRTS on the other hand does not violate standard physics.

Hierarchical OT model

Houtkooper (1983) proposes a 'hierarchical' specification of the OT's to avoid the apparent paradoxes that occur with unrestricted non local time causing all future observers to participate in an experiment. He introduced 'order of observation' converging effects. In CIRTS there is no unrestricted non local time. Rather the classical time and the reversed time do behave in a symmetric way. If there are no problems in the forward direction there aren't in the backward direction.

If precognition is akin to remembering the future then we will expect the same time dependencies. For instance the frequency of precognitive dreams will exponentially decrease with the time between dream and event just like memory exponentially decays. This was indeed the relation found in the analyses by Sondow (1988) of all her precognitive dreams over a period of many years.

The problem of who is (are) actually the one(s) that restore time symmetry, a problem that Houtkooper tried to solve in his hierarchical model, will be given for CIRTS in a separate paper.

DAT

Decision augmentation theory (May, Utts & Spottiswoode, 1995) claims that all psi phenomena can be explained by assuming that at some point in the experimental procedure a selected part of a random series is biased because someone presses a button at the right time to select just that part of the random series that will result in the desired correlations appearing.

Thus the basic mechanism is a kind of precognition from the part of the person, be it subject or experimenter, who hits a button that initiates directly or indirectly the random series acquisition.

The model seems a bit paradoxical because the authors want to explain away psychokinesis, especially micro PK, by assuming precognition. However precognition presumably results in the biasing of a brain-state (so that the button will be pressed at the magical moment) and if one assumes the brain is a physical system and its states have a random component then there is not much difference between biasing a RNG and biasing a brain state. Both should be labeled micro-PK.

Like the OT's, DAT is very explicitly an information based, and not forced based, model. As such it fits with the psychokinesis integration of CIRTS. According to CIRTS there is a gain in information due to reversal of the second law when we allow time to run backwards. This gain in information results in some structure in an otherwise random system. This gain in information might be expressed as correlations between two variables although for all theoretical frameworks to date it is unclear why these correlations would correspond to some expected effect. Given the information based character and the fundamental assumption of time reversal it seems possible to accommodate some of the assumptions of DAT in CIRTS.

Systems Theory & Weak Quantum Theory

In Kornwachs and von Lucadou's system theoretical model of paranormal phenomena (Kornwachs & von Lucadou, 1985, Lucadou 1995), anomalous (non local) correlations that arise are due to an isomorphism of system theory with quantum physics. If one formally introduces meaningful information, as information that can be acted upon, then systems theory produces formulae that are identical to those found in quantum mechanics but, of course, deal with other observables. Kornwachs and Lucadou's approach is a special case of the one that is undertaken in 'weak quantum theory', which is identical to quantum theory but with Planck's constant being removed (Atmanspacher et al., 2002), but these approaches do result in a similar position. The most notable consequence being that the correlations that arise cannot be used to transmit classical information. In CIRTS the situation with regard to signal transmission is subtle. The advanced wave of course carries information. This need not be quantum information, it could even be classical. Therefore it appears that signal transmission (back into the past) is allowed. However the situation is such that the manipulation of the information source is restricted in order to avoid (binary logic) paradoxes i.e. it is forbidden to 'use' the 'advance wave' information to infer the future because that would allow avoiding the event that is 'responsible' for that advanced wave. Thus the no-classical signal theorem in Systems Theory and indeed in each quantum based theory is replaced by a slightly less restrictive rule in CIRTS.

Time symmetric thermodynamics

As early as in 1976, Donald and Martin (1976) suggested that causality violation was an inherent property of time-symmetric thermodynamics. Basically they formulated there the foundations of CIRTS especially with regard to psychokinesis. They did not, however, link this to the peculiar coherent aspect of our brain producing consciousness nor did they work out predictions that could be challenged by experiments. Therefore, and possibly due to the fact that their work had been published in an European Journal that was hardly read and referred to in the US, their theoretical framework was soon forgotten.

Many World Theories

Some authors, most notably J.B. Hasted (1981), have suggested that macroscopic psi phenomena, like metal bending and disappearance-reappearance phenomena could only be accounted for if the many worlds that are proposed to be created upon each quantum event in Everett's solution of the measurement problem (Everett, 1957), could interact i.e. if an observer was able, by some yet unexplained 'mechanism', to go from one parallel world to another one.

Observational theories have also been born out of a solution of the measurement problem, namely the radical subjective solution which states that human consciousness is the ultimate measurement device. In CIRTS, by virtue of not specifying quantum physics per se as the underlying time-symmetric formalism, there is no need to refer to the measurement problem. This is certainly an advantage because there seems to be growing consensus in the physics community that the whole measurement problem doesn't exist. On the other hand phenomena where objects disappear in one place and reappear in another are difficult if not impossible to account for by CIRTS.

Morphogenetic fields

Sheldrake's formulation of the morphogenetic field theory (Sheldrake, 1988) was originally put forward to account for the development of forms in biology. One of the predictions was that forms, once created, would be easier to create in the future. In this formulation the theory is essentially causal which is even evident from the book title 'The Presence of the Past'. Indeed Sheldrake, when suggesting that his 'magic' fields could possibly also account for psi phenomena, focused on telepathy and only recently Sheldrake is considering precognition and other apparent violations of causality (Sheldrake, private communication).

Physics without Causality

Shoup (2006) has taken a more radical position by basically doing away with time at the most fundamental level. Just like in earlier work on Link-theory, any physical formalisms might be reframed in terms of reciprocal relations rather than in cause and effect. In such a framework, causality as well as retro-causality arises naturally. Although Shoup acknowledges the pervasive nature of time-symmetry in physics he focuses on time-symmetry in quantum physics. His position is like CIRTS's that in fact we do not need a radical alteration of physics to account for psi phenomena but his theoretical thinking, unlike CIRTS, does not provide a link to psychologically relevant predictions.

6.2 Psychologically inspired Theories

Honorton's noise reduction

Honorton has put forward the idea that internal and external 'noise' suppresses the detection of 'psi' information. Implicit here is the assumption that this psi information becomes available at the non-conscious level if this level is not too busy with other processing and might become available to consciousness if there is not too much external input. The Ganzfeld procedure was thought to produce better results because it would partly remove this unwanted noise. There haven't been many studies directly comparing the Ganzfeld induction with other induction procedures so it remains to be seen if even this assumption is correct. Rather better performance in the ganzfeld might be explainable in terms of ritual and possibly the relaxation procedure that often is an integral part of the Ganzfeld procedure. Nonetheless with CIRTS as a guiding theoretical framework one can speculate if noise reduction might lead to more coherent brain states.

Stanford's PMIR

Stanford's Psi Meditated Instrumental Response Model (1977) is often used by psi-researchers with a psychological background to justify choices in design. For instance Stanford claims that some motivation for the psi-source has to be instantiated in order to get anomalous effects. In CIRTS it is totally left open how intentional aspects of the subject eventually are reflected in the creation of anomalous correlations. The only psychological aspect that CIRTS deals with is the state of consciousness that would be optimal to create such a correlation. A model for 'Psi missing' for instance is far beyond the current scope of CIRTS but CIRTS might be augmented by models like PMIR.

Altered states

In general it has been argued on the basis of incidental observations, but also on the basis of questionnaire data, that psi might be stronger if subjects are in an altered state of consciousness. CIRTS gives a framework to discuss these 'optimal states'. For instance, assuming that some meditative practices might result in more coherent brain states CIRTS would predict stronger effects with experienced meditators. Or if hypnosis were used to create a dissociative state like a state where pain is eliminated from the conscious experience then we might expect smaller effects. For the more general state of hypnosis where no explicit dissociative instructions are given no specific predictions can be made. The dream state seems to be at least a receptive state for time anomalies to arise. We should make a clear distinction between the source of the advanced wave being a state that basically is the state during feedback or confirmation and the state where the effects of this advanced wave are strong. We suppose that for the latter (receptive) state 'lability' is a more important factor than 'coherence'.

7. PREDICTIONS

Physical

If the Wheeler and Feynman argument holds that time-symmetry is broken due to the lack of multiple particle coherent absorbers it might be worthwhile to see if time-symmetry is restored when interactions occur with a physical system that is known as a Bose-Einstein Condensate. These multi-particle systems are only stable at extremely low temperatures. They exhibit a total coherence where the individual particles loose their individual character and behave as an indistinguishable whole. Interestingly enough, a few decades ago, Ian Marshall proposed that consciousness arose from a Bose Einstein Condensate in the brain (see Zohar, 1991, The Quantum Self).

It seems that Bose Einstein condensate also arise at cosmological scales. Thus one could expect time-symmetrical effects also to arise in cosmology. Possibly cosmological correlations with psi effects as for instance reported by Spottiswoode (1997) might be related to cosmological time-symmetry. Also one could expect time-symmetry to be restored if large scale (global) coherence of many people's minds would occur. This might happen during global meditation events or other events that seem to unite the world like 9/11. Thus we would predict time-symmetrical effects to be visible in the Global Consciousness Project data.

Psychophysical

Form-time symmetry in presentiment

Presentiment experiments offer the most direct way to test time-symmetry models. As was discussed in the data section incidental observations of double peaks in the response part of a simple stimulus-response experiment sometimes seem to have a double bumped counterpart before stimulus exposure. This can be tested formally by using sometimes one and (randomly) sometimes two stimuli separated by an interval of say 2-3 seconds (see figure 4). It should be noted that it is not possible to test this hypothesis in already available data because potential increase in bump frequency before and after the stimulus can be caused by a common factor of increased lability, the tendency of the body to produce spontaneous bumps in the skin conductance.

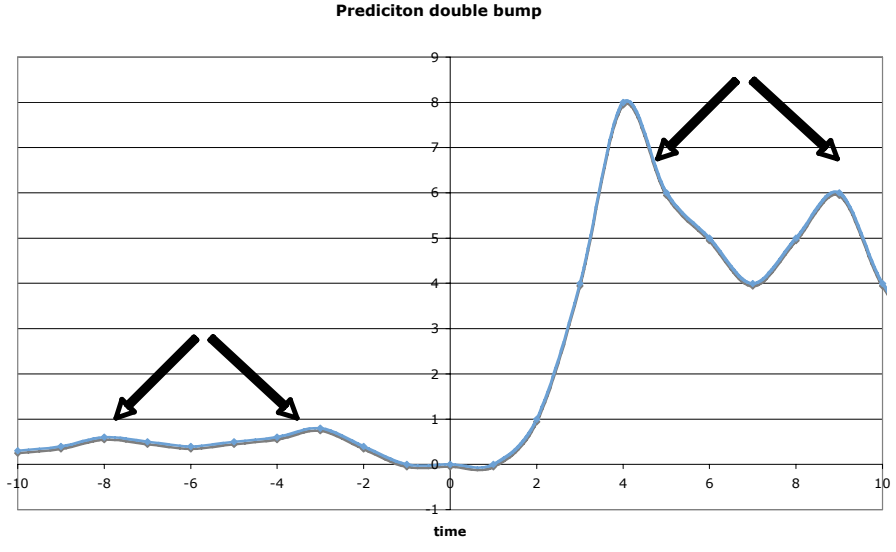


Figure 4. Predicted double bump presentiment effect if two arousing stimuli are exposed within a few seconds

Psychological

The predictions that can be made for psychological effects all have to do with the fundamental assumption that brain coherence is the crucial factor to restore time-symmetry. Thus, effects of certain mental exercises or induction procedures might be predicted as well as effects of specific personality traits in as far these can be related to brain functioning.

One of the most promising avenues would be the effect of meditation of psi. Recently a fmri study with experienced meditators showed stronger preserntiment effects in meditators as was predicted by CIRTS (Bierman, 2008). Radin (2008) did an experiment where subjects were supposed to influence a two slit experiment. Only the experienced meditator succeeded and did so with a very large effect size.

8. DISCUSSION

Progress in science is fastest when a theory predicts phenomena that subsequently can be tested. Especially when the theory has some flexibility and when it cannot account for the phenomena it can be updated according to new findings. It has been argued, mostly by skeptics, that parapsychology has no such theories. This is not quite true, there are many theoretical frameworks around but they are either purely physical in nature or they tend to be of a general psychological nature. The current theoretical framework CIRTS tries to bridge this gap in such a way that the multi-disciplinary approach of psi phenomena finally gets a theoretical basis.

The impetus for this work was the remark by a mainstream researcher at the Bial symposium 'Beyond and Behind the Brain' in 2008 that he was impressed with the psi data and the improvement in methodological quality but that the data were nothing more than a curious set of anomalies if there wasn't a theoretical framework to accommodate those data. Often similar remarks has been interpreted by the parapsychological community as an escape argument. However also mainstream researchers who find effects for which there is no theoretical framework have the very same difficulties to publish as the parapsychological research community has.

A theory, albeit one in 'statu nascendi', that makes explicit predictions about physical and psychological effects therefore could accelerate the acceptance of the field of parapsychology. Psi phenomena, rather than being defined as everything that we can't explain, could now be defined in a positive way as phenomena where physical time-symmetry is restored. The present author has not the illusion that the current formulation of CIRTS is even close to a definitive model. There is still some considerable 'hand waving' there are too many loose ends but rather than waiting for all these to be tied together the current preliminary framework is presented because already in its current formulation it produces several testable hypotheses. That is something the field of parapsychology needs in order to make progress.

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EMILIO SERVADIO: SOME PARAPSYCHOLOGICAL CONTRIBUTIONS

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ABSTRACT

Emilio Servadio was an important personality of Italian psychoanalysis and one of the most important parapsychologists of the XXth century, and a member of the Parapsychological Association. In 1994 he was given the Outstanding Career Award. Since a child, he was interested in parapsychological phenomena, as his mother had telepathic abilities. A pioneer and, until the end, a prominent member of Italian psychoanalysis, he was one of the founders in 1937 of the Società Italiana di Metapsichica. A very important step of his life was during the Second World War, when he spent seven years in India (1938-1945). In this country Servadio studied Indian philosophy and tradition in depth, practised psychoanalysis and studied the relationships between such branches and Yoga in detail. He put his attention on all topics of the paranormal, but in this contribution only six sectors of his long parapsychological experience are pointed out, in which, among other things, he was involved with personal experiences and direct investigations: a) the paranormal phenomena during analysis; b) spontaneous paranormal dreams; c) physical mediumship and the question of fraud; d) Servadio's LSD work; e) "unorthodox" healers and presumed healing energy; f) mysticism and mystical reality. In these ambits, according to our opinion, Servadio's remarks concerning the conditions favouring the expression of some phenomena investigated by parapsychology and their dynamics seem to be remarkable, in a global thought system leading to consider them highly reliable and real, though they are not subject to the rules of scientific repeatability. The "paranormal" investigated by parapsychology, that object of study that has always been a very difficult matter for the official science, to Servadio's mind shows two aspects connected and indivisible among them contemporaneously: at the same time, it is internal and external, subjective and objective, physical and metaphysical. It can be affirmed, moreover, that it is immanent and transcendent. The paranormal phenomena, in this point of view, are somehow comparable to some "arrows" indicating a very different reality from the one we know and in which we are immersed in daily life; in simple words, they represent a finger pointed towards the direction of the unknown, in particular beyond the barriers put by the empirical world. Those phenomena, in the end, allow us to reach a very wider vision of the human being, involving the metaphysical implications of the existence.

INTRODUCTION

Emilio Servadio characterised his long life (Genova 1904-Roma 1995) mainly in the psychoanalytical and parapsychological world, with the constant consideration, from the first decades of XXth century, of the links between the two branches. Since a child, he approached the paranormal phenomena, as his mother was considered gifted with telepathic abilities. A pioneer and, until the end, a prominent member of Italian psychoanalysis, he was one of the founders in 1937 of the Società Italiana di Metapsichica and a member for decades of the Parapsychological Association: he was given the Outstanding Career Award in 1994. In particular, during the Second World War he spent seven years in India (1938-1945), a country in which, strongly pushed by interests of knowledge, he studied the Indian philosophy and tradition in depth, he practised psychoanalysis and investigated the relationships of such branch with Yoga. He constantly referred to the oriental thought till the end of his existence. About his personality and his works, in English, you can refer to Zorab (1974), Pilkington (1987), Alvarado (1994), while a biography, in Italian, was published 18 years ago (Errera, 1990). One of us (G.C.) has had the great privilege of his friendship (Caratelli, 1997), while M.L.F. met him several times and caught his emphasis and convictions about some phenomena and personalities of parapsychology.

In this occasion, we will dwell synthetically upon six important areas of his wide parapsychological interest, in which, among other things, he was personally involved with experiences and direct investigations: a) the paranormal phenomena that can occur during the psychoanalytical professional practice; b) the dynamics of the spontaneous paranormal dream; c) the problem of the physical mediumship and the question often recurring of the accusation of fraudulent behaviours; d) Servadio's LSD and psilocybin work and his personal experiences of consumption of such substances; e) the so called "unorthodox" healers and, in particular, the old debate about nature and check of the hypothetical therapeutic "fluid" presumed to be emanated by the healer; f) mysticism and mystical reality and relationships with the paranormal investigated by parapsychology.

PARANORMAL PHENOMENA DURING ANALYSIS

As a starting point of this important section of the parapsychology, the observations and the fecund intuitions of Freud. They specifically concern the famous "case of Dr. Forsyth", presented in the frame of a contribution that has quickly been translated into Italian and that Servadio presented with a positive remark (Freud, 1933b).

With the "case of Dr. Forsyth", Freud clearly pointed out that during the psychoanalytical sitting, the presumed paranormal events can be expressed also in the "normal" communications of the patient to his analyst, that is in his "free associations" and in particular "lapsus linguae". And, often, this information can be referred to a very definite circumstance: the patient, suddenly, "feels" by anomalous ways neglected by his own analyst and is strongly worried or jealous of other unknown individuals, on which Freud was focusing his interest and his attention, and perceived as being more "considered". Besides, the feelings can include the refusal of himself and the hostility from the analyst. In other simple words, the patient can "perceive" the interest and the attention through presumably paranormal ways, with all thoughts, inclinations and emotions, of his own analyst towards other individuals, informing him – with the unwilling confirmation of his telepathic perception – that somehow he "knows everything" and then does not tolerate his "negligence" any more (Freud, 1933a). Servadio, on his behalf, reviewing the "case of Dr. Forsyth", has pointed out that Freud's analysis, even though precise, could go far off and that the countertransference of the father of psychoanalysis toward his patient was more remarkable and meaningful than Freud himself would have considered (Servadio, 1955a).

In other essays Servadio will show clearly Freud's contributions concerning the telepathy and the telepathic dream (Servadio, 1956b, 1963a, 1980a).

Some psychoanalysts who were very open to the paranormal topic, and that have followed some indications based on Freud's intuitions, have not neglected – since the first half of XXth century – to take note, remark or spread many clinical cases in which probable paranormal dreams were involved in therapeutic situations. A classic anthology, still up to date in his contents, edited by G. Devereux (1953), is still nowadays precious to evaluate the contributions of those great pioneers. Servadio himself immediately stressed the importance of that work (Servadio, 1954) and was always prompt in showing the "present state" of the so called "psychoanalytic parapsychology" properly (i.e. Servadio, 1952, 1956c, 1956g, 1972).

In 1935 Servadio had already presented a case of probable telepathy extracted from his personal experience. It was a fantasy, communicated by a patient, that could be linked to some psychical elements that Servadio aimed to remove from his conscience.

In this paper, in particular, Servadio shared and put the conclusions of the Hungarian analyst Istvan Hollós (1933) in evidence, which showed how the contents of the telepathic communications were referable to elements in course of repression in the analyst's mind, as well as the important function of the relation – with all its important emotional components – of "transference-countertransference" that starts in the analytical context, and this in the sense of an indispensable "precondition" for the occurrence of some paranormal phenomena involving both the analyst and the patient (Servadio, 1935).

SPONTANEOUS PARNORMAL DREAMS

Servadio discriminates, according to Freud's instructions (1922, 1925, 1933a), the telepathic events occurring during sleep – in which there is no distortion between the true fact and the presumable paranormal perception – from those that could be considered true and real telepathic dreams, in which the paranormal content, subject to the "dream-work", could be pointed out and made clear only with the use of the normal psychoanalytical method (Servadio, 1955b: pp. 76-80, 1962).

In 1955 Servadio describes another case extracted from his personal experience. Briefly, it concerned the dream, reported two days after, of one of his patients, a 30 year old man affected by obsessional neurosis and characterised by an emotionally arid life. One afternoon, due to a pleasant dinner appointment with three other psychoanalysts, two Italians and an American colleague accompanied by his wife, Servadio had to cancel a psychoanalytical séance scheduled for that same evening with the patient. Servadio wished to let the American guests taste a dish of "tagliatelle", an Italian culinary speciality. In those days at the end of August Servadio was alone in Rome and felt neglected because his wife and his daughter, together with two other little girls, were on holiday in a house with a garden at the seaside.

The previous night the patient dreamt about some facts related to events of the analyst's life that he could not have learnt in any other normal way and so these could be considered as telepathic: in particular a woman recognised in the dream as Mrs. Servadio, a little girl recognised as the 14 year old daughter and another two little girls in a house that was not the one in Roma, as well as a dish of "tagliatelle" put in the garden by the maid; instead, some other elements showed a precognitive content, as they referred to facts happening the following day, and of which the subject could not infer their occurrence, nor had they even been decided by Servadio in the moment of the dream (the appearance of a maid, never present in any dream of the patient, who, the following afternoon, instead of a telephone call from Servadio, would have been given news personally about the cancellation of the séance). According to Servadio, this case put in evidence a process pointed out by himself and also by Istvan Hollós, that is a process of "unmasking" of psychical contents of the analyst somehow "hostile" toward the patient. Such psychical contents of the analyst, besides, showed very close "analogies" with the psychical dynamics of the patient. It is the concept of the "complementarity" ("dove-tailing") of the positions, other causal precondition considered necessary for the occurrence of the spontaneous telepathic phenomenon, similarly to what reputed by other researchers quoted by Servadio like Eisenbud (1946, 1947, 1948) and Ehrenwald (1944, 1948, 1950, 1954). The patient, with his presumably paranormal dream, somehow would have "requested" his analyst (similarly to the quoted "Freud's case of the Dr. Forsyth") not to be further neglected (Servadio, 1955c).

At this point the important question is: are some causal factors, that really seem to favour, specifically, the telepathic phenomena during the psychoanalytical treatment, also present in other "normal" and "not analytical" situations, that are daily circumstances, contributing to the expression of a quantity of telepathic phenomena much greater than presumed?

Servadio's answer is affirmative, with the dreams carrying out a remarkable role again.

For Servadio, during the analytical situation, the transference from the part of the patient is interpreted and put to advantage of the analyst for the main aims of recovery, but really it is not a typical peculiarity of those moments, showing itself more easily observable. According to this perspective, the transference is instead typical of all interpersonal situations and can be mainly considered as one of the most primitive needs of the human being, bound to null physical and psychological distances of the individuals and to set the lost "primordial unity", filling the gaps between the single "self" and the "whole". If there is a real urgency to communicate something (his own impulses of transference) and the "distance" between the two individualities is felt more or less consciously as intolerable, they can "fall back" temporarily on that "archaic" instrument by which distant ancestors understood one another, probably removed in the human unconscious (as already presumed by Freud) during the phylogenetic development owing to the appearance of more efficient methods of communication (that is sounds and

"signs" perceived rather easily by sense organs), which is the telepathy (Freud, 1933a; Servadio, 1956e, 1956f, 1958a, 1973).

An extra-analytical case, very significant and highly demonstrative in such perspective, pertinent to the normal everyday reality, has been collected, carefully verified and presented by Servadio.

A sixteen year old girl, Luisa, dreamt that the mother of her boyfriend had a strange ring on her finger, on which mysterious hieroglyphics were carved and also a setting that could be opened and closed and in which some perfume could be contained.

As soon as she woke up she immediately told her mother about the dream and, later, she told her boyfriend about it. Servadio observed that Luisa had not yet overcome her "Oedipus complex" (that is, according to the Freudian theory, the strong affection of all women, in youth, towards the parent of the opposite sex, with rivalry for the other parent of the same sex) and often was subject to love fancy with the oldest and socially unreachable men. At the same time – and not by chance – she showed a clear emotional ambivalence with regards to the oldest women, her mother and the mother of her boyfriend included.

A careful clinical observation led Servadio to conclude that also Luisa's boyfriend had not completely solved his "Oedipus complex". He had really bought a ring (an object with a "symbolic-sexual" meaning) for his own mother, which was very similar in detail to the one that Luisa had dreamt. As he had to choose between the two women, he had somehow pointed out a preference for the former. In fact, he gave the girl a couple of earrings, perhaps equally expensive but less significant than a ring. In such global context of psychisms, concludes Servadio, among other things, the casual preconditions of a "complementarity" of the unconscious emotional situations of the two fiancés have occurred, which probably constituted a strong presupposition for the occurrence of the telepathic phenomenon, with which the physical and mental distances have been cancelled and Luisa had shown to her boyfriend, before being informed with the normal verbal communications, that she "already knew" what he had thought and done (Servadio, 1956a, 1956e).

Servadio has proposed a simple, clear and reliable frame, concerning the only paranormal typology of the spontaneous telepathic dream.

It involves five conditions: a) an emotional-transference link between two individuals; b) a particular event full of emotion, that can be objective but also subjective; c) unfavourable conditions to a good communication: distance, incapacity, inhibitions, removal; d) compelling necessity to overcome these troubles; e) the condition of sleeping, which, for its regressive characteristics pointed out by the psychoanalysis, favours directly the return to archaic means of communications (Servadio, 1973: p. 100).

THE PHYSICAL MEDIUMSHIP AND THE QUESTION OF FRAUD

The two editions of *La ricerca psichica* (1930 and 1946), a synthetic but complete work, enriched by a preface of Charles Richet, show largely how much Servadio paid attention to all parapsychological and paranormal topics, including mediums, their distinctiveness and the phenomena they produce and how much he was ready to the constant and correct evaluation of "pros" and "cons"; 235 bibliographic references are attached to the first edition, while 401 bibliographic references are attached to the second updated edition.

Pasquale Erto, from Napoli, was a very debated medium and often considered in negative terms. He was investigated at the Institut Métapsychique International in Paris (1924), as well as at the National Laboratory of Psychic Research in London (1931), with Harry Price. The phenomena produced by Erto were mainly bright manifestations: flashes of light 7-8 meters long, globes and bright columns, diffuse lighting, but during the séances also other effects were observable, like cold winds and telekinesis, or mental phenomena as "incorporation" of presumed disembodied spirits. Gustave Geley obliged the medium to strict preliminary controls, he made him dress completely with sealed clothes, but on one occasion he found some fragments of a flint for a cigarette lighter in ferrocerium in a washbasin. Erto,

with a rubbing action, would have been able to obtain from those fragments only some little sparks, supposing that he had skilfully managed to set his hands free, and that he had managed to use some nibs which were often found in his clothes. But Geley accused him of fraud with great conviction (e. g. Geley, 1924; Servadio, 1931, 1978a; di Simone, 1985).

But Servadio, with the desire of taking a more clear position on the medium, decided to investigate personally and promoted some séances in Roma, in the period 10th May-3rd June 1932, assisted by some reliable helpers and important Italian psychoanalysts as Edoardo Weiss and Nicola Perrotti.

Precise care was adopted again to exclude the possibility of fraud, as a complicated fastening of the medium and other ties, or make him wear a special suit given by the researchers, and undergo a preliminary medical examination, and so on.

During those eight séances in Roma more remarkable bright phenomena occurred, blows of cold air, objects moving, considered real without hesitation by Servadio, though he could not exclude that sometimes the medium could resort to tricks (1932c).

In the part reserved to the study of Erto's phenomena, in a following work (Servadio, 1932d), Servadio supposed that the phenomena produced by the medium were symbolically explainable, that is that they could express, in an extraordinary and paranormal language, aspects of unconscious conflicts and senses of fault of the subject. For example, two mediumistic "voices" in condition of trance could represent his parents' imagines introjected during childhood, a fearful mother and a strict father.

The question of fraud in mediumship has been considered carefully and in detail by Servadio, well acquainted with the variety of physical phenomena that are subject to be somewhat imitated. Interesting, nevertheless, his different considerations about the frequent fraudulent behaviour, in an unwilling and unconscious way.

Therefore, still considering the medium Erto, his continuous propensity (and also skill) to set free from ties and fastenings imposed by researchers (ties that, at the beginning, he had willingly accepted with full availability to collaborate), could be put in relation with the senses of guilt related to a "Oedipus complex" (Servadio, 1932d: p. 6), according to the psychodynamical equivalence: freedom from ties = freedom from the "Oedipus complex".

Then, generally, it is necessary to pay attention to the fraud coming out in virtue of the principle of the "minimum effort". For example, researchers think that a certain medium let an object move paranormally through the "telekinetic force". The subject, in trance and without a perfect tactile control, can act to "please" the bystanders in a banal, fast and economic way, that is displacing or catching the object by the hand. Also, it is necessary to consider the so called "concomitant" or "synchronous" gestures, that can accompany the real telekinetic phenomena and, if are not evaluated as they should be, let the researchers presume fraud by the medium (Servadio, 1932b: pp. 288-290).

SERVADIO'S LSD WORK

Servadio was interested in the experimentation with the psychedelic substances and took LSD personally three times. The first time was in the presence of Eileen Garrett, a parapsychology personality highly esteemed by him, at the Piol in France. After that occasion, he took LSD another two times. For five times more, Servadio took psilocybin with Eileen Garrett. It was an unforgettable and very particular experience. In fact, Servadio and Eileen Garrett experimented that their minds were "attuned", a condition strongly resembling extrasensory perception. From his personal experiences Servadio admitted having deduced remarkable interior "elucidations" and contributions to the better knowledge of himself. After such experiences, Servadio experimented with several subjects, who took the two substances under his supervision (Servadio, 1967: p. 15; Pilkington, 1987: pp. 91-92).

Afterwards, with the precious support of the Parapsychology Foundation and the collaboration of Roberto Cavanna, Servadio carried out a pilot study based on a series of experiments. With regard to the principle that the practice of the altered states of consciousness, through the use of drugs that can weaken or stop the conscious psychical activities, is able to favour the manifestation of paranormal

abilities, Servadio tried to verify if LSD and psilocybin could cause or favour the ESP. In reality, the results obtained in that occasion were not encouraging and, though there was some success, the two researchers had to conclude that no proof carried out by them showed any action of the psychedelic substances on ESP. A subject gave some evidences of extrasensory perception, but a question remained: did it happen due to the assumption of the psychedelic substance, or because he was a subject already able to put in evidence the ESP with or without drugs? (Cavanna and Servadio, 1964; Blewett, 1965; Servadio, 1978b; Pilkington, 1987: p. 92).

Servadio, anyway, did not limit himself to the mere experimentation with such substances, but tried to face and explain the many involved questions, as well as all medical, psychological and psychotherapeutic, social and ethic implications (Servadio, 1967).

"UNORTHODOX" HEALERS AND PRESUMED HEALING ENERGY

Another very remarkable and complex problem, with various branches, concerns the "unorthodox" healers and "unorthodox medicine", comprising a wide range of therapeutic actions that do not conform to the principles of scientific method and/or the procedures approved by official medicine.

In particular, Servadio paid attention to those cultural areas in which the figure of the physician is not separated from the magician and intense emotional feelings are attributed to the figure of the therapist, from which not a real treatment is expected, but a miracle.

At the International Conference of Royaumont (France) in 1956 (Servadio, 1956d), whose main topic was the links between psychology and parapsychology, two Italians present, the ethnologist Ernesto de Martino and Servadio, put the proposal of a particular scientific "expedition" on the agenda, but not to be done in so called "exotic" lands. The idea of the two Italian scholars was of a journey in a much closer region, but really different and "far", with certain ways of thinking still widely spread among its inhabitants: it was the rural Lucania, in Southern Italy, the Lucania of the so-called "magician-healers", where it was still possible to pick up a wide documentation about strange and resolutive treatments, particularly cases in which the concepts of disease, "occult" influence and magic treatment converged and intersected strictly. Illness and disease, in Lucania, often assumed particular aspects: they were sometimes ascribed to witchcraft or the "evil eye", and other times viewed as a sort of punishment for bad thoughts or for actions that had not to be committed, or ascribed to the influence of evil spirits operating on their own or let loose by sorcerers and witches. Besides, it was decided to examine other folk aspects that could involve possible parapsychological components. The Italian proposal was approved unanimously and much appreciated by the promoting institution, the Parapsychology Foundation, that decided to put to disposal the indispensable means for the research, to be carried out with the support of the Museo di Arti e Tradizioni Popolari of Roma and of the Istituto di Antropologia of Perugia. The research group, with the suitable interdisciplinary characterisation, besides Servadio and de Martino (the latter the director of the expedition), was formed by physician Mario Pitzurra, assistant to the Cattedra di Igiene of Università of Perugia, sociologist Adam Abruzzi, Dr. Ando Gilardi (photograph). Secretary and organizer was Dr. Romano Calisi, anthropologist, also in the representative role of Museo delle Arti e Tradizioni Popolari of Roma, with the presence of Vittoria de Palma (Servadio, 1965; Gallini, 1986: p. 107).

On the whole, from Lucania and villages visited in the second half of May and some days of June 1957, some clear elements that came out presumed that the complex cultural frame of effects and magic treatments was plausibly referable to the concepts of mutual and psychological influences, psychic disturbances and psychosomatic syndromes causing real organic diseases. In the magician-healer a so called "catalyzer" and a "stabilizing" agent could be identified, so that, a following and real healing from the reported disturbance could occur in the individual asking for his action (Servadio 1959: p. 154; 1963b: p. 9; 1965: p. 255; 1969: p. 13).

For Ernesto de Martino, on the other hand, the great anthropological preamble in which those magic rituals are inserted is the "crisis of the presence", the individual psychological lability, in a context in

which, both on the single subject and on wide social layers, the pressure of the environmental forces in a broad sense and the strong recurrence of critical, traumatic, frustrating moments (de Martino, 1959) is remarkable.

But, perhaps you can ask at this point, were the parapsychological phenomena present or not in that particular context?

What do you think, for example, of some cases of individuals subject to strange and persecutive effects, or that find themselves suddenly in the centre of unexplainable physical effects without any human contact, like furniture moved, flowers falling from above, disappearance and appearance of different objects, and so on, in a global phenomenal frame comparable to what we know as *poltergeist*?

And what do you think of prophetic and telepathic dreams, ESP, and so on? What about a Lucania magician, a woman, who can list exactly the strictly personal things of another individual? Can all this be traced back only to illusions, autosuggestion and casual coincidences? We are not absolutely on the level of scientific certitude, Servadio remarks, but a lot of probability exists on a paranormal level (Servadio, 1965, 1976b).

Some of his remarks seem very pertinent:

"It seems that many elements in our total picture cannot be understood or explained without conceding that certain bulwarks, in our own part of the world rarely penetrated by the paranormal, are much more elastic and permeable in the world we were studying. Many things that we usually consider as outside the norm were here more or less within the limits of what *might* happen" (Servadio, 1965: p. 255, cursive in the text).

Finally, if we stick to his words, that "world" is right to be examined from different perspectives, all equally valid, but that determined cultural *milieu* constitutes also, in conclusion, a favourable *humus* to the production of genuine paranormal expressions, though from a strict point of view, probably, such expression presents itself only in circumscribed occasions.

About the same general topic: a group of therapeutic "unorthodox" actions exist that is based on healers that affirm to use a presumed curative "fluid", a particular "emanation" of their organism that would act to the advantage of the ill person.

For Servadio, the matter is however tied fast and historically with the figure of Franz Anton Mesmer. And, apart from the great and important topic of the direct line linking the so called "animal magnetism" with the events of hypnotism of the nineteenth century to arrive to the Freudian psychoanalysis, remarkable disputes have taken place about the nature of the "universal fluid" proposed by Mesmer. And, in particular, with regard to its presumed curative properties when condensed, but always impalpable and invisible, the "fluid" was reputed to be emanated – according to the presented theory – from the hands of the "mesmerist" (1930a: pp. 13-15, 1930b, 1932a, 1946: pp. 16-20, 1976a, 1990).

Nevertheless, Servadio remarks that the existence of the presumed "waves" or "bioradiant emanations" has never had a scientific demonstration. The validity of the different devices to measure the human "fluid", from the physical point of view, have always been denied by technicians and scientists. Since the nineteenth century all different instruments, complicated and not, have fallen into oblivion and every time it has been demonstrated that they worked only in virtue of known agents that had no relation with "fluids" or mysterious "energies" (Servadio, 1932a, 1969: p. 9).

On the other hand, such an idea of the "universal fluid" was not created by Mesmer, as the concept of an omnipresent and impalpable energy was and is common to different religious and metaphysical traditions; you have only to think, for example, about the Indian context in which the idea of *prana* recurs, a term often subject to abuse as all Hinduist sages have indicated with it an "immaterial" force, present everywhere and everything, in no case subject to measurement or quantification (Servadio, 1990: p. 16). According to this point of view, the great debates that have been taking place for centuries – between "fluidists" and "not fluidists" – seem useless, as well as the attempts to report the presumed "fluid" to something physical and measurable, to a physical force with similar features to the ones of known physical forces, to a "substance" having the property to be weighed and measured, circumscribed and condensed. Besides, the uselessness of those debates originates from a typically "dualistic" conception about which you can debate for a long time, that considers the interior and physical world as

irreparably isolated between them, both in their roots and in their phenomenal aspects (Servadio, 1976a: p. 54). In conclusion, according to Servadio's opinion, the so called "fluid" is not and perhaps will be never suitable to submit to the strict rules of scientific measurablement, though on the typically empirical plane various effects are noticed that allow a certain "quid", to be conceived anyway as a physical and phenomenal projection of a cosmic and metaphysical principle.

MYSTICISM AND MYSTICAL REALITY

What has been said in the previous section can be substantially valid also for what concerns the mysticism and the mystical reality.

The mystic presents many extraordinary phenomena, some of them similar to those investigated by parapsychology, while others do not seem comparable to those included in this field of study. And often those manifestations appear in such conditions that scientific observation is precluded. About the most interior experiences we must rely on mystics, and on their language that often appears to be somehow contradictory if evaluated with the common logical and rational tools of evaluation. Nevertheless, without exceptions of any kind, all mystics claim that the "duality", which is the foundation of the empirical experience of all days, as well as of the scientific method (subject-object) with which the real is faced, is denied in the context of the mystical experience, as mystics aim to reach the "unity" and to overcome the "dual". But that contradictoriness, at some levels of the mystical experience, is similar to that commonly attributed to the paranormal phenomena at a level of logical, rational and scientific observation. We can think about telepathy or psychokinesis: is it not contradictory that an individual can communicate with the other without the mediation of physical senses and some other verifiable intermediary, or that his thought can affect material objects without the action of any known and measurable energy? So, here is the effective link between mysticism and parapsychology: the experiences of the former, the phenomena investigated by the latter belong to two worlds, to two levels of reality at the same time (Servadio, 1980b).

Servadio continued that the paranormal presents aspects that cannot be investigated with the common scientific methods and instruments, as it constantly keeps its "dark side". And perhaps such a side could be put outside the Newtonian world and therefore under the sign of the transcendence. The main difficulty that has prevented clearer considerations, at an official level, of the parapsychology and of the investigated phenomena is that the "paranormal", that always difficult object, shows contemporaneously two linked and inseparable sides: at the same time it is internal and external, subjective and objective, physical and metaphysical; with the due courage, it can be affirmed again that is immanent and transcendent. Useless, therefore, are the efforts of making it an object of study that can be perfectly arranged in the conceptions regarding the physical and material structure of the universe proposed by Newton and in those dualistic (extreme independence between mind and matter) of Descartes. Servadio assumes that the parapsychology must not persist in a sterile materialistic reductionism but help to recognise the integration between the empirical and metaempirical, between the manifested and the metaphysical (Servadio, 1989: pp. 32-34 and 38-39).

CONCLUSIONS

Emilio Servadio is one of those uncommon personalities that surely cannot be defined only in a few words, considering the variety and abundance of his interests and contributions. We can affirm that all parapsychological topics have been considered, analysed, and checked, efficiently and clearly presented and commented upon by him. His huge work is certainly still fully topical and comprises cues for many reflections and directions of research.

In particular, as far as Italy is concerned, Servadio has contributed, besides his scientific and professional work, for a not negligible period of seventy years, a precise and profitable work of

popularisation in the field of parapsychology, which, for the constant exactitude, the clearness of exposition, the incessant continuity and the great spent energies, has induced many sceptical or nearly sceptical researchers to pay better attention and to put aside definitively or to weaken their dislike for this field. Or, to say more clearly, to go, at last, beyond their interior and unconscious "resistances" regarding the identification and the acceptance of paranormal phenomena.

Servadio has tried, with his perseverance and authority, to find a way that parapsychology could conquer in Italy and in the world the due cultural position and that it be considered, always and anywhere, with the due respect.

Some firm points of his investigation are his intimate certitude about the reality of many phenomena investigated by parapsychology and that thousands of cases are well supported by verfied documentary evidence, as confirmation of their existence. Often he tried to communicate emphatically, synthetically and with great clarity in his writings, that those paranormal effects are not and perhaps will never be investigated with the current scientific methods and rules and that these are, in his opinion, much more than "something" pointed out, for example, through the sophisticated statistical method.

Servadio pointed out and repeated till his last interview that those phenomena are fully comparable to some "arrows" indicating a reality very different from what we know and in which we are immersed in daily life. They represent a "message" to be heard, because, in simple words, they widen the rather limited horizon of our Ego and represent a "finger" constantly and steadily pointed towards the unknown, beyond the barriers put in place by the empirical world (Battistin, 1994: p. 120).

We can add that this is, in conclusion, the great and lasting fascination of parapsychology.

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A DISTINCT PERSONALITY TRAIT? THE RELATIONSHIP BETWEEN HYPNOTIZABILITY, ABSORPTION, SELF-TRANSCENDENCE, AND MENTAL BOUNDARIES[1]

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ABSTRACT

It has been proposed that one of the basic personality traits, openness to experience, may be related to psi phenomena. Yet, a different character trait, self-transcendence, seems a much better candidate. We conducted two studies to evaluate the relationship between the constructs of behavioral and experiential hypnotizability, absorption, mental boundary thinness, and self-transcendence. In study 1, hypnotizability (especially measured experientially) and absorption were related to personal mental thin boundaries, but not to 'world' boundaries such as opinion of others. Also, a mediation analysis showed that absorption contributes to the experience of involuntariness during response to hypnotic suggestions and that involuntariness, in turn, facilitates behavioral hypnotizability. In study 2, hypnotizability, absorption, and self-transcendence were significantly related to each other. Regression analyses suggest that absorption and self-transcendence lead to unusual experiences during hypnosis, which in turn trigger involuntariness and behavioral responding. These results indicate that a personality construct reflected in part by absorption and self-transcendence determines experiential responses to hypnotic suggestions and that such experiences facilitate behavioral hypnotic responding. Such a personality trait is consistent with earlier postulates by F. W. H. Myers and William James of a basic individual difference in people's ability to access anomalous experiences or other states of consciousness. Direct research on the relationship between psi experiences and events and self-transcendence is a promising area for the field.

INTRODUCTION

In a seminal chapter, Honorton (1977) proposed a relationship between internal attentional states (e.g., hypnosis and meditation) and psi, but did not discuss personality (traits) to engage in these states. In the same volume, Palmer (1977) reviewed the literature on psi and traits and concluded that the only robust finding was that relatively well- adjusted people were more successful at psi. More recently, Zingrone, Alvarado, and Dalton (1998-1999) proposed a relationship between the trait of openness to experience and psi experiences, and found a weak correlation ($r = .20$) between the two. Nonetheless, there is growing evidence that a different trait not included among those analyzed by them and related to the propensity to experience hypnotic suggestions, become absorbed, and have self-transcendent experiences may be more strongly related to alterations of consciousness associated with psi experiences and performance. For instance, Carpenter (2004) found that successful performance in ganzfeld psi research was significantly related to experiences of positive transcendence of boundaries and a sense of merger. Furthermore, individuals with high but not medium or low hypnotizability tend to have self-transcendent experiences following a hypnotic induction (Cardeña, 2005; Cardeña, Lehmann, Jönsson, Terhune, & Faber, 2007) and meta-analyses of research using hypnosis procedures have linked them to psi performance (but see Stanford & Stein, 1994, for an alternative explanation to the hypnosis-psi link).

Hypnotizability denotes behavioral and experiential responses to specific suggestions following a hypnotic induction (a set of suggestions focusing the person's attention on the hypnotist while minimizing extraneous concerns). There is evidence that hypnotizability can be considered a life-long,

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consistent trait (Piccione, Hilgard, & Zimbardo, 1989; but see also Fassler, Lynn, & Knox, 2008). The search for the personality correlates of this construct has been mostly fruitless. Hypnotizability has been related to conceptually similar phenomena such as absorption or the propensity for having episodes of total attentional involvement (Tellegen & Atkinson, 1974; Ott, 2007; Roche & McConkey, 1990), with some aspects of imagery (Rader, Kunzendorf, & Carrabino, 1996), and more recently with emotional contagion (Cardeña, Terhune, Lööf, & Buratti, in press) and empathy (Wickramasekera & Szlyk, 2003). Yet, it has shown negligible correlations with the influential five-factor model of personality (FFM; Nordenstrom, Council, & Meier, 2002), which includes the trait of openness to experience that Zingrone et al. (1998-1999) hypothesized to be related to psi abilities.

An alternative trait model, Cloninger's Psychobiological Model of Temperament and Character (Cloninger, Skravic, & Przybeck, 1993), proposes a specific neurotransmitter mechanism for inborn temperament and later-developed character traits, including *self-transcendence*, a character construct involving a sense of going beyond one's physical or mental boundaries, merging with something larger than the self, and similar experiences. A genetic analysis found that this trait had 90% unique variance when analyzed along other major character/temperament constructs (Gillespie, Cloninger, Heath, & Martin, 2003). One study that evaluated hypnotizability and some of Cloninger's proposed traits unfortunately did not include self-transcendence, and only found a significant relationship with persistence (Lichtenberg, Bachner-Melman, Ebstein, & Crawford, 2004). Relatedly, Piedmont (1999) proposed that his scale also measuring *spiritual transcendence* was unrelated to the FFM according to both self- and observer-reports. Although Piedmont's scale includes some specific religious content items relating to prayer, many of the items describe alterations of consciousness such as becoming "oblivious to the events of this world," having peak experiences, and experiencing visual apparitions of the deceased. We can argue that although the concept of transcendence seems to have specific religious connotations, the propensity to have anomalous experiences, including those in which the person has an altered experience of the self and its surroundings, represents the core of this construct (McClenon, 2001).

The possibility that hypnotizability is related to various anomalous experiences is supported by studies showing significant correlations between dissociation, hypnotizability, and anomalous experiences (e.g., Kumar & Pekala, 2001) and the higher hypnotizability of individuals who report different types of anomalous experiences (for a review, see Cardeña, Lynn, & Krippner, 2000). The proposal of a capacity to have unusual experiences is not new; it can be traced at least to Plato's classification of the *manias* (Pieper, 1964) and more recently to various authors at the end of the 19th and beginning of the 20th century, including William James, who proposed that there were individual differences in accessing consciousness "beyond the margins" (Taylor, 1996). Perhaps the most developed modern theory, though, comes from F. W. H. Myers's (1903) proposal of individual differences in how permeable or stable individuals are in transferring information between *subliminal* and *supraliminal* processes. For instance, individuals with a propensity for genius and creative inspiration, and perhaps some general psychological instability, have more permeable boundaries, whereas "The [hu]man who is in but small degree thus permeable, who acts uniformly on supraliminal considerations,...is likely to be safe in prudent mediocrity" (Myers, 1903, p. 116; see also Kelly, Kelly, Crabtree, Gauld, Grosso, & Greyson, 2007, for a thorough discussion of Myers's relevance to current psychology). Other important psychological theorists such as Kurt Lewin, Paul Federn, and Carl Gustav Jung also posited stronger or weaker forms of communication, or boundaries, among psychological processes (Hartmann, 1991), and a concept of dissociation is based on the assumption of a lack of integration among psychological processes that are ordinarily integrated in other individuals (Cardeña, 1994).

More recently the concept of *transliminality*, the "hypothesized tendency for psychological material to cross thresholds into and out of consciousness" has been proposed as a variable critically involved in the experience of anomalous perceptions (Lange, Thalbourne, Houran, & Storm, 2000, p. 591; see also Houran, Thalbourne, & Lange, 2003; Thalbourne, 2000). Various studies have found that individuals scoring high on a psychometric measure of transliminality tend to exhibit schizotypal cognition

including unusual thoughts and experiences, be unconventional or even neurotic, be sensitive to stimulation and high in fantasy-proneness and absorption, find dream interpretation useful, and perhaps do well in controlled psi tests (Thalbourne, 2000). It must be pointed out that the construct of schizotypy, although etymologically related to schizophrenia, is not necessarily pathological as contemporary research has found a cluster of psychologically healthy and creative schizotypes (Goulding, 2005). The relationship between transliminality and hypnotizability has yet to be evaluated, although transliminality was found to positively correlate with the incidence of 'hypnotic-like' experiences in respondents' daily lives (Cooper & Thalbourne, 2005).

In a related fashion, the construct of mental boundaries refers to the *thickness* or *thinness* (or permeability) of different mental processes such as whether a person considers thoughts and feelings to be independent (thick boundaries) or interdependent (thin boundaries) (Hartmann, 2000). This construct emerged from the observation that chronic nightmare sufferers tended to exhibit some positive cognitive abilities (e.g., creativity) at the same time as they had distressing experiences, and is consistent with Myers's (1903) proposal that the permeability between types of consciousness can be adaptive or maladaptive. There is a long list of proposed boundaries between such processes as sensory inputs, thoughts and feelings, interpersonal feelings, states of consciousness, and identity (Hartmann & Kunzendorf, 2007). The *Boundary Questionnaire* (BQ) has been offered as a measure of the permeability of various types of boundaries and has been consistently found to correlate moderately with nightmare frequency, dream frequency recall, and other features such as dream image intensity and emotionality (Hartmann & Kunzendorf, 2007), reported psychic experiences (Richards, 1996), and transliminality (Houran, Thalbourne, & Hartmann, 2003; Sherwood & Milner, 2004-2005).

The foregoing suggests that hypnotizability would be related to some types of boundary thinness. For instance, various dream characteristics (Zamore & Barrett, 1989), creativity (Bowers, 1979), and emotional contagion (Cardeña et al., in press), which are consistent with Hartmann's (1991) conception of thin interpersonal boundaries, are positively related to hypnotizability. We located only three studies that directly probed the relationship between hypnotizability and mental boundaries, one of them unpublished. The latter (Barrett, 1989) was carried out with 197 undergraduates and included the administration of measures of behavioral hypnotizability, unusual experiences during hypnosis, absorption, and boundary thinness. Boundary thinness, as measured by the BQ, was positively correlated with the Harvard Group Scale of Hypnotic Susceptibility (HGSHS:A; Shor & Orne, 1962, r = .19), the Inventory Scale of Hypnotic Depth (ISHD; Field, 1965; r = .29), and Tellegen's Absorption Scale (TAS; Tellegen & Atkinson, 1974; r = .54). Kunzendorf and Maurer (1988-89) found a similar (r = .16) although non-significant correlation between the HGSHS:A and the BQ in a study with 144 undergraduates. Finally, research with 136 undergraduates (Rader et al., 1996) found boundary thinness to correlate with behavioral hypnotizability (r = .20) and absorption (r = .67).

These studies have not fully resolved various questions about the possible relationship between hypnotizability and boundary thinness, nor the relationship between these variables and germane constructs such as the self-transcendence character trait. In addition, none examined the relationship between the experiential features of hypnotizability, such as involuntariness (Bowers, 1981), and boundary thinness. The principal measure of boundary thinness, the BQ, consists of multiple subscales, some of which lack a clear conceptual relation to hypnotizability (e.g., opinions about others). However, none of these studies examined the relationship between hypnotizability and the different subscales. In addition, all three involved a 'strong' context in which the scales were administered in the same session. This procedure has been questioned because the contextual influences of a hypnosis session and other variables such as consistency motivation may function to inflate correlations between hypnotizability and personality measures (Council, 1993) although the nature of such context effects and their interpretation remains in dispute (Barnier & McConkey, 1999).

In this paper, we report on two studies in which we examine the relationship between behavioral and experiential hypnotizability and capacity for absorptive and self-transcendent experiences. In study 1, we examined the relationship between hypnotizability and boundary thinness while circumventing some of the limitations of previous studies. We hypothesized that given the similarity of some of the BQ

subscales (e.g., the sleep/wake/dream and unusual experiences subscales) with hypnotizability, there would be a significant correlation between the two constructs and that such correlations would differ across subscales of the BQ. In addition, given previous findings (Cardeña et al., in press), we expected boundary thinness to exhibit stronger correlations with experiential than behavioral measures of hypnotizability, because altered experience may not manifest compliance as much as the easier behavioral items in hypnotizability scales do (Woody, Drugovic, & Oakman, 1997). We also administered the TAS to a subset of the participants in this sample to evaluate if any possible relationship between hypnotizability and the BQ could be accounted for by absorption. Although there are many studies showing correlations between these and similar variables, little is known about the functional relationship among them. In study 2, again controlling for possible context effects, we evaluated the inter-relationships between behavioral and experiential measures of hypnotizability, self-transcendence, and a modified version of the TAS (Jamieson, 2005)

METHODS

Participants

In the first study, 112 North American undergraduates volunteered. Their mean age was 21.41 years (*SD* = 5.66; range: 17 to 53), and 62.5% were female. In the second study, 58 Swedish undergraduate students in a first-year introductory psychology course participated. The sample was composed of 33 women (57%) and ranged in age from 18 to 43 (*M* = 23.22, *SD* = 4.83). All consented to participate.

Materials

Participants in the two studies were administered or completed the following behavioral and psychometric measures. All are well recognized and have strong psychometric properties (see respective references).

The *Harvard Group Scale of Hypnotic Susceptibility, Form A* (HGSHS:A; Shor & Orne, 1962) is a group measure of hypnotizability, with a scoring range of 0 to 12. Scores for the post-hypnotic amnesia item were derived using the criterion of having three or fewer items recalled before cancellation of the amnesia suggestion *and* two or more items recalled following the cancellation (Kihlstrom & Register, 1984).

The *Subjective Experiences Scale* (SES) for the HGSHS:A (Kirsch, Council, & Wickless, 1990), a 12-item questionnaire, measures the voluntariness with which HGSHS:A items are experienced. Each item is scored using a five-point response format, with higher scores reflecting greater involuntariness during hypnotic responding.

The *Inventory Scale of Hypnotic Depth* (ISHD; Field, 1965) includes 38 items tapping subjective experiences empirically associated with hypnosis: a) absorption and internal and external unawareness, b) feelings of automaticity and compulsion, and c) discontinuity from normal experience.

The *Tellegen Absorption Scale* (TAS) is a scale of the Differential Personality Questionnaire (Tellegen & Atkinson, 1974), which evaluates focused attentional deployment and comprises 34 dichotomously-scored items.

The *Modified Tellegen Absorption Scale* (MODTAS) is a modified version (Jamieson, 2005) of the TAS (Tellegen & Atkinson, 1974; Tellgen, 1992) in which the dichotomous response format was changed to a five-point Likert scale.

The *Boundary Questionnaire* (BQ; Hartmann, 1991) is a 145-item questionnaire that includes an overall score (SumBound), and twelve subscales: sleep/wake/dream (sleep); unusual experiences (unusual); thoughts, feelings, moods (feelings); childhood, adolescence, adulthood (childhood); interpersonal; sensitivity; neat, exact, precise (neat); edges, lines, clothing (edges); opinions about children and others (opinions on others); opinions about organizations and relationships (opinions on relationships); opinions about peoples, nations, groups (opinions on people); and opinions about beauty,

truth (opinions on beauty). The first 8 subscales make up the *personal* subscale, whereas the last four comprise the *world* subscale.

The *Temperament-Character Inventory* (TCI; Cloninger, Przybeck, & Svrakic, 1993) is a very influential personality inventory. In this study we used a Swedish version of the Self-Transcendence Character Scale (ST), which has three subscales (ST 1 = *self-forgetfulness*, ST 2 = *transpersonal identification*, and ST 3 = *spiritual acceptance*; Brändström, Sigvardsson, Nylander, & Richter, 2008).

The *Waterloo Stanford Group Scale of Hypnotic Susceptibility, Form C* (WSGC; Bowers, 1993, 1998) is a group measure of hypnotizability with a scoring range of 0 to 12. This scale is an adaptation of the individually-administered *Stanford Hypnotic Susceptibility Scale, Form C* (Weitzenhoffer & Hilgard, 1962).

The *Inner Subjective Experiences Scale* (ISES; Kirsch, Council, & Wickless, 1990) indexes experiential involvement in the different suggestions of the WSGC.

Procedure

In study 1, participants were administered the HGSHS:A, SES, and ISHD during a single session. At a separate session some months later, a subset of participants completed the BQ and TAS as part of an undergraduate course on altered states of consciousness. No link was made between the two contexts, although the experimenter and course instructor were the same person. In study 2, participants were administered the WSGC, ISES, and ISHD in one session. Two months later, the same participants were administered the ST and MODTAS by a different instructor and without mention of hypnosis.

Statistical analyses

Simple and multiple regression analyses followed previously posed predictions, so conventional significance levels were used throughout ($\alpha = .05$). Two-block backwards-entry multiple regression analyses were conducted using the subscales of the BQ in the first block and the TAS in the second in study 1. The significance of the mediation analysis relating TAS, SES, and HGSHS:A scores was computed using the $z' = \alpha\beta/\sigma_{\alpha\beta}$ method (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Regression analyses in study 2 used the backwards-entry method with a single block for predictors. The backwards entry method was used because this is regarded as the most suitable method for exploratory analyses (Tabachnick & Fidell, 2007); the sample sizes in both studies were deemed sufficient for exploratory purposes because they exceeded conventional criteria of 10-15 cases per predictor variable. Analyses were carried out using SPSS v. 14.0.

RESULTS

Study 1.

The scores for the sample fell within the typical ranges for the research measures (see Table 1 for descriptive statistics). Neither age (all rs < .18, all ps > .05) nor sex (all Fs < 2.10, all ps > .15) were associated with any of the research measures.

Table 1.
Descriptive statistics for the research measures ($N = 112$).

	M (*SD*)		*M* (*SD*)
HGSHS:A	6.48 (2.75)	Neat	19.84 (4.83)
TAS†	20.51 (6.71)	Edges	34.08 (6.53)
ISHD	19.18 (8.36)	Opinions on others	20.42 (3.80)
Sleep	23.46 (8.06)	Opinions on relations	21.04 (4.60)
Unusual	30.18 (9.03)	Opinions on people	31.98 (6.19)
Feelings	33.80 (8.29)	Opinions on beauty	17.52 (3.70)
Childhood	11.02 (4.06)	Personal	191.69 (31.84)
Interpersonal	25.92 (5.31)	World	90.95 (13.91)
Sensitivity	13.37 (3.15)	Sum	282.64 (40.37)

Note. †: $N = 61$

Table 2 presents the correlation matrix for the research measures. As expected, the HGSHS:A correlated significantly with the SES, ISHD, and TAS. The latter three variables were also intercorrelated. In contrast with some of the previous research, the HGSHS:A did not correlate with the BQ sum score, nor with any of the BQ subscales. As previously found, the TAS correlated with the BQ Sum, Personal, and World scales and with 9 of the 12 BQ subscales (it did not correlate with the scales *neat*, *edges*, or *opinions on organizations;* full correlation matrix available from the authors).

In line with our prediction that experiential boundary thinness would be more closely related to the experiential features of hypnotic responding, as compared with the World scales, the BQ Sum and Personal scales, correlated with hypnotic experiences. In addition, a subset of the BQ personal subscales correlated with the SES (*sleep, feelings, interpersonal*, and *edge*) and with the ISHD (*sleep, feelings*, and *interpersonal*).

Table 2.
Correlation matrix for the research measures ($N = 112$).

	SES	ISHD	TAS†	BQ Sum	BQ personal	BQ World
HGSHS:A	.82***	.65***	.26*	.13	.18	-.05
SES		.79***	.41**	.25**	.31***	-.01
ISHD			.40**	.18	.24*	-.04
TAS†				.56***	.58***	.32*
BQ Sum					.95***	.72***
BQ Personal						.48***

Note. †: $N = 61$

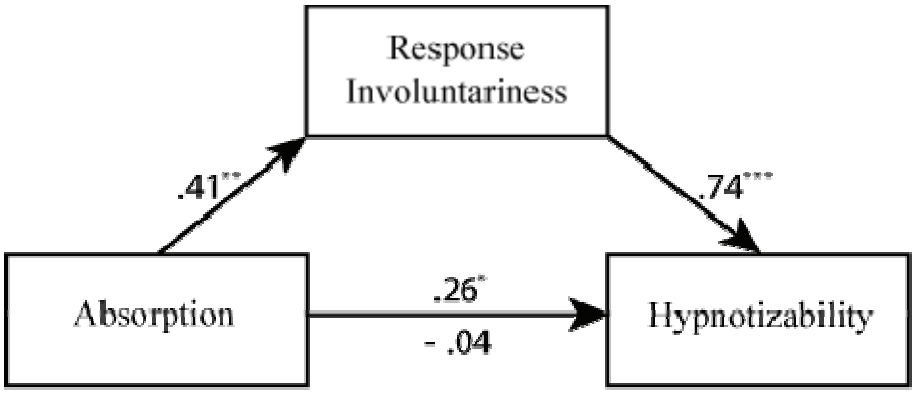
* $p < .05$, ** $p < .01$, *** $p < .001$

To examine these relationships further, a series of multiple regression analyses were conducted on the SES and ISHD with the BQ scales entered in the first block and the TAS entered in the second block. The model retained two variables (BQ *sensitivity* and TAS) and was statistically significant ($R^2 = .22$, $F[2,58] = 8.07$, $p = .001$). Of the two individual predictors, BQ *sensitivity* approached significance ($\beta = .24$, $t = 1.98$, $p = .052$), whereas the TAS was significant ($\beta = .33$, $t = 2.72$, $p = .009$). The second analysis on the ISHD retained three variables (BQ *unusual*, BQ *feelings*, and TAS) and was significant ($R^2 = .31$, $F[3,57] = 10.05$, $p < .001$). Of the three individual predictors, all were independently significant: *unusual* ($\beta = -.53$, $t = -3.72$, $p < .001$), *feelings* ($\beta = .54$, $t = 3.37$, $p = .001$), and TAS ($\beta = .31$, $t = 2.29$, $p = .026$).

We speculated that involuntariness during hypnotic responding, as measured by the SES, might mediate the relationship between absorption and behavioral hypnotizability. That is, a propensity for

absorption may lead to reduced meta-cognition and greater perceived involuntariness; such experiences, in turn, may facilitate behavioral responding. To test for this proposed mediation effect, a series of regression equations were computed that evaluated the relationship between TAS, SES, and HGSHS:A scores. As reported earlier, TAS scores significantly predicted HGSHS:A (β = .26, t [59] = 2.07, p = .043) and SES scores (β = .41, t [59] = 3.41, p = .001). SES also predicted HGSHS:A scores (β = .72, t [59] = 8.01, p < .001). When TAS and SES were together included in the regression analysis, TAS scores no longer predicted HGSHS:A scores (β = - .04, t [59] = - 0.39 , p = .70), whereas SES scores still did (β = .74, t [59] = 7.43, p < .001). This mediation effect is significant (z' = 1.1, p < .05)[2] and is consistent with involuntariness during hypnotic responding fully mediating the relationship between absorption and behavioral hypnotizability (see Figure 1).

Figure 1. Mediation model of absorption, response involuntariness, and hypnotizability.



* p < .05
** p < .01
*** p < .001

Study 2.

Descriptive statistics for the research measures of study 2 are presented in Table 3. The means for the WSGC, ISES, ISHD, and MODTAS were lower than those reported in previous studies in North America, but the mean for ST was similar to that of a Swedish sample of similar age (Brändström et al., 2008). Age correlated with *transpersonal identification* (r = .34, p = .009), but not with the other variables (all rs < .21, all ps > .10). There was a main effect of sex on ST total scores (F[1,56] = 10.91, p = .002, η_p^2 = .16), *self-forgetfulness* scores (U = 118.50, Z = 4.64, p < .001, η_p^2 = .35), and a suggestive effect on ISES scores (F[1,56] = 3.95, p = .052, η_p^2 = .07), with women scoring higher on all three scales. There were no main effects of sex for WSGC (F[1,56] = 0.01, p = .94), ISHD (F[1,56] = 0.18, p = .67), or MODTAS (F[1,56] = 0.04, p = .84).

As expected, there were multiple significant correlations among the research measures (see Table 4). Along with inter-correlations between the behavioral and experiential hypnotizability measures, MODTAS correlated with the WSGC and ISHD, but not the ISES. The ST total score correlated with all of the hypnotizability measures, Self-forgetfulness and Transpersonal identification correlated with ISHD scores, and Self-forgetfulness correlated with ISES scores. Finally, MODTAS correlated with the ST and all of its subscales.

[2] This method uses a non-normal distribution such that critical values for z' differ from those typically used with z tests, hence the lower, yet statistically significant, value reported here (see MacKinnon et al., 2002).

A series of regression analyses were performed to examine the utility of the different measures in the prediction of the behavioral and experiential components of hypnotizability. When MODTAS, ISHD, and ISES were regressed on WSGC scores, the overall model was statistically significant, $R^2 = .70$, $F(3,54) = 31.57$, $p < .001$. ISES ($\beta = .82$, $t = 7.58$, $p < .001$) and MODTAS ($\beta = .19$, $t = 2.06$, $p = .045$) were the only independent significant predictors (ISHD: $\beta = -.01$, $t = -0.09$, $p = .93$; ST: $\beta = -.09$, $t = -0.91$, $p = .37$). This supports the claim that ISES mediates the relationship between ISHD and ST and WSGC scores, but indicates that the relationship between WSGC and MODTAS scores is independent of ISES scores, because the latter two are uncorrelated.

Table 3.
Descriptive statistics for the research measures for females ($n = 33$), males ($n = 25$), and the total sample ($N = 58$).

	Females	Males	Total
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
WSGC	4.39 (1.98)	4.44 (2.55)	4.41 (2.22)
WSGC ISES	30.64 (8.30)	26.40 (7.69)	28.81 (8.25)
ISHD	16.73 (6.34)	16.00 (6.66)	16.41 (6.43)
MODTAS	51.54 (24.41)	52.88 (23.82)	52.12 (23.95)
ST	14.09 (5.95)	9.40 (4.44)	12.07 (5.80)
Self-forgetfulness (ST 1)	7.15 (3.07)	3.04 (2.52)	5.38 (3.49)
Transpersonal identification (ST 2)	4.55 (2.27)	4.32 (2.41)	4.45 (2.31)
Spiritual acceptance (ST 3)	2.39 (1.98)	2.04 (1.46)	2.24 (1.77)

Next, ISHD, MODTAS, and ST were regressed on ISES scores, yielding an overall significant model, $R^2 = .53$, $F(2,55) = 19.91$, $p < .001$. The ISHD was the only independent predictor of ISES scores ($\beta = .69$, $t = 6.81$, $p < .001$; MODTAS: $\beta = -.11$, $t = -0.98$, $p = .33$; ST: $\beta = .15$, $t = 1.27$, $p = .21$). This lends support to a mediation model in which ISHD mediates the relationship between ST and ISES scores.

Finally, a regression analysis on ISHD scores with MODTAS and ST as predictors was also significant, $R^2 = .15$, $F(2,55) = 5.00$, $p = .010$. Neither MODTAS ($\beta = .16$, $t = 1.06$, $p = .30$) nor ST ($\beta = .29$, $t = 1.93$, $p = .059$) exhibited independent effects. This demonstrates that the two variables' utility in the prediction of ISHD scores overlaps.

The previous findings cumulatively suggest a model in which ISHD mediates the relationship between ST and ISES and ISES mediates the relationship between ISHD and WSGC, whereas, MODTAS has a direct path to the WSGC. On this account, absorption and self-transcendence facilitate unusual experiences during hypnosis such as cognitive (the experience of fascination) and perceptual (temporal distortions) alterations. These experiences inform the experiential concomitants of hypnotic responding, which in turn influence behavioral hypnotizability, which itself is also directly influenced by absorption.

Table 4.
Correlation matrix for the research measures.

	ISES	ISHD	MODTAS	ST	ST 1	ST 2	ST 3
WSGC	.82***	.61***	.29*	.30*	.23	.21	.25
ISES		.71***	.19	.34**	.36**	.18	.17
ISHD			.31*	.37**	.33*	.32*	.16
MODTAS				.54***	.36**	.58***	.31*
Self-forgetfulness ST 1					.84***	.77***	.62***
Transpersonal identification ST 2						.40**	.24
Spiritual acceptance ST 3							.43**

* $p < .05$, ** $p < .01$, *** $p < .001$

DISCUSSION

Our studies extend previous research on the relationship between mental boundaries, absorption, self-transcendence, and hypnotizability. Although the correlation between the HGSHS and the overall score for boundary thinness was not significant, its magnitude ($r = .13$) was similar to those of the two other studies using those questionnaires, so the overall pattern shows a positive but small correlation between these domains. This weak correlation then appears to be stable irrespective of the experimental context in which the measures are administered. We should point out that we replicated a significant correlation between absorption and hypnotizability even in both a minimal context procedure (study 1) and independent context procedure (study 2).

One of the aims of the first study was to test the prediction that boundary thinness was more closely related to involuntariness during hypnotic responding than to behavioral hypnotizability, as has been previously found with emotional contagion (Cardeña et al., in press). In line with this prediction, the total scale and various subscales measuring boundary thinness correlated with absorption, involuntariness, and the reporting of unusual experiences during hypnosis, but not with behavioural responsiveness. The reason may be that performance on hypnotic behavior scales is multidimensional, involving for instance compliance and the propensity to become absorbed and have unusual experiences. It may be that boundary thinness is related to subjective experiences related to hypnosis, rather than to the compliance factor of hypnotic responding..

Although just a first step, our mediation analysis suggests that involuntariness during hypnotic responding mediates the relationship between absorption and hypnotizability. One of us advanced earlier the theory that absorption reduces the frequency of meta-cognition, which underlies some experiences of voluntariness (Cardeña & Spiegel, 1991), a proposal consistent with that of lowered supervisory attentional control during hypnosis (Jamieson & Sheehan, 2004). The results indicate that the various BQ subscales forming the World subscale point to a different domain than hypnosis, thus supporting the idea that what underlies behavioral and, especially, experiential hypnotizability and related constructs is the propensity to have anomalous experiences, rather than the blurring of conceptual boundaries. In a similar fashion, Glisky and collaborators (1991; 1993) found that hypnotizability is unrelated to political liberalism, a facet of openness to experience. Thus, efforts such as those of Rawlings (2001-2002) to find different factor analyses for the BQ should continue, and, more generally, convergent and discriminant analyses with items, subscales, and biological markers (e.g., Lichtenberg et al., 2004), need to be conducted to get a better grasp at the processes underlying hypnotizability.

In the second study, we evaluated the relationship between self-transcendence, hypnotizability, and absorption. The lower scores than reported with North American samples probably indicate a

general tendency for Swedish samples to score lower on these type of measures, at least when the measures are in English rather than Swedish (cf. Cardeña, Kallio, et al., 2007). Results replicated a modest positive correlation between absorption and hypnotizability using an independent-context procedure. More importantly, hypnotizability indices, especially experiential ones, had various positive correlations with self-transcendence, as did even more clearly absorption. The effect size for the correlations between self-transcendence and various measures of hypnotizability compare favorably with reported correlations between hypnotizability and openness to experience even when analyzing different factors of the traits (Glitzky et al., 1991, 1993). These results support the propensity to have unusual experiences as a personality trait, distinct from general opennes to experience or mere behavioral compliance.

Another potential area of inquiry is whether different types of high hypnotizables (Barber, 1999) manifest self-transcendence differently. For instance, Crawford (1982) found three different factors: one involving high hypnotizability, imagery, absorption, and positive daydreaming, another one was dysphoric daydreaming, and the third was lack of attentional control. In order to better understand these relationships, in-depth research looking at different cognitive processes with both quantitative and qualitative measures is called for. Structural equation modelling should be undertaken to contrast unitary and multiple latent variable models of these constructs.

Another research path that should be developed is the longitudinal effect of the self-transcendence trait, considering that other personality traits have shown to be as influential as socioeconomic status or cognitive ability in predicting important life outcomes (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Although this and other studies do not address whether a self-transcendence trait is best considered as a permeability between conscious and unconscious processes instead of as, say, the ability to enter different states of mind and anomalous experience (Cardeña, Lynn, & Krippner, 2000; Putnam, 2005), they all support the notion of important individual differences in the propensity to experience anomalous perceptions, as Myers, James, and others proposed long ago. And there is good reason to suppose that this personality trait may be more directly related to psi experiences and, perhaps, performance. Hypnotizability testing contributes to the assessment of this personality trait by being a procedure that is likely to evoke unusual behaviors and, especially, experiences that may not be so readily experienced in everyday life even by those predisposed to them. In addition, as has been shown (Bowers, 1973), the interaction between personality traits and environmental cues is a better predictor of behavior than mere paper and pencil measures of traits. The characteristics and behavior of the researcher (Silverman, 1974), the interaction between the experimenter and the participant (Schlitz, 1992), and specific procedure to elicit self-transcedent cognition remain essential variables in our understanding of what may happen during a psi experiment.

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A CONTROLLED LONG DISTANCE TEST OF A PROFESSIONAL MEDIUM[1]

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ABSTRACT

Suitable methods for testing alleged mediums are still debated after a century of research. In this study a professional medium was tested using a double-masked, long distance protocol with seven male sitters who rated how each statement and overall readings applied to them; they also completed a measure of paranormal belief. The experimenters rated the specificity of the statements. Statement specificity was negatively correlated with applicability, whereas paranormal belief was positively related to overall applicability ratings, but not to sitters' ratings of their target reading. No sitter rated his target reading as the most applicable and the statistical analysis based on the Pratt and Birge (1948) technique did not support the hypothesis of genuine mediumistic ability. Possible reasons for these results are discussed as are methodological issues in the quantitative assessment of mediumship.

INTRODUCTION

Methods for testing alleged mediums have been the centre of much discussion and controversy for a long time (O'Keeffe & Wiseman, 2005; Schouten, 1994). O'Keeffe and Wiseman (2005) argue that the methodological problems have centred around three key issues: (A) the need to control for sensory leakage, (B) the need to accurately assess the generality of the mediums' statements, and (C) the need for masked judgment. As a response to these shortcomings, they developed a controlled procedure for testing mediums. Controls for sensory leakage should prevent the medium from gaining information about sitters via normal means; the medium should not be able to ascertain information on the sitters prior to the reading and verbal and non-verbal cues should be prevented during the reading. The assessment of the generality of the statements has been much debated, but probably the most widely employed procedure is that of Pratt and Birge (1948), in which a small number of sitters receive a reading from a medium and are asked to blindly rate both the reading intended for them (the *target* reading) as well all the other readings (the *decoy* readings). This procedure was employed here and is described further below. The need to ensure proper masked judging arises from observations that sitters rate mediumistic readings in very subjective ways (Hyman, 1977; Wiseman & O'Keeffe, 2001) because of personal beliefs and psychological needs, selective recall, forgetting, wishes to please the medium, and other reasons. This subjective rater bias is not totally eliminated by the Pratt and Birge procedure, since subtle temporal cues (e.g., mentions of the weather, time of day, public events) in the statements might reveal at what day or time the reading was given, allowing the *recipient* (sitter for whom the reading is intended) to infer if s/he is the recipient or not (O'Keeffe & Wiseman, 2005). To overcome this difficulty, O'Keeffe and Wiseman used rooms that isolated the sitters from obvious sources of external events and counterbalanced scheduling of the sitters' readings.

Robertson and Roy (2001; 2004; Roy & Robertson, 2001) have carried out various experiments with alleged mediums, varying the circumstances of the sessions. They have presented supportive evidence

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that the mediums were able to acquire ostensibly veridical information, since recipients significantly accepted the mediums' statements as more relevant to their lives than did non-recipients. The effects seemingly could not be explained as the result of verbal or non-verbal cues or sitters' knowledge of whether they were the recipients or not. The Robertson-Roy Protocol (Roy & Robertson, 2001) in full form definitely seems worth exploring further, but it is not designed for long distance experiments and it is time consuming.

Emily Kelly (2007) recently used proxy sittings to control for sensory leakage in tests of alleged mediums. In the second phase of this experiment, which yielded significant results, she or her colleague acted as proxy sitters and recruited the real sitters from among people they knew. Kelly states that the proxy sitters knew little about the deceased individuals and sitters. The procedure involved presenting mediums with the name, birth date, and a photograph of the deceased individuals. Sensory leakage through the verbal responses of the proxy sitters to readings of the few people they did know beforehand cannot be ruled out since one of the sitters was not masked to the photos, but a comparison between the unmasked and masked proxy sitters revealed that both obtained significant results. Although the chosen photographs were considered 'neutral' and did not involve specific activities, it is possible that the photos allowed for the use of cold reading techniques, and sending them to the mediums in advance reduces the control for possible fraud, however unlikely. Kelly also edited the transcripts of the sessions to remove fillers and identifying information derived from the photos before the sitters actually chose which transcript referred to them. Using a masked editor would be a methodological improvement over this procedure.

Gary Schwartz and colleagues (Schwartz *et al.* 2001; Schwartz, 2003) have also conducted a series of experiments with mediums and concluded that they obtained convincing evidence for the survival hypothesis. The experiments have been criticized (Wiseman & O'Keeffe, 2001; Hyman, 2003; 2003b) for not being double masked, for choosing sitters with a disposition towards the survival hypothesis, for lacking controls for sensory leakage from the recipients, and for allowing subjective rater biases to influence the mediums' accuracy scores. Schwartz replies (2001; 2003b) that the research team chose more naturalistic experimental designs to develop professional trust with the mediums and to examine how mediumship is often conducted in the field. They did not intend to eliminate these possible explanations, but to minimize them in an exploratory phase, and slowly work towards more controlled experiments, in which they have continued to get significant results (Beischel & Schwartz, 2007). As discussed later, a more naturalistic approach may present certain advantages.

This experiment was tightly controlled and adds some procedural refinements to the above mentioned studies. Sensory leakage was prevented by the use of a double-masked, long-distance design. Statement specificity was rated by the experimenters under masked conditions and sitters rated the extent to which all statements and readings applied to them. The medium's reported confidence in each reading was compared to the applicability ratings and transcriptions were assembled in sets counterbalanced as to both order and status (target or decoy) for each sitter.

Evaluating the possibility of genuine, mediumistic ability, this experiment tested four predictions. The first primary prediction was that target readings would receive greater applicability ratings than decoy ones. The second held that statement specificity would be negatively correlated with averaged sitter applicability ratings, but positively correlated with the recipient's applicability rating, since highly specific statements should more often fit the recipient than any other sitter. The third prediction was that sitters' average ratings would correlate with paranormal belief and confirm the notion of a subjective rater bias. The fourth, exploratory, prediction was that the medium's self-reported confidence levels would be related to recipients' applicability ratings. This would corroborate the phenomenological reports of mediums' ability to feel when there is a 'reliable' connection with a putative paranormal information source.

METHODS

Participants

The medium

The anonymous medium is internationally renowned and is regarded as an excellent medium in spiritualist circles. For over twenty years she has worked extensively as a medium in a variety of private and public settings. She provided informed consent and did not receive any compensation. She had not previously participated in any controlled experiments of her alleged mediumship ability.

The sitters

Seven men ranging in age from 28 to 68 years (M = 38.00, SD = 15.55) participated as sitters and provided informed consent. None reported having been to a medium before. All had lost at least two *significant* persons, defined as "someone with whom you had a personally important relationship, not just someone you knew superficially." Three of the seven had lost at least one *close* person, defined as "someone you loved, shared your innermost secrets with, or cared deeply about." Six sitters had lost a significant or close person within 10 years and four within 5 years.

Materials

The Revised Paranormal Belief Scale (RPBS; Lange, Irwin, & Houran, 2000; Tobacyk, 1988; Tobacyk & Milford, 1983) was used as a measure of paranormal belief. It has twenty-six items anchored on a seven-point Likert scale and two scales that measure traditional paranormal (TPB) and new age (NAP) beliefs.

For audio recordings we used a Mini Disk SHARP Digital Audio Recorder, MD-MT20. This unit performs by 24-bit ATRAC encoding and has an adjustable record-level, which can reduce low-frequency noise. An external microphone on a stand was connected to the MT20.

For video and secondary audio recording we used a Sony DCR-IP7BT digital camcorder that records MPEG-2 video. All recordings were of satisfactory quality.

Procedure

Experimenters 1, 2, and 3 correspond to the first, second, and third authors. Throughout the experiment, E1 was masked as to the identity of the sitters. Similarly, E2 and E3 had no contact with the medium. No information concerning the medium or the time or the place of the readings was disclosed to the sitters. No information other than the name of each sitter was provided to the medium at the time of the respective reading. Finally, the sitters were chosen to ensure that none had extremely unique names and the names were ethnically similar (Swedish-sounding). However, some information (e.g., sex, age) may have been inferable from the names, as discussed below. Sitter names were individually enclosed in sealed envelopes labelled with random numbers from 1-7 by E3.

The readings were supervised by E1 in Karlstad, Sweden. E1 conducted a search of the surrounding rooms for hidden cameras and microphones and covered up the windows. The medium sat in a chair behind a table with no tablecloth on which the microphone was placed on a stand. The video recorder was placed on a tripod at a distance of about three meters from the medium, ensuring the visibility of her full figure. Recording was initiated, the instructions were repeated, and she was given the large, sealed envelope. E1 left the room and closed the door.

After getting into an altered state of mind, of which she gave verbal reports at a later time, the medium opened the large envelope, and followed the same procedure for each reading. She opened a small envelope and silently read the name of the sitter and wrote the name down behind a plastic screen, so the name could not be seen on the video recording. She began and ended each reading by stating the respective reading number. She was instructed to not state the name of the sitter aloud, and she adhered

to this instruction. Following the completion of each reading, she provided a self-report of her confidence in the preceding reading (1: *Unconfident*; 2: *Somewhat unconfident*; 3: *Somewhat confident*; 4: *Confident*). The allotted time for each reading was 15 minutes. Each reading was timed by E1 and the medium was notified of the time remaining at 12 and 14 minutes into each reading. The medium was encouraged to take short breaks between each reading to avoid overflow of information from the preceding reading, and to "follow her natural rhythm," rather than sticking to a controlled schedule.

E1 subsequently examined the video and found no behaviour suggestive of chicanery or fraud. He transcribed the readings, removed extraneous details (e.g., comments at the beginning and end of a reading), and segmented them into series of statements (SOS). This procedure adhered to that used by O'Keeffe and Wiseman (2005). The full text and SOS for each reading were blindly examined and corroborated by E2 and E3. Each statement was rated for its specificity (1: *Overgeneral*; 2: *Somewhat general*; 3: *Somewhat specific*; 4: *Very specific*) by the experimenters, who did so masked to each other's ratings.

E1 next designed one rating set specifically for each sitter, with all seven SOS in each, placed in a double-counterbalanced order, which took into account both the placement of the target reading and the order of all the readings and was done to ensure that each sitter received a rating set with his target reading at a different position. Each sitter read the seven readings in full, followed by the seven sets of SOS.

The sitters completed the RPBS and provided ratings for individual statements and global ratings for each SOS. Participants were instructed to rate each individual statement for its applicability to their personal history and current life situation (1 [*Not applicable*] to 7 [*Very applicable*]) and globally rate the applicability of each SOS (1 [*Not applicable*] to 100 [*Very applicable*]). Participants were further instructed to briefly report the reasons why they gave their highest rating to a particular reading. Data were computed by E3 while he remained masked to the target readings.

Statistical analyses

To test whether the recipients' ratings were higher than expected by chance, a permutation analysis similar to the one employed in O'Keeffe and Wiseman (2005) was carried out. The Pratt and Birge technique (1948; Pratt, 1969) from which the analysis originates was designed to handle free-response data from psychic readings. All responses (in this case ratings) are arranged in a matrix with responses for targets placed diagonally through the matrix, and then whether the sum or the average of the numbers in the diagonal cells deviate significantly from a chance distribution is determined. When the sample size is below 10 (as it is here), it is possible to calculate this probability permutation analysis in which a computer program rearranges the numbers in the matrix in every possible way, computing the score (the sum or the average) of the diagonal cells every time. Statistical significance occurs if the proportion of the scores that are more extreme than the score in question is less than the criterion *p*-value (Edge *et al.*, 1986). (For a detailed discussion of this analysis, see also Greville, 1949; Scott, 1972; Thouless, 1949).

RESULTS

The readings ranged in duration from 5:01 to 12:45 min. (M = 8:41, SD = 2:55) and ranged in number of statements from 14 to 61 (M = 30.3, SD = 14.9). The medium did not report fatigue associated with the procedure and provided the relatively highest level of confidence in, and greatest number of statements for, the last reading.

Applicability Ratings

In contrast with the first prediction, no sitter chose his target reading as the most applicable. Target readings were ranked 3rd, 3rd, 3rd, 5th, 6th, 7th, and 7th as measured by the recipients' overall scores[2] (see Table 1). They were ranked 2nd, 2nd, 3rd, 5th, 6th, 7th, and 7th as measured by the recipients' average ratings of the SOS (see Table 2). Target rank derived from final rating and target rank derived from average statement ratings correlated significantly, indicating that the sitters' overall evaluation for each reading corresponded to their average rating of the single statements in each SOS (*rho* = .89, p = .008). Performing 10,000 permutations in a computer programme for the overall scores of the recipients yielded a z-score of – 1.2, p = .89. Ten thousand permutations for the recipients' average statement ratings resulted in z = - 1.3, p = .90. Thus, neither the overall scores nor the average statement ratings for the target SOS were significantly better than expected by chance. These results are not supportive of a genuine mediumistic performance during the experiment.

Table 1: Sitters' overall applicability ratings.

		Reading A	Reading B	Reading C	Reading D	Reading E	Reading F	Reading G	Total r
Sitter	A	**22**	25	10	15	20	23	7	122
Sitter	B	15	**17**	15	50	12	20	10	139
Sitter	C	32	82	**19**	29	47	61	31	261
Sitter	D	15	75	10	**20**	30	50	45	245
Sitter	E	50	55	70	60	**56**	45	40	376
Sitter	F	15	32	27	25	20	**19**	30	621
Sitter	G	6	10	4	5	11	9	**4**	49
Total c		155	296	155	204	196	227	167	
								Diagonal	**157**

Table 2: Sitters' average statement ratings.

		Reading A	Reading B	Reading C	Reading D	Reading E	Reading F	Reading G	Total r
Sitter	A	**2.55**	2.74	2.21	1.94	2.5	2.48	2.03	16.45
Sitter	B	3.36	**3.22**	2.41	4.09	2.93	2.9	2.28	21.19
Sitter	C	3.59	5.83	**2.79**	3.78	3.57	4.35	4.07	37.64
Sitter	D	3.09	4.87	2.14	**2.81**	3.71	3.58	3.82	24.02
Sitter	E	4.64	4.48	5.34	4.56	**4.64**	4.58	3.93	32.17
Sitter	F	2.91	4.43	3.34	3.56	2.43	**2.97**	3.84	56.19
Sitter	G	1.77	2.22	1.55	1.72	2.14	1.77	**1.43**	12.6
Total c		21.91	27.79	19.78	22.46	21.92	22.63	21.4	
								Diagonal	**20.41**

[2] When overall scores (contrary to instructions) were the same for two readings in a set (n = 2) the higher overall rank between the two was assigned to the one with the higher average statement score.

Confidence ratings

The medium's confidence ratings were relatively low with five ratings of 1 (unconfident) and two of 2 (somewhat unconfident). Contrary to the exploratory hypothesis, the medium's confidence ratings correlated negatively with the recipients' ratings of the readings: *rho* = - .80, p = .032, and non-significantly with the sitters' average statement ratings: *rho* = - .16, p = .74. The former correlation may be suggestive of psi missing, however, considering the small sample size and the low variance in the medium's confidence ratings, this should not be considered a crucial finding. Also, the medium's confidence levels did not correlate with the number of statements in a reading: *rho* = .32, p = .49.

Paranormal belief

The sitter's scores on the TPB (M = 25.15, SD = 7.15) and NAP (M = 23.94, SD = 3.16) measures were within the normal range for non-clinical samples (see Lange et al., 2000). The two measures were significantly correlated, *rho* = .79, p = .036. Average ratings significantly correlated with TBP (*rho* = 0.89, p = .007) and NAP (*rho* = 0.78, p = .04). This indicates that paranormal believers judged statements to fit their lives to a higher degree than non-believers. Neither subscale correlated with the target SOS overall ranking (TPB: *rho* = .06, p = .91; NAP: *rho* = .19, p = .69), or rank derived from average statement ratings (TPB: *rho* = - .29, p = .53; NAP: *rho* = .07, p = .88.).

Statement specificity

The three experimenters' inter-rater reliability concerning the specificity of the statements was adequate (Spearman *rho*s ranged from .46 to .53, $p < .001$). A significant, negative correlation was found between statement specificity and average rating from all sitters combined: *rho* = - .38, $p < .001$. However, in contrast with our prediction, the more specific a statement was, the *lower* the rating it received from the recipient (n = 212; *rho* = -.12, p = .073).

DISCUSSION

Methodologically this experiment was strictly controlled. The experimental conditions permitted a very small possibility of sensory leakage: the distance between the medium and the sitters was 800 kms, the principal experimenter (E1) was masked to the sitters' identities, and the secondary experimenters (E2 and E3) had no interaction with the medium and were masked to the target readings during sitter rating sessions. The sitters received no information about the medium, who was only presented the names of the sitters, the room was carefully inspected to minimize the potential for fraud, and the whole experiment was recorded on both video and audio. Some information may have been inferable from the sitters' names, but this was probably rendered more difficult as the medium was dealing with persons of a foreign nationality where naming trends were probably unknown to her. However, ruling out this confound seems impossible within this methodological framework.

The generality of the medium's statements were accurately assessed: each sitter rated all given statements and all given readings as a whole and all three experimenters rated all statements for their specificity. The sitters also rated the SOS masked as to which was their target reading and the SOS were administered in double-counterbalanced order.

Considering psychological variables, the medium seemed highly motivated to obtain recognizable information, her belief in mediumship is very high, and she reported being in her usual altered state of consciousness. These factors could normally be expected to contribute to a heightened chance for anomalous information transfer, as they often correlate with more positive scores on ESP tests (Palmer, 1997). On the other hand, all readings were given low confidence ratings by the medium; thus, it is apparent that this protocol did not provide an environment conducive to the medium's confidence in her

ability to obtain what she usually feels to be a "reliable" connection with a paranormal information source.

The finding that paranormal believers judge statements to fit their lives to a higher degree than non-believers support the notion that judging the accuracy of a reading is a highly subjective matter (Hyman, 1977; Wiseman & O'Keeffe, 2001), and replicate earlier findings (O'Keeffe & Wiseman, 2005; Robertson & Roy, 2004).

One potential limitation of this study is contextual; each statement was always presented to participants in the context of the series of statements proffered by the medium in the respective reading. This may facilitate a sitter bias in which two statements of relatively equivalent applicability drawn from different readings receive differential ratings due to the applicability of the surrounding statements. Foregoing the administration of statements in reading-based clusters and randomizing them may improve upon the internal validity of the experiment by reducing the potential for this contextual sitter bias. However, this sacrifices ecological validity since the meaningfulness (i.e. applicability) of a statement often resides precisely in the context. Thus, when measured quantitatively, the whole may well constitute more than the sum of its parts as judged in isolation. Future studies should consider this issue.

This study is naturally too small to draw any firm conclusions, but we think that the adopted protocol circumvented the methodological shortcomings that have plagued previous studies of mediums (see O'Keeffe & Wiseman, 2005). Improvements may lie in administering controls for sensory leakage in a way that does not allow for normal information transfer but at the same time allows for entanglement or 'organizational closure' to occur, as suggested by von Lucadou, Römer, and Walach (2007). This is highly speculative, but the medium in this experiment specifically mentioned the impossibility of "blending into" the mind of the sitter as a reason for her low confidence levels. Establishing a person-to-person contact at long-distance without losing the control for sensory leakage might be a worthwhile methodological challenge to accept for long distance studies of mediumship.

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BENIGN SCHIZOTYPY: INVESTIGATING DIFFERENCES BETWEEN CLUSTERS OF SCHIZOTYPE ON PARANORMAL BELIEF, CREATIVITY, INTELLIGENCE AND MENTAL HEALTH

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ABSTRACT

Belief in ostensibly paranormal phenomena has often been associated with poor critical thinking, suggestibility and psychopathology in the research literature. Other work has found that belief in the paranormal is multidimensional, with some aspects relating to mental health and others relating to psychopathology. Paranormal belief has been found to be highly correlated with the personality construct schizotypy (in particular that of 'positive schizotypy', indicative of unusual experiences, such as pseudo-hallucinations). Schizotypy is a personality continuum which may underpin both believing in and experiencing paranormal phenomena, and artistic creativity. However, cluster analyses have indicated that there are two types of high scorers on positive schizotypy – one relating to mental health (variously termed 'healthy', 'happy' or 'benign' schizotypy), and the other more to ill health ('high' schizotypy). The current study sought to replicate and extend previous work supporting the construct of the 'happy schizotype' and, by extrapolation, the 'happy believer in the paranormal'. 183 participants completed a battery of questionnaires including the short OLIFE (to measure schizotypy), the Sense of Coherence Scale (to measure mental health), four measures of creativity (Creative Activities, Creative Personality, Emotional Creativity and Creative Cognition), and the Vocabulary and Blocks Tests of the Wechsler Intelligence Scales. A cluster analysis of z-score transformed scores on the OLIFE measure of schizotypy was undertaken and a MANOVA run to compare scoring on each of the dependent variables. Findings partially support the notion of a happy schizotype, who is characterized by mental well-being, belief in the paranormal and who scores on highly on a range of creativity measures. No significant differences were found between the clusters in intelligence. Findings are discussed in terms of the prior literature.

INTRODUCTION

This paper explores schizotypy and its relationship to believing in the paranormal, mental health, creativity and intellectual functioning. In particular, the paper seeks to replicate and extend recent work by Goulding (2004; 2005) and others (Jackson, 1997; McCreery & Claridge, 2002) on the construct of the "happy" or "benign" schizotype. This research challenges the idea that there is a clear-cut and direct relationship between unusual experiences and beliefs (such as believing in paranormal phenomena) and psychopathology, and instead argues that schizotypal traits are associated with both psychopathology and well-being.

Schizotypy is a term derived from 'schizophrenic genotype' and indicates a greater disposition toward schizophrenia (Claridge, 1997). Schizotypy is understood in two forms in the research literature. Advocates of a quasi-dimensional approach consider that schizotypal traits exist on a dimension but their presence is indicative of (future) psychopathology (e.g., Eckblad & Chapman, 1983). Others construe schizotypy as a personality dimension (the fully dimensional approach). Advocates of a fully

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dimensional model of schizotypy (e.g., McCreery & Claridge, 1995) argue that, rather than being associated with psychosis per se, in a categorical manner (meeting the diagnostic criteria for Schizotypal Personality Disorder or Schizophrenia), schizotypy is a personality continuum upon which all people vary. In this model schizotypy is neutral in terms of mental health, but interacts with risk (e.g. stressful events) and protective variables (e.g. supportive social networks), leading to 'healthy' or 'unhealthy' outcomes, such as creativity or psychosis (Bak et al., 2003; Brod, 1997; Claridge & Beech, 1995; Jackson, 1997; Nettle, 2006). Recent research has found direct support for the notion of schizotypy as a personality dimension, rather than a taxon that reflects diminished mental health (Rawlings, Williams, Haslam & Claridge, 2008). However, support for the continuum model comes predominantly from research that has found an association between schizotypy or anomaly-proneness and well-being (Goulding, 2004, 2005; Kennedy, Kanthamani & Palmer, 1994; Kennedy & Kanthamani, 1995; McCreery & Claridge, 2002). It is also supported by the high incidence of anomalous experiences in non-clinical populations. For example, in surveys of the general population approximately 10% report having had at least one, non-drug-induced, vivid hallucinatory experience (Bentall & Slade, 1985; Posey & Losch, 1983; Sidgwick, 1894). Hallucinations occur more frequently under conditions of bereavement, stress or trauma, as well as both sleep deprivation and sensory deprivation (Bentall, 1990; Lukoff, 2007; West, 1962). Yet, they vary in intensity and have been placed on a continuum with other, more common, perceptual experiences, such as hypnagogia and daydreams (Bentall, 1990; Fosse, Stickgold & Hobson, 2004), perhaps underpinned by an inhibitory mechanism, related to REM sleep, that enables 'dreaming awake' (Morrison, Wells & Nothard, 2002). Likewise, reports of subjective parapsychological experiences are prevalent in the general population. Cross-culturally, the most commonly reported experience is that of telepathy, by 33 to 50% of respondents (Glicksohn, 1990; Palmer, 1979; Rice, 2004; Targ, Schlitz & Irwin, 2000). Gianotti et al. (2001) suggest that paranormal experiences are underpinned by cognitive disinhibition, and propose a continuum of associative processing, from creative thinking, through paranormal ideation in healthy individuals to psychopathological delusion, disordered thought processes or apophenia – the "specific experience of abnormal meaningfulness" (p. 596). Bentall (2000) also considers that unusual experiences exist on a continuum, such that similar biases in information processing may contribute to both paranormal beliefs and delusions and normal and pathological hallucinations.

Schizotypy is actually a multi-factorial construct (e.g., Mason, Claridge & Williams, 1997). Four core traits are subsumed within the schizotypy construct. The most consistent factor – Unusual Experiences − includes magical or religious beliefs, altered sensations and perceptions of one's own body and the world, hypersensitivity to sounds and smells as well as a heightened sensitivity to the external environment; déjà vu, jamais vu, auditory hallucinations and pseudo-hallucinations (Mason, Claridge & Williams, 1997). These symptoms are thought to be underpinned by weak gating or disinhibition (at the sensory or cognitive level) (Claridge & Davis, 2003), which may lead to flooding of the contents of consciousness (Burch, Hemsley & Joseph, 2004; Frith, 1979; Gray et al., 2002). A second factor, Cognitive Disorganisation, reflects difficulties with attention, concentration and decision-making, alongside a sense of purposelessness, moodiness and social anxiety (Mason, Claridge, & Jackson, 1995). A third factor, Introvertive Anhedonia, is characterized by schizoid solitariness and lack of feeling (Claridge & Beech, 1995). Mason, Claridge and Jackson (1995) describe this factor as pervaded by a lack of enjoyment derived from social interaction and physical pleasure; alongside which is a withdrawal from emotional and physical intimacy and an emphasis on independence and solitude. A fourth factor, Impulsive Nonconformity, assesses disinhibited and impulse-ridden characteristics and violent, self-abusive and reckless behaviours. Mason et al. (1995) note that a more moderate score would indicate a preference for a free living and non-conforming lifestyle. It is related to Eysenck's Psychoticism Scale and hypomania and uncontrollable urges, etc. (Mason et al., 1997).[1]

[1] Loughland and Williams (1997) have argued that this factor is not truly an aspect of schizotypy, relating more to borderline thinking. However, Mason, Claridge and Williams (1997) point out that this factor emerges in six out of nine factor analyses as a factor.

Distinct profiles have emerged from cluster analyses of schizotypy dimensions[2] (Goulding, 2004, 2005; Loughland & Williams, 1997; Suhr & Spitznagel, 2001; Williams, 1994; Simmonds, 2003; Simmonds & Holt, 2007): 1) Positive Schizotypes, who score highly on Unusual Experiences only; 2) Low Schizotypes, who are not considered to be anomaly-prone and score at a low level on all dimensions of schizotypy; 3) High Schizotypes, who score highly on Cognitive Disorganisation and Introvertive Anhedonia in particular, but who also have high scores on Unusual Experiences; and 4) Negative Schizotypes, who score highly only on introvertive anhedonia. The Positive Schizotypy profile has been called "Happy Schizotypy" as this group appears to be prone to unusual experiences in the absence of psychopathology, having higher levels of mental health and well-being than High and Negative Schizotypes, and in some studies than Low Schizotypes (Claridge, 2001; Goulding, 2004; Jackson, 1997; McCreery & Claridge, 1995, 2002). It appears that while unusual experiences have been significantly associated with a sense of meaningfulness in life, optimism and well-being (Kennedy, Kanthamani & Palmer, 1994; Kennedy & Kanthamani, 1995), that this relationship requires low levels of 'negative symptoms' (Introvertive Anhedonia) and disorganized symptoms (Cognitive Disorganisation) (Goulding, 2004).

Irwin and Green (1998-1999) have asserted that the relationship between "schizotypy" and paranormal beliefs has now been firmly established. There is a clear overlap between believing in the paranormal and psychopathology (Berenbaum, Kerns, & Raghavan, 2000; Thalbourne & Delin, 1994) and psychological maladjustment (Irwin, 1991; Thalbourne & French, 1995). Others, however, have found that paranormal belief is actually unrelated to measures of maladjustment (Mehrabian, Stefl, & Mullen, 1997) and is even negatively correlated with psychopathology (Schumacker, 1987). Schofield and Claridge (2007) observed that Happy Schizotypes tended to evaluate unusual experiences as pleasant while High Schizotypes tended to evaluate them as unpleasant. They attributed this to Cognitive Disorganisation preventing the formation of a reassuring belief system. 'Peculiar' beliefs may operate as a buffer against stress (Boden & Berenbaum, 2004) and assist in the interpretation of unusual experiences, thereby preventing distress (Bell, Halligan & Ellis, 2007). In addition, work addressing childhood concomitants of paranormal belief has demonstrated a second route (in addition to childhood trauma) such that childhood fantasy also leads to paranormal beliefs (Lawrence et al., 1995), implying a role for imagination in the development of paranormal beliefs.

To some extent, this mixed literature may reflect the existence of several types of paranormal belief, which may each impact differently on other variables, including those indicative of pathology. There has been much controversy about the structure of the Paranormal Belief Scale (PBS) (Lawrence, 1995), which was designed to have seven subscales.[3] Interestingly, only three of the original subscales (traditional religious belief, superstition, and precognition) actually relate to irrationality (Roig et al., 1998). There are also four different types of "believer" (traditional religious believers, tentative believers, sceptics and new age type believers) according to a cluster analysis (Irwin, 1997), which may each relate differently to pathology and mental health. Houran, Irwin and Lange (2001) found that scoring highly on one PBS subscale (New Age Beliefs) was far more associated with psychopathology than scoring on the Traditional Paranormal Beliefs subscale. As such, "belief" in traditional paranormal phenomena may not be directly associated with pathology.

[2] Just as a factor analysis works by grouping variables that share common variance in a data set, a cluster analysis aims to group individuals or objects into 'clusters' according to their responses on a particular set of variables. As such, those in the same cluster are more similar to one another than they are to individuals in other clusters in terms of their response patterns (Hair, Anderson, Tatham & Black, 1998). Cluster analysis attempts to maximise homogeneity (the similarity) of objects within the clusters while maximising the heterogeneity (differences) between the clusters, allocating people to different groups according to their responses on variables of interest, here sub-scales of schizotypy.

[3] Although the Rasch form of the PBS contains only two subscales, New Age Beliefs and Traditional Paranormal Beliefs (Lange, Irwin & Houran, 2000).

The idea that paranormal belief overlaps with psychopathology is illustrated by the presence of many paranormal phenomena in older versions of the DSM classification for schizophrenia. This has carried over to their presence within the Magical Ideation Scale, a scale that assesses positive dimensions of schizotypy and was designed to be an indicator of later psychotic breakdown in those who are currently psychologically healthy (Eckblad & Chapman, 1983). Extreme scorers on the Magical Ideation Scale may indeed be at risk of psychosis, but those who attain above average scores may reflect an "anomaly-prone personality". Lynn et al. (1996) suggested that the overlap between fantasy proneness and magical ideation indicates that magical ideation is not pathological per se and may reflect imaginative tendencies, which we consider could be associated more with creativity. Indeed, magical ideation has previously been associated with creativity (Zanes et al., 1998).

There is some evidence that the negative dimension of schizotypy may relate to different types of belief (Irwin & Green, 1998-1999). It seems that the presence of negative schizotypal symptoms alongside positive is an indicator of possible psychopathology, and as such could indicate a different type of relationship to paranormal beliefs than positive (or negative) traits in isolation. Chapman et al., (1994) found that although magical ideation is related to psychotic breakdown, this is more likely if one has negative traits of schizotypy as well as positive. If one withdraws socially and develops a dislike of emotional and physical intimacy in conjunction with exhibiting anomalies in perception and cognition characteristic of positive schizotypy/schizophrenia this is associated with psychopathology.

Links have been made between the cognitive processes, styles or temperaments of both creativity and psychopathology.[4] In Eysenck's (1995) model, psychoticism underpins both trait creativity (originality) and psychosis. In the general population, creativity has been found to be positively correlated with psychoticism (e.g. Woody & Claridge, 1977) and the positive dimensions of schizotypy: hypomanic traits, perceptual aberration, unusual experiences and magical ideation (Nettle, 2006; O'Reilly, Dunbar & Bentall, 2001; Schuldberg, 1990, 2001). Debate continues about whether this relationship might be due to the flight of ideas and positive affect of mania, or to the loose associations of schizophrenic cognition, or to both (e.g. Schuldberg, 2001; Russ, 2001). Anomalous experiences more widely have also been found to be associated with artistic creativity (Holt, 2007; Kennedy & Kanthamani, 1995). That the interaction of schizotypal dimensions, rather than Unusual Experiences alone, may impact upon creative functioning is suggested by Nettle's (2006) finding that Introvertive Anhedonia was negatively correlated with artistic creativity,[5] flat affect, he suggested, preventing the channelling of anomalous experiences into creative output. This implication, that only Happy Schizotypy is related to creative functioning, is supported by models linking positive affect with creative functioning (Fredrickson, 2002; Isen, 1999) and the role of focus and determination in the creative process (Eysenck, 1995). Additional research has suggested that ego strength (Fodor, 1995) or high intelligence (Carson, Peterson & Higgins 2003) may interact with schizotypy to lead to creative achievement. Such a profile, termed 'controllable oddness' by Barron (1993), may increase facility of engagement with the creative process as proposed in two-factor models of creativity, where a creative outcome emerges from bi-phasic recursive looping between loose, fluid, associative, unstructured cognition and linear, sequential, goal-oriented cognition (Eysenck, 1995; Martindale, 1991; Finke, Ward & Smith, 1992). In dual-interactive models schizotypal states are moderated by variables such as ego-strength or high IQ – that is, there is 'something that allows' optimum deviations along a continuum of expanded to constricted thinking (Prentky, 2001). Flach (1990) presents a 'resilience hypothesis', where creativity requires ego-strength: autonomy, setting one's own goals, social poise, and a strong sense of responsibility. Carson et al. (2003) suggest that high intelligence may enable the insights gained through schizotypal thinking to be interpreted and applied in a healthy way, to be used creatively and integrated into the personality.

The current research examines the relationship of schizotypy clusters to scores on: a measure of mental health (the Sense of Coherence Scale); The Australian Sheep-Goat Scale; a battery of creativity

[4] A review of this literature is beyond the scope of this paper and the reader is referred to: Andreason (2006); Claridge, Pryor & Watkins (1998); Sass & Schuldberg (2000-2001).

[5] In fact, this was more related to scientific and mathematical creativity.

measures; and a measure of general intellectual functioning. The study was planned as a partial replication of Goulding's (2004; 2005) work on clusters of schizotypy, paranormal belief and mental health, but extends previous work by: 1) the inclusion of the impulsive nonconformity variable in the cluster analysis (after Simmonds-Moore & Holt, 2007); 2) assessing whether schizotypal profiles differ in degree of creativity; and 3) the inclusion of a measure of intelligence.

Hypotheses

1) Four schizotypy clusters will be extracted which will reflect Positive, Negative, High and Low schizotypy profiles.
2) Low and Positive Schizotypes will score higher than High and Negative schizotypes on the Sense of Coherence Scale.
3) Positive and High Schizotypes will score higher than the other cluster groups on paranormal belief.
4) Positive Schizotypes will score higher than the other cluster groups on all measures of creativity.
5) Positive Schizotypes will score higher than High Schizotypes on IQ.

METHOD

Design

This study was a planned cluster analysis of scores on the four subscales of a multidimensional scale for the measurement of schizotypy (using the OLIFE, Mason et al., 2005). The second stage of the study was a MANOVA analysis with four pre-specified clusters as the independent variable and the other psychometric measures (Sense of Coherence scale, Belief in the Paranormal, Creative Activities, Creative Personality, Creative Cognition, Emotional Creativity and IQ) as the dependent variables. The order of completion of the questionnaires was counterbalanced across participants.

Participants

Participants were recruited through opportunity sampling with psychology and sociology undergraduate and graduate students and the psychology participant pools at three universities in the UK: Northampton, Liverpool Hope and York and through friends of the authors. Overall, 183 participants took part in the study, of which 27 were male and 156 were female. The median age was 21 (range = 18 to 82). Participants were remunerated with £10. NH and SM both acted as experimenters.

Measures

The Emotional Creativity Inventory, Averill (1999). A 30-item inventory examining three facets of emotional creativity, based on Wallas's (1926) stage model of creativity: preparedness (α = .82); novelty (α = .84); authenticity and effectiveness (α = .83). Good reliability and construct validity has been established in a series of studies (see Averill [1999] and Ivcevic, Brackett & Mayer [2007] for reviews). This scale assesses emotional awareness and manipulation of cognitive content concerning affect, which may be used to solve interpersonal and intrapersonal problems, as well as being a resource for artistic creativity.

The Creative Cognition Inventory, CCI (Holt, 2007). A 29-item measure with a 5-point Likert response scale. The CCI measures a range of experiences and epistemologies that are rated according to their importance in an individual's creative process. It has demonstrated good internal consistency and a stable factor structure. Adequate construct, convergent and discriminant validity has been obtained (Holt, 2007). The CCI has two orthogonal sub-scales: Linear Cognition (logical analysis, planning,

careful selection of ideas) (α = .724) and Non-linear Cognition (paying attention to internal states, playful cognition, ideas arising in states along the dream-wake continuum, following hunches, instincts, intuitions and moments of inspiration in waking state, and a sense of ideas coming from 'something other') (α = .918).

The Australian Sheep-Goat Scale (Thalbourne & Delin, 1993). This scale was developed to assess degree of belief in paranormal phenomena. It consists of 18 items, with a five-point response scale ranging from 'strongly disagree' to 'strongly agree', with 'neutral/unsure' at the midpoint. Eleven items cover experiences of and belief in ESP (e.g. believing that ESP is possible and having had a precognitive dream), five items enquire about experiences of and belief in PK (psychokinesis), and two items about belief in an afterlife and the possibility of contact with spirits. The scale obtained adequate concurrent validity, test-retest reliability and internal consistency (Thalbourne & Delin, 1993).

The Short Oxford-Liverpool Inventory of Feelings and Experiences (Mason et al., 2005). This 43-item scale assesses four dimensions of the schizotypal personality trait: unusual experiences, cognitive disorganisation, introvertive anhedonia and impulsive non-conformity. Good reliability and concurrent validity with the long version of the O-LIFE (Mason, Claridge & Jackson, 1995) has been demonstrated.

The short-from of the *Sense of Coherence Scale* (Antonovsky, 1987). A 13-item measure with a 7-point Likert response scale, assessing well-being across three components of orientation to life: Meaningfulness, Manageability and Comprehensibility. Adequate reliability and validity has been established, with a mean Cronbach's alpha of 0.82. Test-retest reliability for the longer version ranges from 0.41 to 0.97 (Antonovsky, 1993; Ebert, Tucker & Roth, 2002; Pallant & Lae, 2002).

The Creativity Checklist, (Griffin & McDermott, 1998; Hocevar, 1979). A 34-item checklist, focusing on the visual arts, performance arts, writing, domestic arts and scientific activities, with a dichotomy between an active interest in these activities and recent experience of these activities. This checklist was based on the 90-item Creative Behavior Inventory (Hocevar, 1979). An interest and activity in each domain was found to be significantly and positively related to openness-to-experience on the NEO-PI (Costa & McCrae, 1992).

Gough's Creative Personality Scale, (1979). A 30-item sub-scale of the Adjective Checklist (Gough & Heilbrun, 1983), 12 adjectives being antithetical to and 18 being associated positively with 'creative personality'. Internal reliability, test-retest reliability and concurrent and predictive validity have been established (Domino, 1970; Gough, 1979; Gough & Heilbrun, 1983; Schaefer, 1972).

The Vocabulary and Blocks Tests of the Wechsler Intelligence Scales (Wechsler, 1999); verbal and visual-spatial indicators of general intellectual functioning.

Procedure

Participants signed up to the study and were sent a battery of questionnaires titled "Personality and Creativity Questionnaire". They were asked to complete this battery of questionnaires prior to participating in some tasks not relevant to the current paper (described in Holt, Simmonds-Moore & Moore, 2007). Finally, they were supervised while completing the Weschler Vocabulary and Blocks tests. When the experiment was complete, the participants were thanked for their time and given feedback on the purpose of the study. Participants were encouraged to ask any questions about the study before being given £10 in appreciation of their time and effort.

RESULTS

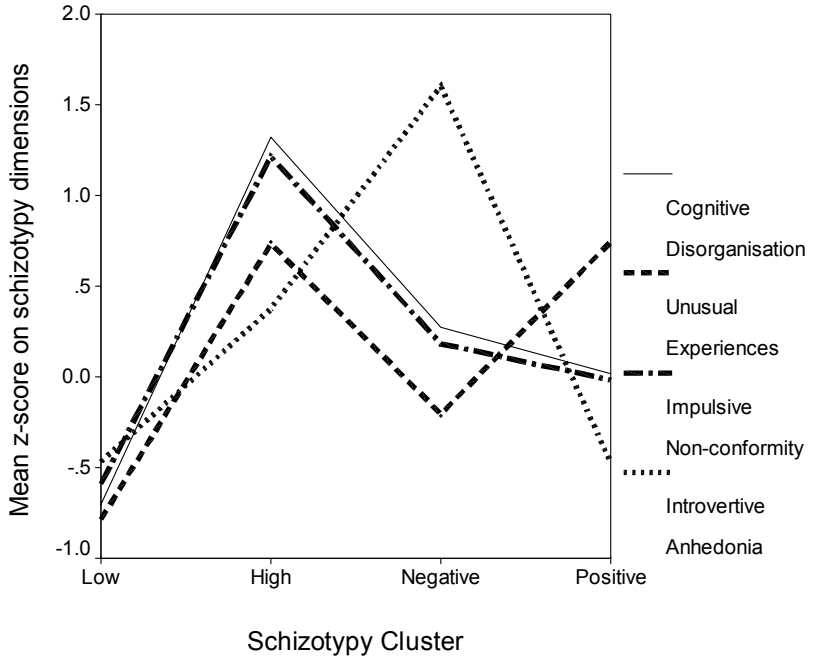
Cluster analysis

A non-hierarchical method was selected for use in this investigation, known as Quick Cluster, or K-means cluster analysis. The cluster procedure (in SPSS) begins with the pre-specification of the number of clusters required. The number of clusters was pre-specified as four (after Simmonds, 2003; Simmonds & Holt, 2007; Suhr & Spitznagel, 2000). *Z*-scores were computed for each participant on

each schizotypy dimension, based on which, the cluster analysis provided four 'profiles' that best distinguished homogenous groups of cases. Each participant was allocated to a profile. The average *z*-scores on each dimension, in each cluster, are presented in *Figure One*, where positive scores indicate above average scores compared to the entire sample and negative scores below average scores. The four schizotypy profiles emerged as follows, and are in accordance with previous work: Cluster 1) Happy or Positive Schizotypes (n = 52), scoring highly on unusual experiences only; Cluster 2) Negative Schizotypes (n = 29), scoring high on introvertive anhedonia only (characterised by flat affect and withdrawn behaviour); Cluster 3) Low Schizotypes (n = 71), scoring below the mean on all dimensions of schizotypy; and 4) High Schizotypes (n = 31), scoring above the mean on all dimensions of schizotypy: unusual experiences, introvertive anhedonia, cognitive disorganisation (social anxiety and difficulties with attention and concentration) and impulsive nonconformity (disinhibited and impulse-ridden characteristics).

FIGURE ONE

RESULTS OF A CLUSTER ANALYSIS PROCEDURE ON Z-SCORE TRANSFORMED SCORES ON THE SUBSCALES OF THE OLIFE



Differences in the schizotypy clusters according to paranormal belief, creativity and intelligence

The four cluster groups were compared according to scores on the Sense of Coherence scale, Belief in the Paranormal, Creative Activities, Creative Personality, Non-linear and Linear Cognition, Emotional Creativity and Intelligence. Table One delineates the mean scores and standard deviations on each of these for each cluster of schizotypy.

From *Table One* it can be discerned that the highest mean score for well-being (Sense of Coherence) was found in the Low Schizotypy cluster group (63.17), followed by the Positive Schizotypy group (57.00), and with lowest well-being in the High schizotypy group (41.67). For belief in the paranormal, the highest mean was found for those in the Positive Schizotypy cluster (53.38), closely followed by the High Schizotypes (52.03). On all of the creativity measures Positive Schizotypes had the highest mean scores, followed by High Schizotypes, except for the use of Linear Cognition in the creative process,

upon which Negative Schizotypes score the highest, followed by Positive Schizotypes. In terms of intelligence, High Schizotypes had lower mean scores than the other clusters.

TABLE ONE

MEAN SCORES OF EACH SCHIZOTYPY PROFILE ON PARANORMAL BELIEF, SENSE OF COHERENCE, CREATIVITY MEASURES AND INTELLIGENCE , AND ASSOCIATED PROBALILITIES

	Schizotypy Cluster							
	Low (*)		High (!)		Negative (●)		Positive (○)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Creative Activities	11.51 ○○	6.73	13.06	6.70	11.31 ○	7.30	15.63 **●	7.99
Linear Cognition	10.72	3.06	9.50	2.47	10.93	2.45	10.90	3.11
Non-linear Cognition	49.71 !!!○○○	13.39	60.53 ***	10.26	52.37 ○○	12.12	62.26 ***●●	12.63
Emotional Creativity	96.44 !! ○○○	11.96	104.58 **●	12.69	96.97 !○○○	11.30	107.50 ***●●●	8.98
Creative Personality	4.10	3.57	3.42	3.78	3.07 ○	4.15	5.42 ●	4.34
Cumulative Creativity Score	-.99 ○○○	2.71	.15 ○	2.46	-.96 ○○○	2.54	1.86 ***!●●●	2.92
Paranormal Belief	40.03 !!!○○○	11.86	52.03 ***	12.99	44.16 ○○	14.63	53.38 ***●●	11.79
Sense of Coherence	63.17 !!! ●●●○○	8.45	41.68 ***●●●○○○	9.70	51.38 ***!!!	10.67	57.00 **!!!●	7.85
Intelligence	.30	1.51	-.10	1.50	.28	1.77	.26	1.55

Note: The intelligence scores are not standardised to reflect scoring in relation to norms.
Note: Post hoc tests were conducted with Tukey's honestly significant test. Statistical significance is indicated in the table above, where $p < .05$: * from Low Schizotypy; ! from High Schizotypy; ● from Negative Schizotypy; ○ from Positive Schizotypy. Two of each symbol, e.g., ** indicates $p < .01$. Three of each symbol indicates $p < .001$.

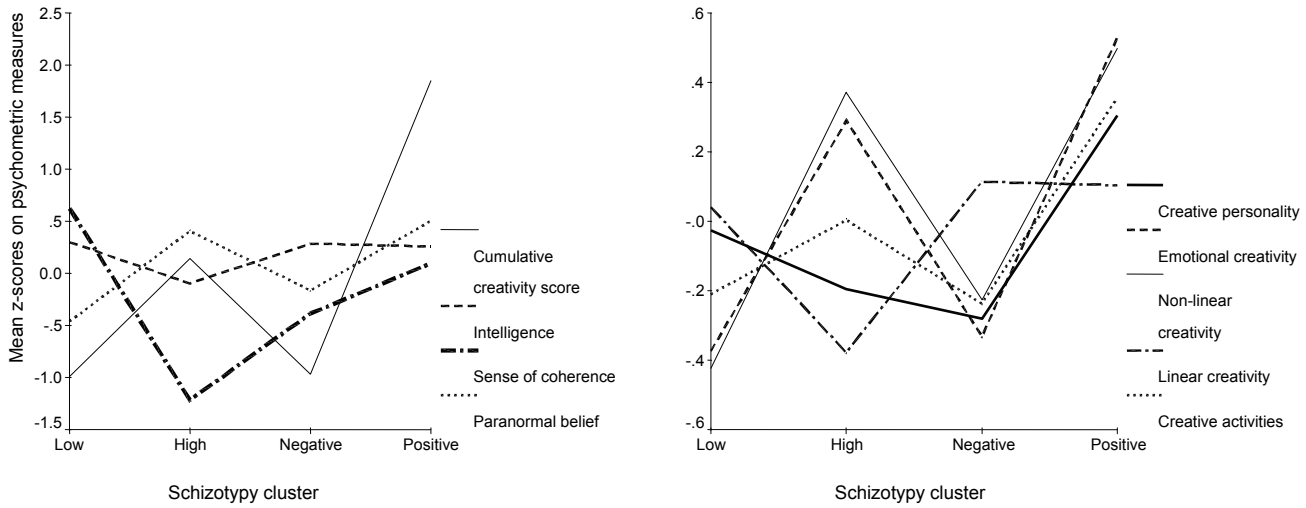
Figure Two presents the mean *z*-scores on the dependent variables for each Schizotypy cluster. This enables the patterns of scoring on these measures to be visually apprehended in relation to each other. It is noticeable that Positive Schizotypes score above the mean (zero) on each psychometric measure, thus combining high scores on belief in the paranormal, well-being and creativity. Negative Schizotypes only score above the average on intelligence and the use of linear cognition in the creative process, with scores below the mean on creativity, well-being and belief in the paranormal. Low Schizotypes show a similar pattern to Negative Schizotypes, except that they have a *high* level of well-being. Finally, High schizotypes show the most divergent pattern, with very low scores on well-being, low scores on creative personality and linear creative cognition, and high scores on belief in the paranormal, emotional creativity and the use on non-linear cognition in the creative process.

A MANOVA was conducted with the four schizotypy clusters as the independent variable and the eight psychometric predictors delineated above as dependent variables. Significant differences were found across the schizotypy clusters for: Belief in the Paranormal ($F_{183,3} = 13.946$, $p = .00000003$); Sense of Coherence ($F_{183,3} = 45.00$, $p < .0000001$); Non-linear Cognition ($F_{183,3} = 12.26$, $p = .0000003$); Creative Activities ($F_{183,3} = 3.871$, $p = .01$); Creative Personality ($F_{183,3} = 2.905$, $p = .036$); Emotional Creativity ($F_{183,3} = 12.021$, $p = .0000003$) and the Cumulative Creativity Score ($F_{183,3} = 12.398$, $p = .0000002$). However, there was no significant effect for either intelligence ($F_{183,3} = .509$, $p = .677$) or Linear Cognition ($F_{183,3} = 1.794$, $p = .150$).

Thus, Hypothesis Five, that, following Carson et al. (2003), Positive Schizotypes would score higher on intelligence than High Schizotypes, thereby suggesting that they more effectively handle being anomaly-prone due to intellectual functioning that facilitates the interpretation of anomalous experiences, was rejected.

FIGURE TWO

MEAN *Z*-SCORES OF EACH SCHIZOTYPY PROFILE ON: PARANORMAL BELIEF, SENSE OF COHERENCE, CREATIVITY MEASURES AND INTELLIGENCE



As delineated in *Table One*, *post hoc* tests showed that Low Schizotypes had significantly higher levels of well-being than the other Schizotypy profiles, including Positive Schizotypy. However, Positive Schizotypes had higher levels of well-being than both Negative ($p < .05$) and High Schizotypes ($p < .001$). Thus, Hypothesis Two, that although being anomaly-prone, Positive Schizotypes would show higher levels of well-being than schizotypal profiles characterised by high scores on negative and cognitively disorganised dimensions of schizotypy was confirmed.

In terms of belief in the paranormal, *post hoc* tests showed that Positive Schizotypes scored significantly higher than both Low ($p < .001$) and Negative Schizotypes ($p < .01$), and High Schizotypes significantly higher than Low Schizotypes ($p < .001$) – thus, partially confirming Hypothesis Three that High and Positive Schizotypes would be characterised by belief in the paranormal.

Finally, *post hoc* tests were conducted to test Hypothesis Four, that Positive Schizotypes would obtain the highest scores on measures of creativity. On the composite measure of creativity, Positive Schizotypes did have significantly higher scores than all of the other schizotypy profiles (refer to *Table One* for *p*-values). The remaining schizotypy profiles did not significantly differ from each other on the composite creativity score. As the composite measure consists of totalled *z*-scores on all of the creativity measures, high scores indicate high creative functioning across a range of parameters: creative personality, involvement in creative activities and the use of a wide range of cognitive strategies in the creative process. However, on the individual creativity scales, Positive Schizotypes only had significantly higher levels of creativity than Low and Negative Schizotypes. High Schizotypes also scored highly on emotional creativity and non-linear cognition. Thus, Hypothesis Four was only partially met. Positive Schizotypes did appear to be the most creative group, but High Schizotypes also scored highly on types of creativity associated with 'intrapersonal awareness' (Holt, Delanoy & Roe, 2004).

DISCUSSION

This study suggests that there are two profiles of paranormal believer, one being associated with High Schizotypy and low levels of well-being and the other being associated with Positive Schizotypy and higher levels of well-being. Thus, as well as providing evidence for the notion of the happy schizotype, this study provides evidence for the idea of the happy believer in the paranormal. This outcome lends further support to the clustering approach in terms of exploration of personality and belief. A scale-based approach would obscure fundamental differences between the profiles of scorers who both score highly on unusual experiences (the positive traits of schizotypy) and belief in the paranormal.

In terms of psychological well-being the findings suggest that those who had the Low Schizotypy profile demonstrated the highest overall score. As such, this implies that mental health is actually better if one has no schizotypal traits (although one may be less creative). However, it is of interest to note that the second highest score on well-being was for Positive Schizotypy (characterized by scoring high on Unusual Experiences and correspondingly low on Cognitive Disorganisation, Introvertive Anhedonia and Impulsive Non-Conformity), supporting the construct of the Happy Schizotype (Goulding, 2004; 2005; McCreery & Claridge, 2002). In contrast, and in line with our expectations (after Chapman et al., 1994), those who scored high on *all* dimensions of schizotypy demonstrated the lowest scores on the well-being measure. However, these results must be interpreted with caution as one cannot draw firm conclusions about mental health from a self-report measure.

A comparison of the schizotypal profiles on measures of creativity suggested that, overall, Positive Schizotypes were the most creative, supporting the notion that having unusual experiences without cognitive disorganisation or flat/negative affect contributes to creative ideation, temperament and activity. However, analyses of individual creativity measures showed that while Positive Schizotypes were consistently more creative than Low and Negative Schizotypes, their creativity scores, particularly on emotional creativity and the use of non-linear forms of creativity in the creative process, were not significantly different from those of High Schizotypes. The pattern of results suggested that Positive Schizotypes were better able than other profiles to use *both* linear and non-linear cognitive styles *and* to have high scores on other measures of creativity, including creative personality (associated with synthesising imaginative traits with the careful evaluation of ideas, hard work and determination) – in line with two-factor models of creative cognition (e.g., Martindale, 1991). Work with samples actively involved in creative pursuits might better differentiate between schizotypal profiles and creativity. It might be that creative *achievement,* rather than interest and ability, is a clearer distinguishing factor between High and Positive Schizotypes.

Happy schizotypes demonstrate an adaptive profile, incorporating belief in the paranormal and subjective paranormal experiences in addition to relatively high well-being. The study extends previous work by providing some evidence for the heightened creativity of Happy Schizotypes – seeming to combine different aspects of creativity (trait, behavioural, cognitive and affective). However, it was not found that high intelligence enabled this creativity (as suggested by Carson et al., 2003). The schizotypal profiles did not differ in general intelligence. Hence, unusual experiences (or the mechanism that underpins this) in the absence of cognitive disorganisation and flat affect may be factors enough to heighten creativity. Future work might profitably explore what types of unusual experiences, considering anomalous experiences more broadly, High and Positive Schizotypes are prone to, and whether these differ in type or quality.

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A CATCH-22: PSI AND EXPLANATION

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ABSTRACT

Despite progress in parapsychology, the evidence for psi is under utilised in the development of mind models in mainstream consciousness studies and philosophy of mind. This paper presents two arguments, based on the explanatory history of psi, which can be used to two-fold effect: first they provide the psi researcher with an understanding of the explanatory history of psi in relation to pertinent issues in philosophy of science which can be employed to defend the investigation of psi and elucidate those who are not familiar with the evidence for psi; and secondly, they are used to provide the non-psi aware researcher with a reassurance that psi is not necessarily a challenge to the currently dominant materialist-reductionist program. The first argument is based on an assessment of the publication of prominent psi literature in relation to the dominance of the covering law theory in philosophy of science. The second argues that the limits of science were formed when a substantially different explanatory scheme was assumed. Together they provide an understanding of the relevant explanatory issues regarding the study and use of psi in contemporary theory development in mind studies.

INTRODUCTION

It is fairly uncontroversial to state that psi is almost invisible in contemporary mainstream consciousness, neuro-science and cognitive studies as well as philosophy of mind. It is also fairly well accepted that the evidence for psi has the potential to inform the understanding of how the mind functions. However, there appears to be a gap between the continued build up of evidence for psi, which emanates from the field of parapsychology, and the use of psi in mainstream investigations of the mind. For those who are conversant with the evidence for psi, the situation is absurd. And yet it continues.

Suggestions that have been put forward to explain the ongoing gulf between the data that emanates from parapsychology and the lack of it in mainstream theory development. For instance, Charles Tart suggests that there is a fear of psi which inhibits the reception of psi in the broader scientific community and, indeed, sometimes influences parapsychologists themselves (Tart, 1984). And Nancy Zingrone puts the issue into a sociological context using thought on controversy from science studies (Zingrone, 2002) insights from which are used to formulate some suggestions on how to improve the reception of parapsychology in the mainstream (Zingrone, 2002, p.24).

This paper hopes to add another element that can be included that reveals a little more of the picture, and used to help defend the use of psi in current theory development, especially in philosophy. For, with the notable exception of the work on psi, mind and science by philosophers such as Stephen E. Braude, contemporary philosophy continues to ignore the evidence for psi.[1] And theorists who dare mention 'psi' in their work on mind theory continue to be taken to task by those concerned that psi challenges the currently dominant point of view that mind can be reduced to brain.

[1] On two separate occasions in two different university book shops, I have undertaken a review of all the indexes of the texts available in the field of consciousness studies and philosophy of mind. In both instances the results revealed virtually no reference to psi in the indexes and when it does appear the reference to it is negative and dismissive on the basis that fraud or coincidence can account for the phenomena.

A relatively recent example is the reception, by the mainstream, of the work of Dianne Powell and Ken Hennacy when they developed a model of mind that incorporated psi, initially developed to explain the capabilities of savants. (Powell, 2005, p.17) In response Peter Slezak, a philosopher who publicly commented on their work in the mainstream media, argued that psi does not exist and should not be incorporated into models of mind. (interview in Browning, 2005, online) the assumption being that the traditional mainstream assessment still holds; namely, that fraud, fluke or flaky experimental methodology can be (or perhaps must be) used to explain the apparent evidence for psi. However, when the evidence is reviewed, it is apparent that the amount of fraud or coincidence required to explain the phenomena in this way is far more vast than would normally be reasonably accepted in any other scientific endeavour.

A Catch-22 situation appears to obtain: if fraud or fluke can't account for the phenomena then some other theory must be employed, however, the mainstream will not accept psi until it is explained; but psi is unlikely to be fully explained until it is incorporated into more inclusive scientific problem-solving. There is therefore a tension between the apparent evidence for psi and lack of a working explanation for the phenomena. The tension is unresolved by an empirical analysis of the evidence. It is clear that there is evidence for psi events. What is disputed is how best to explain the events. Currently the evidence for psi remains without a dominant working theory that can explain the still anomalous phenomena, which further marginalises the potential to use the phenomena in theory development. At the moment, despite the valiant effort of high-level theoreticians, numerous theories compete with various ontological implications (for a summary of theories see Stokes, 1989). The focus of this paper is therefore on the explanatory history of psi, which helps to reduce the tension and resolve the Catch-22 situation.

Two arguments are subsequently presented: firstly, it is shown that an outmoded explanation theory has reinforced the assessment that psi is impossible, even in the face of continued evidence for the phenomena; and secondly, it is argued that the limits of science that were obtained during the creation of the modern world view had a significant impact on the explanatory category of the phenomena, the legacy of which continues. [2]

ANOMALOUS PHENOMENA AND EXPLANATION THEORY

It is interesting to note that the use of psi in cognitive science has not always met with the reception that it does today. A telling example of this is to be found in the work of Alan Turing in a seminal paper in which he devised the, now well-known, Turing Test: 'Computing machinery and intelligence'. In objection (9) The Argument from Extra-Sensory Perception Turing makes a specific reference to telepathy:

> I assume that the reader is familiar with the idea of extra-sensory perception, and the meaning of the four items of it, viz. telepathy, clairvoyance, precognition and psycho-kinesis. These disturbing phenomena seem to deny all our usual scientific ideas. How we should like to discredit them? Unfortunately the statistical evidence at least for telepathy, is overwhelming…if telepathy is admitted it will be necessary
> to tighten our test up. The situation could be regarded as analogous to that which would occur if the

[2] I am making a distinction between the mainstream assessment of psi (which is often based on the assumption that psi events are impossible) and the work of those theorists who incorporate psi into their work. In doing so, I do not intend to diminish the work of psi theorists who have developed models which incorporate psi. For instance Rupert Sheldrake's theory of morphic resonance and the work of Stephen E. Braude in philosophy of mind and science amongst others. However, the mainstream still evidently considers the use of psi controversial (e.g. the comments generated by the scientist Brian Josephson's statement about telepathy, see: http://www.guardian.co.uk/uk/2001/sep/30/robinmckie.theobserver). It is hoped that the arguments presented in this paper will help the mainstream mind theorists and other authorities to re-evaluate the assumption that psi can be ignored or dismissed and thus help promote psi-inclusive mind theories.

> interrogator were talking to himself and one of the competitors was listening with his ear to the wall. To put the competitors into a 'telepathy-proof room' would satisfy all requirements. (Turing 1950, pp. 453-454)

It is evident that Alan Turing believed that there was enough evidence for telepathy to warrant discussion of its confounding possibilities in this landmark paper. He was convinced that the evidence for psi was legitimate and required assessment in the development of mind theory. However, Turing's speculations are now considered an eccentric aberration, or even a misguided joke. For instance, contemporary mind theorists such as Daniel Dennett and Douglas Hofstadter dismiss the plausibility of Turing's assessment and remark with surprise in *The Mind's I* that:

> Apparently Turing was convinced that the evidence for telepathy was quite strong. However, if it was strong in 1950, it is no stronger now, thirty years later-in fact, it is probably weaker.

They go on to say:

> But it is safe to say that the majority of physicists-and certainly the majority of psychologists, who specialize in understanding the mind-doubt the existence of extrasensory perception in any form.

They do not give a reason why they doubt the existence of telepathy, so it is hard to gauge on what basis they make this claim. It could be that they do not think the evidence stands up to scientific scrutiny, regardless Hofstadter and Dennett finally conclude that:

> Turing took "cold comfort" in the idea that paranormal phenomena might be reconcilable in some way with well-established scientific theories. We differ with him. We suspect that if such phenomena as telepathy, precognition, and telekinesis turned out to exist (and turned out to have the remarkable properties typically claimed for them), the laws of physics would not be simply amendable to accommodate them; only a major revolution in our scientific world view could do them justice. One might look forward to such a revolution with eager excitement—but it should be tinged with sadness and perplexity. How could the science that had worked so well for so many things turn out to be so wrong? The challenge of rethinking all of science from its most basic assumptions on up would be a great intellectual adventure, but the evidence that we will need to do this has simply failed to accumulate over the years. (Hofstadter & Dennett, 1981, pp. 67-68)

The reception and possible use of psi phenomena in speculation about matters regarding consciousness certainly changed between the time Turing published his seminal paper and the contemporary assessment of his work by prominent mind theorists.

A related point is made in the article 'Complicating the conversation: Rhetoric, substance, and controversy in parapsychology' in which Nancy Zingrone looks at the rhetoric of scientific discourse in relation to two important early publications that deal with psi phenomena: J.B. Rhine's *Extra-sensory Perception* (Rhine, 1934) and *Extrasensory Perception After Sixty Years* by J.G. Pratt (produced with four colleagues) and published in 1940. Rhine's work was subject-based, contained personal anecdotes and did not adhere to the scientific reporting conventions at the time. In contrast Pratt et al's book was closer to acceptable scientific writing. The ensuing discussion in mainstream academia reflected the way that the results of psi experiments were presented in these two important works. The Pratt work, especially, was responsible for allowing for reasonable discussion about the evidence for psi in more mainstream scientific journals (Zingrone, 2005, p.18). It was, perhaps, this that allowed researchers such as Alan Turing to speculate on ESP in the mainstream. The open discussion, however, was short-lived as Zingrone notes:

> Suffice it to say that the controversy did abate for slightly more than a decade after the publication of *Extrasensory Perception After Sixty Years*, but archival research is needed to discover why that was. Were the critics merely tired of the argument? Because the controversy had shifted to the pages of the *Journal of Parapsychology*, was it just that psychologists and other scientists were no longer faced with the debate in their own literatures?' Whatever the reason, from 1940 until 1955 when G.R. Price's critique appeared in the pages of *Science*, the battle seemed to have been won. (Zingrone, 2005, p18)

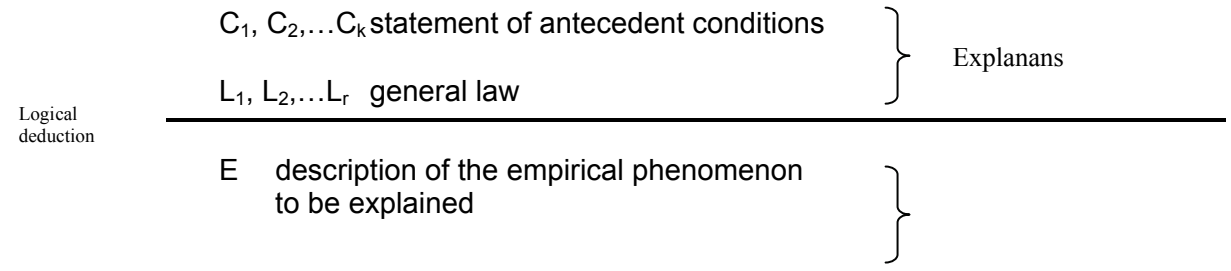
The next section of this paper attempts to answer the questions posed here as well as to explain why the current reception of psi in philosophy is so different to that at the time Turing was writing. It focuses on what was happening in philosophy which might have impacted on the reception of psi from the time the Pratt and Rhine works were first published, through to the publication of Price's article in *Science* in 1955 in which he makes a case, based on a Humean argument, that apparent evidence for psi can be accounted for by fraud and self delusion. From the tone and lack of supporting arguments in contemporary literature, as exemplified by the Turing example above, the matter is clearly not one of a rational assessment of the empirical data. Instead I suggest that something more fundamental occurred between these two times and that a, now outmoded, theory of explanation has informed the current assessment of the phenomena which should now be redressed in mainstream philosophy.

PSI AND THE COVERING LAW THEORY OF EXPLANATION

In this section I make a case that a chance congruence between the surge in publications outlining the evidence for psi prior to the 1950s, and the dominance of the covering law model in philosophy of science most likely influenced the mainstream assessment of psi and gave rise to the notion that psi cannot be accounted for by contemporary science. I outline the argument in the following steps; the basic tenets of the covering law theory are presented, then it is shown why the theory is problematic for explanation of anomalous phenomena such as psi, and finally I provide a chart detailing the time that the covering law theory was dominant in relation to the publication of prominent psi literature.

The covering law model

The deductive nomological (DN) model of covering law explanation theory was developed by the philosophers of science Carl Hempel and Paul Oppenheim as part of a broader assessment of explanation in the sciences. According to Hempel and Oppenheim 'to explain the phenomena in the world of our experience, to answer the "why?" rather than only the question "what?", is one of the foremost objectives of all rational inquiry' (Hempel & Oppenheim 1948, p. 135). Answers to why questions 'may be regarded as an argument to the effect that the phenomenon to be explained, *the explanandum phenomenon*, was to be expected in virtue of certain explanatory facts' (Hempel, 1965, p. 336) Under the DN model the fact in question is explained by an argument in the following form:



(Hempel & Oppenheim 1948, p.138)

Lines one and two are the premises and the third line is the logically deduced conclusion. The argument is the explanation and must be both valid and sound. So, for an event E to be explained there must be a statement of antecedent conditions and at least one general law (the explanans) which are used as premises in order to conclude E (the explanandum). Because of its structure and reliance on a general law, this form of scientific explanation has become known as deductive nomological (DN) model of explanation.

There are certain conditions that must be met for an argument of the DN type to be considered an explanation. Hempel further explains that:

> a DN explanation answers the question 'Why did the explanandum-phenomenon occur?' By showing that the phenomena resulted from certain particular circumstances, specified in C_1, C_2,…C_k, in accordance with the laws L_1, L_2,…L_r. By pointing this out, the argument shows that, given the particular circumstances and the laws in question, the occurrence of the phenomenon *was to be expected*; and it is this sense that the explanation enables us to *understand why* the phenomenon occurred. (Hempel, 1965, p.337)

Hempel and Oppenheim divide them into two categories: the logical conditions of adequacy and the empirical condition of adequacy (Hempel & Oppenheim, 1948, p.137). The logical conditions of adequacy that must obtain if the argument is to provide a valid explanation are threefold:

(derivability)	the explanandum must be logically derived from the explanans
(lawlikeness)	at least one of the explanans must be a general law
(empirical content)	the explanans must be empirically testable

And the empirical condition makes a fourth criterion that must hold if the argument is to serve as an explanation for the event in question:

(truth)	the sentences of the explanans must be true.

Only if all of these criteria are fulfilled can the argument be considered a legitimate explanation for the why question originally proposed (Hempel & Oppenheim, 1948, pp.137-138). Further to this, Hempel and Oppenheim explain that the model they have developed is also intended to predict what will happen if the same initial conditions are encountered. The predictive aspect is important to science and to their theory of scientific explanation. They state that:

> it is this potential predictive force which gives scientific explanation its importance: only to the extent that we are able to explain empirical facts can we attain the major objective of scientific research, namely not merely to record the phenomena of our experience, but to learn from them, by basing upon them theoretical generalizations which enable us to anticipate new occurrences and to control, at least to some extent, the changes in our environment. (Hempel & Oppenheim, 1948, p.138).

So if the deductive argument is both valid and sound, contains at least one general law and is empirically testable, then one should be able to use it as both an explanation and a means to predict the outcome of a similar situation.

Assessment of anomalous phenomena under the covering law model

It is not hard to see how the covering law model of explanation is going to pose problems for anomalous phenomena such as psi. If the covering law theory is correct, then a law of nature is required for any acceptable scientific explanation. However, putative psi phenomena are anomalous; outside accepted scientific law by their very definition. The philosopher C.D. Broad famously made a case in

1940 that psi phenomena contravene, not just laws of nature, but what he called Basic Limiting Principles which are:

> prior to and more fundamental than any named laws of physics: they are and have been accepted as items of basic common sense by many who have never benefited from any contact with systematic science. Like those named laws of physics, and like all other true laws of nature, these BLPs assert: not only that there in fact have been, are, and will be no occurrences incompatible with their own truth; but also, and more strongly, that such incompatible occurrences have been, are, and will be impossible. (Broad 1953, p7)

Broad subsequently identifies nine aspects of psi phenomena that contravene what is commonly thought possible. And although it can be argued that Broad's analysis requires ontological assumptions about the nature of mind and causation that could be challenged today, the basic point that psi is by its very definition anomalous still holds; psi is only thought to be apparent when all other 'normal' explanatory avenues have been ruled out.

At the time the covering law model obtained, the situation is not revisable unless either the covering law model is shown to be problematic or subsequent laws are discovered that explain psi. Put in terms of an outline of an argument, the situation for psi under covering law theory is therefore as follows:

PREMISE 1	Acceptable scientific explanations require that the explanandum is derived from a covering law and other conditions.
PREMISE 2	Psi is not covered by any known law, nor have any psi-specific covering laws been found (or are likely to be found)
CONCLUSION	Therefore, we have (and are likely to have) no scientific explanations that are inconsistent with the Skeptic hypothesis (namely that fraud, flawed methodology, flukes or self delusion explain psi effects).

Only if either the covering law model does not hold or if psi can be explained in terms of natural laws, can this argument be shown to be unsound. Pertinently, it is generally understood that the covering law model, though dominant during the 40s-60s, finally fell victim to significant problems (the problem of irrelevance, the problem of laws and the problem of symmetry) in the 1970s (Salmon, 1990, p.10) and it is now considered the 'the cornerstone of the old consensus' (Salmon, 1998, p.302). New models of explanation have been developed. For example there are now at least three competing explanation theories currently discussed in contemporary philosophy of science: causation theory, unification theory and the pragmatic theory of explanation such as that developed by Bas van Fraassen (not to be confused with the pragmatic tradition of William James). As Charles Adams succinctly phrases it: 'even if Hempel's…models have fallen from grace, it is not clear what has taken (or should take) their place.' (Adams, 1991, p.58)

Thus, the situation that obtained under the covering law theory, and which cut psi out of consideration, is no longer a legitimate appraisal of the situation. A re-evaluation can legitimately be called for on the grounds that an outmoded model of explanation informs the current assessment of psi in contemporary (mainstream) philosophy.

A chance congruence: Psi publications and the dominance of covering law theory

I have shown in the section above that the covering law theory is problematic for anomalous phenomena such as psi. It seems plausible to suggest that the dominance of the theory in philosophy influenced the subsequent reception of psi into more mainstream theory development in both philosophy of mind and related areas such as cognitive science. It is interesting to view the time that the covering law was dominant in relation to the publication of Turing's paper in 1950 and the early seminal publications that presented the experimental evidence for psi. The chance circumstance that the two

occurred together goes some way to explaining why at first psi was taken up and used in theoretical speculation, such as in Turing's paper, but also why, as the covering law theory became more and more dominant, the view that the phenomena could not be possible became prevalent and the study of the phenomena became taboo in contemporary mainstream theory development of mind. An article by George Price called 'Science and the Supernatural' was published in *Science* in1955 and it exemplifies the change in approach in the mid-1950s. In the article Price makes the case that apparent instances of psi must be attributed to fraud because they contravene too severely what is accepted in modern science, and he mentions the problem of laws for psi specifically (Price, 1955, p.361). The explanatory ground appears to be changing and psi phenomena subsequently are considered implausible.

It is interesting to note also that broader changes in concepts of scientific explanation also occurred at this time. During the 1930s and 40s the era of logical positivism was at its height. Under this school of thought explanation was not a goal of science. For the logical positivists, science developed theories and built on truths which were cumulative; knowledge grew as science progressed (Pitt, 1988, p.5). However, post World War II the logical positivists lost the dominant ground and logical empiricists such as Hempel dominated the mid-latter half of the century. They were instrumental in changing the assessment of explanation as an important goal of science (Salmon, 1999, pp.338-339). The reception of psi into mainstream theory development, even if speculative, appears to have changed as a result.

Here is a chart that depicts the scenario graphically:

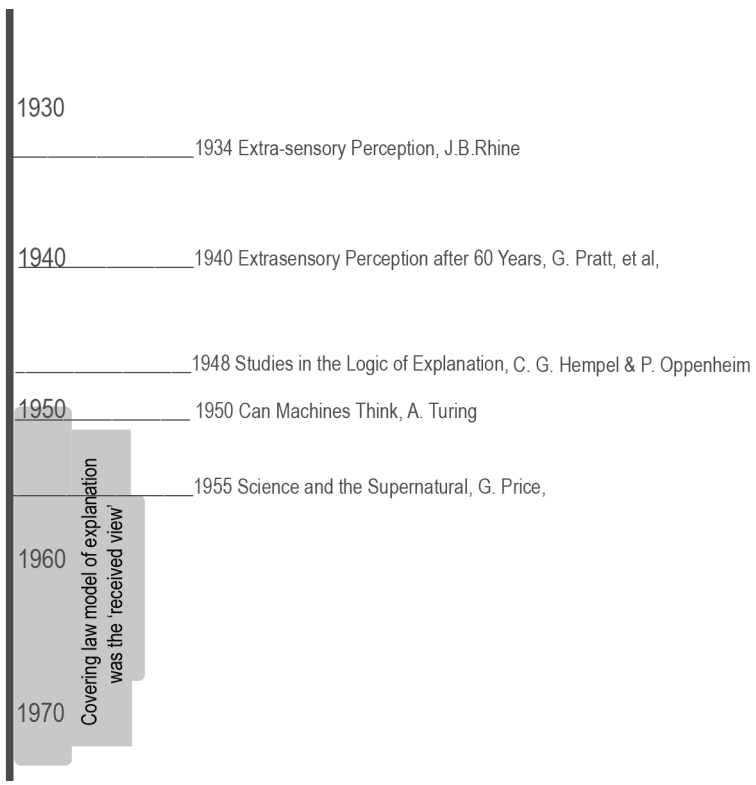


Fig. 1 A timeline comparing the publication dates of major psi publications with the time the covering law theory dominated explanation theory.

The salient point that I draw from this analysis is that in the early 30s and 40s, (when the psi experimental literature was first published and started to gain notoriety) the covering law theory was in its early stage of development, and did not dominate the philosophical landscape as it came to. In fact, the covering law theory, first formerly proposed in 1948, started to become dominant in the 50s and only left the scene in the early 70s.

Before the dominance of the covering law theory thinkers such as Turing could comment on the evidence for psi as a plausible element of speculation about matters of the mind. However, post the covering law theory such speculation is considered less favourably by mainstream mind theorists exemplified by comments such as those of Daniel Dennett. I suggest that the impact on the mainstream perception of the plausibility of explanation of psi was influenced by the covering law theory and that current philosophy and science is still assuming an assessment of psi using the, now outdated, explanatory situation.

This section has covered only a small period of time; the explanatory territory gets more complex still once historic trends of explanation are taken into consideration. So far, the assessment has presented a case for a review of the assumptions about potential explanation based on the unlawful nature of psi. There are, however, even larger explanatory trends that continue to influence the reception of psi in the mainstream. If psi's history as a once supernatural phenomena is put into context then it becomes even more apparent that these anomalous phenomena require consideration in contemporary development of mind theory and that it is the limits of science that were set at the foundation of the modern world view that might require tweaking. The argument that lends support for this assessment I call 'the historic account' and I outline it in the section below.

THE EXPLANATORY HISTORY OF PSI

The historic account is an assessment of the explanatory history of psi which shows that psi-like phenomena were once considered, by the mainstream, as supernatural[3]. It is admitted upfront that this account relies on an overview of trends and is a sketch of broad-scale changes, rather than a detailed historic account, the details of which, though fascinating, are beyond the scope of this paper. It is hoped that when viewed as such the account can be used as a rough guide to explanatory considerations regarding the current state of psi and the Catch-22 that is the focus of this paper. The historic account argues that there have been two transitions in the history of science that have informed the explanatory status of psi:

1) Middle Ages to the Modern world view
(roughly the 14th-18th centuries)

2) Modern world view to the Materialist world view
(roughly mid 18th and 19th centuries)

According to the scientific and religious scope of the time, the first transition placed psi-like events in the supernatural category of explanation. Currently, due to the second transition, psi is considered paranormal. The historic account maintains that it was the limits of mechanistic science that determined the scope of scientific explanation at the time the Modern world view was formed. At this time apparent psi events were considered supernatural in origin. Subsequently, with the rise of the materialist world view, the supernatural category become obsolete as an explanatory category within the framework. Therefore, under the materialist view, psi-like events are unable to be explained as supernatural, but nor can current scientific theory account for the phenomena. The historic account suggests that science is currently unable to conceive of how to account for psi because the limits of scientific explanatory scope regarding action at a distance were set during the end of the first transition, when scientific theory was influenced by mechanism.

[3] In using the word supernatural here I am drawing a distinction between the interpretation of psi events as either potentially explainable as ostensibly paranormal events and events that are interpreted as the result of intevention by a divine being or agent of a divine being.

First transition

From the 14th to the 17th centuries a gradual transition occurred in Western society that resulted in a situation whereby there were two explanatory categories: that of a law-abiding mechanistic physical category; and a supernatural, intangible category. Known as the mechanistic view of nature, science determined how the former operated and religious ideology the latter (Griffin, 1997, p.17). The change coincided with the developments in scientific understanding and the founding of the modern world view by scientists such as Isaac Newton. The view promoted the notion that God provides the mechanistic world with impetus, for instance:

> the mechanistic view of nature was also used, for example by Boyle and Newton, to argue for the existence of God: if nature was devoid of self-motion, there had to be a supernatural being to have put it into motion and also to have imposed laws of motion upon it. Newton also argued that the mechanistic materialistic conception of matter, according to which it has no hidden powers and acts only by contact, shows the need for a cosmic spiritual being to explain the mutual attraction of bodies (gravitation) and the cohesiveness of atoms in solid bodies. (Griffin 1988, p10-11)

It is not surprising that the division of explanatory categories at this time impacted on psi and placed them firmly in the supernatural category of explanation. Psi events do not appear to have any known mechanistic explanation and in the past, prior to the time the modern world view was formed, psi events were generally considered supernatural in origin. However, subsequent developments in science and explanation impacted on this initial assessment of psi in relation to the explanatory scope of science.

There are, of course, debates about when and how the transition occurred and, in particular, whether or not the medieval scientists pre-empted the changes that were to occur during the modern era. And Newton himself had a life-long interest in alchemy and other hermetic interests which could be interpreted as representing a medieval approach to scientific inquiry (Thomas, 1971, p.226). However, the intricacies of the discussions aside, the historian of science David C. Lindberg makes the point that 'If, methodologically speaking, the seventeenth century did not see a new world, it certainly saw a new day.' (Lindberg, 1992, pp.360-361)

Second transition

After the modern world view became dominant and explanation for psi was firmly grounded in the supernatural category, a second transition then occurred. The result changed the category in which explanation for such anomalous phenomena is sought. Griffin makes a case that from the mid-18th century and during the 19th century supernaturalism and dualism were gradually replaced by the now currently dominant materialist worldview. Furthermore explanation of reality is undertaken by reduction in terms of the four known forces electromagnetism, gravity and the strong and weak nuclear forces. Therefore under the materialist view, the supernatural category of explanation is obsolete.

The result of this second transition was that 'the supernaturalistic theism of early modernism transmuted into the naturalistic atheism of late modernism. Accordingly the mechanical philosophy's implication that events not understandable in terms of action by contact cannot happen *naturally* came to mean that they cannot happen *at all*' (Griffin, 1997, p.23). Psi phenomena, then, are currently difficult to explain, as they appear to resist mechanistic explanation in terms acceptable to current science, but nor can they be explained as supernatural as they have been in the past.

However, a new explanatory category has emerged which is now commonly ascribed to psi: paranormal. Or rather, ostensibly paranormal, because, as the philosopher Stephen E. Braude points out 'it is plausible to regard the domain of the paranormal as something that may change with time, as our thinking about the world becomes more sophisticated' (Braude, 2002, p.204). The combined effect of the two transitions thus places psi phenomena into the paranormal explanatory category because without recourse to the supernatural category of explanation and without any known explanation in science, psi is considered beyond the scope of science. This point is expounded upon below.

Result of the two transitions for psi

It is important to realise that the historic account puts the evidence for psi into explanatory context as it helps to explain why psi cannot be accounted for under the current scientific scope. For instance, to explain the influence that the modern worldview still has on the scientific perception of phenomena such as anomalous action at a distance Griffin points out that:

> In the dominant thinking of the time [Newton et al], the connection between the desire to exclude action at a distance in physics, on the one hand, and the desire to rule out all paranormal influence on and by human minds, on the other, was evidently something like this: given the dualism between (spiritual) mind and (physical) nature, excluding action at a distance from nature did not, strictly speaking, rule out the possibility that human minds might either receive or exert causal influence at a distance.
> (Griffin 1997, p20)

Possible explanation of psychokinesis was therefore excluded in order to keep all distant interaction with the world, in the spiritual or mental realm under a supernatural/dualist worldview. More broadly, under the modern worldview the evidence for psi, whether anomalous action at a distance or anomalous communication, was to be explained as supernatural and therefore outside of the realm of scientific inquiry and without further need to explain mechanistically in terms of natural laws. The result of this explanatory scheme was to exclude from the scope of science the means by which psi could be explained as natural. And with the subsequent change to predominance of the materialist worldview, combined with the decline of the supernatural/dualist worldview, evidence for psi events such as the movement of an object without any known mechanism or communication without the use of the five senses were left without recourse to either supernatural or mainstream scientific explanation.

The explanatory history of psi has informed some assumptions regarding the phenomena which, once made explicit, help put the current taboo that psi experiences in the mainstream into perspective. I have constructed a chart which clarifies how the sketch of trends outlined in this section impacts on the explanatory status of psi.

The chart is intended to illustrate the notion that the modern worldview was formed under the influence of mechanism when two explanatory categories were available for phenomena. However, the limits on science under the two-category mechanistic view influence the scientific assessment of psi events today thus relegating them to the unexplainable, paranormal category.

The historic account suggests that, if the body of evidence for psi is considered legitimate, then it is therefore pertinent to look at the perceived limits of scientific explanation in order to discover how best to approach explanation of the phenomena as natural.

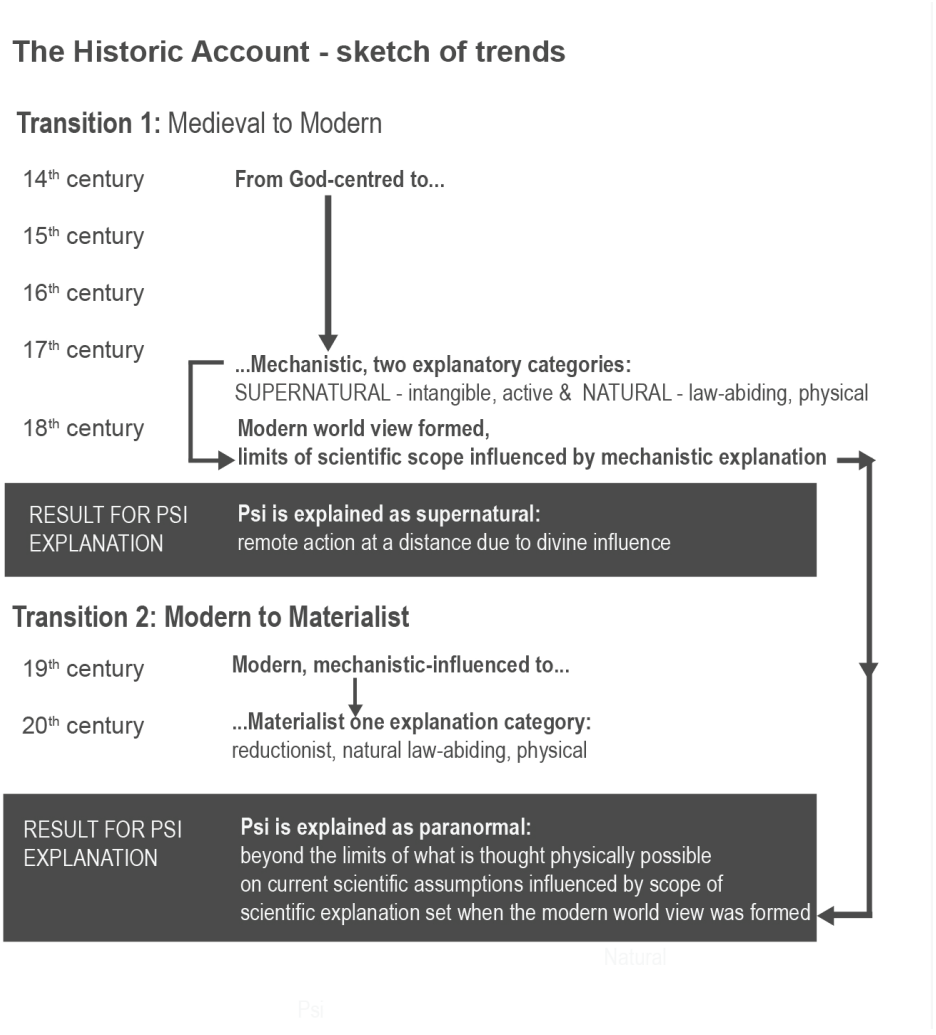


Fig. 2 A chart depicting the two major transition and the impact on explanation of psi

A possible argument against the historic account

The bare bones of the historic account are reasonably uncontroversial. We know that psi-events were once considered supernatural (from historic accounts of psi-events) and we know that psi is currently defined as paranormal (from dictionaries and encyclopaedias). There is also evidence for the two transitions that are thought to have occurred and which have impacted on explanatory issues regarding psi. If one allows that the historic account is a very broad brushstroke account then these claims are uncontentious. And, although I've drawn mainly on the work of one philosopher in the presentation of the information in this paper, other thinkers (such as Sheldrake 1990 and Randall 1977) present a similar analysis of the explanation of psi through history.

However, accusations could be made that the picture painted is too broad, there has never been a consensus on these issues, and there have been debates and opposing points of view along the way. For instance, one could argue that the sketch of trends and transitions does not do justice to the fact that there are philosophers of a dualist persuasion and there are, of course, scientists and philosophers who have supernatural belief systems, so for them the supernatural or immaterial mind explanatory category is still an option, despite the apparent dominance of materialism in the sciences.

I am only able to defend the historic account against this challenge by conceding that it is a valid criticism, the fine detail is missing in this sketch and the controversies are more complex than the

representation of historic transitions suggest. However, if it can be accepted as a rough indication of mainstream trends which have clear and obvious implications for psi, the historic account seems reasonable. This is because it is readily verifiable that psi is considered paranormal and psi was once considered supernatural by the mainstream authorities, even if there have been opponents to the mainstream assessment at these times. I argue then, that the historic account provides an important insight into the background beliefs that inform the mainstream assessment of psi. The most important assertion regarding psi taken from the historic account is the idea that the scope of science was set to deliberately exclude psi-like phenomena and that this background informs the assessment of psi today and this point gives some clues as to how best proceed in gaining a better understanding of the nature of psi.

REDUCING THE TENSION AND RESOLVING THE CATCH -22

I started this paper with a comment on the tension between the apparent evidence for psi, which is substantial, and the lack of a widely accepted working theory that explains the mechanisms of psi. The tension is manifest in the continuing division between those who are aware of the evidence and use it in theoretical development, and those in the mainstream who ignore psi on the basis that it is impossible or insubstantial or irrelevant. I suggested that a Catch-22 situation obtains in which the use of psi remains marginalized at the expense of developing interdisciplinary investigation into a comprehensive working theory that could potentially help explain the anomalous phenomena associated with psi events. The issue is relevant to all psi researchers across the disciplines, many of whom have already presented arguments from their own fields that tackle the problem of mainstream acceptance of psi phenomena. For it is a continuing puzzle why so many barricades continue to reduce the funding and publishing opportunities for those engaged in psi research.

I have focussed attention on one area in particular, the reception of psi in philosophy, with particular reference to explanation theory and broad-scale explanatory trends. I promised that once the explanatory history of psi is placed in perspective, it becomes apparent that the tension between the evidence and lack of explanation that has given rise to the Catch-22 situation can be lessened and it is hoped that, in combination with other theories from other disciplines such as psychology, sociology and science studies, it can aid in adding another piece to the overall picture which reveals why psi research is problematic to the mainstream. In this section I will outline the impact that the two arguments presented in this paper have on the current assessment of psi.

Firstly, as stated in the conclusion to the first section, an investigation of the recent history of explanation theory in philosophy of science reveals that an outmoded model of explanation has informed the assessment of psi phenomena in mainstream mind theory. The phenomena can no longer be dismissed as unlawful and therefore unexplainable and a review of the body of evidence in relation to explanation in the sciences is required. It should no longer be considered rational to ignore the evidence for psi on the basis that it is impossible and speculation, such as that undertaken by Alan Turing, should re-enter the mainstream mind theory literature.

Secondly, the historic account gives some hints on how best to proceed with theory development. If the account is accepted as an account of trends that have affected the assessment of psi then it can be concluded that psi is currently considered ostensibly paranormal because it cannot be accounted for under a limitations set during a different era, when a supernatural explanatory category played a more major part in the territory of appropriate explanations.

The assessment can be used to promote the inclusion of psi in contemporary theory development by psi-aware researchers and theorists who sometimes find a hostile reception to their use of psi in theory development. The assessment also indicates to the new generation of mainstream non psi-aware cognitive scientists and mind theorists that psi has, in recent decades, been excluded for now outdated reasons. (Though I very much doubt the old-guard will give up its entrenched belief that psi is impossible!)

Finally, I point out that although psi has long-been famously described as 'the small black cloud on the horizon of a Materialist theory of mind' (Armstrong 1968, p364) the phenomena do not necessarily challenge the currently dominant materialist-reductionist program in mainstream mind theory. The historic account indicates that psi is currently excluded from being encompassed by any known scientific explanation because of its prior status as supernatural and consequent limitation on the scope of science. It could just turn out that new forces or new concepts of known forces will eventually be used to account for the phenomena in terms acceptable to the dominant program. Or, as suggested by Stephen E. Braude, once it is accepted that physics and chemistry are unable to explain the phenomena then other, equally valid, explanations will be put forward that are likely to be derived from acknowledging the difficulties of explaining organic, dynamic phenomena. (Braude, 1997, p. 231)

CONCLUSION

I have presented two accounts of the history of explanation relevant to psi's current status as a maligned and taboo phenomenon in the mainstream, which contrasts starkly to the body of evidence for the phenomena that has emanated from the field of parapsychology. The conclusion that can be drawn is that unlawful phenomena do not equate to unexplainable phenomena. More specifically, the mainstream is missing out on the potential to use anomalous phenomena to further explain the workings of the mind because of ingrained and outdated beliefs about the status of psi. The analysis can be used to provide support for those theorists who use psi in the development of mind models and to, hopefully, educate those who are unaware of the body of evidence for psi because of its outdated misrepresentation as impossible or irrelevant in current mainstream texts. Psi then becomes a challenge, not a threat.

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PSI MAY LOOK LIKE LUCK: PERCEIVED LUCKINESS AND BELIEFS ABOUT LUCK IN RELATION TO PRECOGNITION

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ABSTRACT

Smith (1998) has shown that different people use the term "luck" to mean different things, some of which might be used euphemistically to account for psi experiences. However, previous luck-psi experiments have only measured perceived personal luckiness (PPL) without investigating what participants actually mean by the term luck when they say that they are lucky, so luck beliefs were also investigated in relation to psi in this study using the Questionnaire of Beliefs about Luck (QBL). The literature on psi and luck indicates that luck might best be understood by Stanford's model of 'psi-mediated instrumental response' (PMIR). A non-intentional, PMIR-type, precognition experiment with static fractal images as decoys and targets was run with 100 participants and utilised erotic images as a psi incentive, and a boring vigilance task as a psi disincentive. The degree of incentive/disincentive changed incrementally in proportion to psi task performance. Each participant performed ten forced-choice trials giving a mean psi score for each participant of 2.85 (MCE = 2.5) resulting in a precognition effect overall (t[99] = 2.508, p = .007 one-tailed, r = .244). Furthermore, PPL and the belief that luck was controllable (Luck subscale of the QBL) were found to correlate significantly with precognition performance (r = .263, p = .008 two-tailed, for both, alpha = .01), however, only the Luck subscale was found to be a significant predictor variable of psi score (adjusted R^2 = .06, t[99] = 2.7, p = .008), indicating that beliefs about luck are more salient to psi performance than PPL alone. Non-intentional psi scores also correlated with belief in psi (r_s[98]= .236, p = .009, one-tailed) and belief in the paranormal (r_s[98]=.194, p = .026, one-tailed), offering tentative support for the notion that psi ability drives belief initially. Precognition performance was also found to be significantly higher amongst the erotically reactive than the erotically unreactive (t[99] = 1.65, p = .05, one-tailed) offering indirect support for the experiment's validity and the need-serving aspect of PMIR. A number of other exploratory hypotheses are discussed. The findings support the suggested relationship between luck and psi but further investigations should consider beliefs about luck not just perceived luckiness.

INTRODUCTION

Research shows that the term 'luck' is often used metaphorically as a means of expressing gratitude for life success and fortuity, yet it is also often used to account for improbable and unexpected events, either serendipitous or tragic (Smith, 1998). This latter use of the term luck for specific event outcomes may hide a degree of unconscious psychic intervention at work, either in the service of the person, as in the case of good luck, or against them, as with bad luck. This led Broughton (1991, p.193) to suggest that psi may "…look like luck". This conception of luck as unconscious psi activity is consistent with the model of 'psi-mediated instrumental response' (PMIR) proposed by Stanford (1974a, 1974b, 1977a, 1982, 1990), which supposes that events of the type that are often labelled good or bad luck may be the result of unconscious psi processes. This model has been favoured among parapsychologists in explaining the possible psi component of luck (e.g., Broughton, 1991; Smith, Wiseman & Harris, 2000; Taylor, 2003; Watt & Nagtegaal, 2000), probably because it is highly ecologically valid as an explanation.

In particular, Stanford's PMIR model of psi lends itself to the possible misinterpretation of unconscious psi events as being lucky because it stipulates that psi serves the needs of the organism, thereby allowing for seemingly fortuitous events to occur under the auspices of psi, such as the avoidance of accidents and beneficial chance meetings – incidents often considered to be lucky.

Conversely, PMIR implies that events attributed to bad luck may be the result of unconscious self-sabotage resulting from negative self-concepts that cause counter-productive psi missing to occur.

Several experiments have indirectly investigated the relationship between luck and PMIR by testing non-intentional psi in relation to luckiness with some such success, although the results are not unequivocal. Ratte and Greene (1960) and Ratte (1960) found a positive relationship between perceived luckiness and PK in a non-intentional task, although there remains some criticism of their statistics (e.g., Stanford, 1977b) and sample size (Rebman & Radin, 1995). Rammohan and Krishna Rao (1987), however, failed to find a relationship between self-reports of luckiness in exams with performance on a non-intentional ESP task embedded within an English vocabulary test. Nevertheless, a replication by Rammohan and Lakshmi (1993) did reveal a significant positive correlation ($r = .33$, $p < 0.05$, N not reported) between ESP and self-perceived luck, but only where participants were uninformed about the ESP task, supporting the relationship with non-intentional psi. However, evidence of a psychophysiological presentiment effect, highly compatible with Stanford's PMIR conception of psi, was not significantly related to perceived personal luckiness when measured by EEG (Bierman & Ditzhuijzen, 2006), although "lucky" participants had a much higher difference in mean EEG potential (~2.9 microvolts) between their hits and misses compared to the non-lucky group (~0.6. microvolts)

Specifically testing the relationship between a PMIR conception of ESP and belief in luck, Watt and Nagtegaal (2000) conducted a non-intentional ESP experiment that required participants to indicate an aesthetic preference for Chinese pictograms (kanji), one of which was the target. Performance on the non-intentional task, which was found to correlate positively with scores on the Belief in Good Luck (BIGL) scale ($r_s(58) = .21$, $p = .05$ one-tailed), was coupled with either a pleasant or unpleasant contingent task outcome. Participants who correctly rated the target image to be their most favourable out of the ten images presented to them in the non-intentional PMIR test performed the pleasant task and were given the choice as to whether they would leave the experiment early, listen to a relaxing audio tape, or play a computer game, whereas in the unpleasant task participants were required to track a slowly moving target on a computer screen, which was considered to be a tiring and tedious task. In a further study, Watt and Ravenscroft (2000) also tested PMIR-type ESP but with an altruistic incentive, whereby success on a non-intentional ESP task, the kanji task, resulted in the reciprocal helping of a friend towards a pleasant task rather than an unpleasant task, the same as in Watt and Nagtegaal (2000). However, a measure of perceived personal luckiness (the Luckiness Questionnaire – Smith, Wiseman, & Harris, 1997) was found not to correlate with PMIR task performance, although the authors noted that the 'altruistic psi' expected in the reciprocal helping task was not analogous to everyday life experiences of self-benefiting luck, nor indeed that proposed by the PMIR model. No evidence of psi overall was found in either Watt study.

Based upon these experiments, it is apparent that the relationship between non-intentional psi and perceived luckiness is somewhat equivocal. However, in all except the Watt and Nagtegaal (2000) and the Bierman and Ditzhuijzen (2006) study there was no implementation of a specific 'need' to act as an incentive to motivate psi as stipulated by Stanford's model of PMIR. In the Watt and Nagtegaal study, participants correctly selecting the target as their preferred choice were rewarded with the option of a choice of pleasant tasks, whereas those not selecting the target were led towards an unpleasant task. In the Bierman and Ditzhuijzen study participants gambled with real money that they were allowed to keep if they won. Indeed, Stanford (1990) has criticised other non-intentional psi experiments for the blind faith that psi will just happen without a suitable consequence as an incentive. Taking the Watt and Nagtegaal and the Bierman and Ditzhuijzen experiments as the only psi experiments that include a measure of luck, and are consistent with the PMIR model, we find the results only partially support the theorised relationship. Nevertheless, there is some difficulty in interpreting the results of the Watt research due to the inappropriate use of the BIGL questionnaire as a single unitary scale (Luke, 2007), because it includes a mixture of items relating to differing concepts, such as perceived personal luckiness, beliefs about luck, and even decision-making (Oner-Ozkan, 2003).

Furthermore, the primary use of a measure of perceived personal luckiness as the sole measure of luck in previous studies fails to identify what people believe luck to be when they say that they are lucky

(Luke, 2003). For instance Rebman and Radin (1995) found a very large negative correlation between the belief in luck and PK task performance but admitted that they were incapable of interpreting this finding because the term luck was undefined. Research has shown that luck is often used to mean different things, such that it can be thought to be purely random and inert or a controllable element, or merely used metaphorically to express gratitude for success in life and the absence of poor circumstances generally (Luke, 2007, Smith, 1998). Clearly these different luck beliefs may have a bearing on how perceived personal luckiness relates to psi.

The present study further investigates this relationship between luck and psi within the PMIR model by utilising the Questionnaire of Beliefs about Luck (Luke, Sherwood, & Delanoy, 2003) to measure both perceived personal luckiness and belief in luck on four individual subscales (Luck, Chance, Providence and Fortune). It is expected that a combination of perceived personal luckiness and differing luck beliefs will be related to PMIR-type psi-task performance in a luck-type scenario. If psi is possible and it can function unconsciously, as proposed by the PMIR model, then luck may be often invoked euphemistically as an explanation for the outcome of need-serving, unconscious, psi activity. Therefore, when people regard themselves as lucky and use the term luck euphemistically for what could possibly be psi events, they are actually indirectly suggesting that they themselves are "psi-effective" (Broughton, 1991, p.352). In such a case we would expect that those that perform well on the psi task would perceive themselves to be lucky and also believe luck to be controllable rather than random, and use the term luck more literally rather than metaphorically. This group may also be more likely to expect their luck to affect the outcome of a psi task, if they have any support for the notion of psi. Nevertheless, any of the scales correlating with psi would indicate the utility of measuring luck beliefs and we might rather ask what is the best predictor.

This present study also differs from previous PMIR-luck research in that it uses erotic images as a reward because, by relating directly to positive primal instincts, sexual arousal was considered to be intrinsically more rewarding than a relaxing audiotape or a computer game. Furthermore, Stanford and Associates (1976) specified that continuous rather than nominal PMIR measures are theoretically and psychometrically more sensitive, yet previous PMIR-luck studies (Watt & Nagtegaal, 2000; Watt & Ravenscroft, 2000) statistically analysed the PMIR outcome in terms of an ordinal PMIR score, but used a nominal, psi or no-psi, category to determine the task outcome. Indeed, the Watt et al. studies also used even more restricted criteria for assigning participants to reward scenarios by only utilising the one highest score of all the participant's 8 or 10 trials as the indicator for ESP success, so that the task outcome was not actually dependent upon the overall non-intentional psi score for all of that participant's trials. Had a task outcome contingent been calculated based upon all the participants responses, rather than just one, then the outcome task contingency would also depend upon an ordinal psi score rather than a nominal one, thereby increasing the likelihood with which PMIR could be expressed, according to Stanford, and at a level of data comparable with the dependent variable.

Given that PMIR is dependent upon need strength, which relates to incentive strength in experimental conditions, then varying incentive strength relative to each participant's PMIR task success would provide a design more sensitive to the expression of PMIR, and should, therefore, give better results. Indeed, the absence of PMIR in the recent Watt et al. (2000) studies may have been due in part to a discrepancy between the measure of PMIR used for overall analysis and that used to determine the nature of the incentive/disincentive, particularly when attempting to detect what is clearly a weak effect. The present study addresses this with an ordinal PMIR score for each participant, on the basis of which their pleasant or unpleasant task outcome is determined. Consequently, the incentive also benefits from being comparatively ordinal and so the pleasant task has been graded with increasing eroticism, and the unpleasant task has increasing degrees of unpleasantness, by making it take longer. Our primary hypotheses were:

- Hypothesis 1: Overall there will be more correctly selected fractal-image targets than expected by chance, indicating a non-intentional precognition effect

- Hypothesis 2: Some of the four variables of belief in luck (Luck, Chance, Providence and Fortune) or Perceived Personal Luckiness (PPL) will function as predictor variables of non-intentional precognition

A number of exploratory hypotheses were also put forward:

- Hypothesis 3: Overall belief in psi (Sheep-Goat Criteria I-IV combined) will correlate positively with non-intentional precognition direct hits
- Hypothesis 4: Belief in the anomalous/paranormal (as measured by the AEI subscale) will correlate positively with non-intentional precognition direct hits
- Hypothesis 5: Participants who believe that their luck can affect the test outcome will demonstrate greater non-intentional precognition (direct hits) than those who do not believe their luck can affect the psi test outcome
- Hypothesis 6: Participants who believe that their luck can affect the test outcome will score higher on the measure of controllable luck (Luck subscale) than those who do not believe that their luck can affect the test outcome
- Hypothesis 7: Erotically reactive participants will demonstrate more non-intentional precognition (direct hits) than erotically un-reactive participants

METHODS

Participants

Fifty male and fifty female participants (mean age = 34.0 years, S.D. = 11.0, n = 93) were selected by opportunity sampling from friends, associates, local university students, members of psi or esoteric interest groups, and interested members of the public. Participants had to be willing to see erotic images, and were recruited through word of mouth, through their interest group, or through local advertisements requesting people to take part in a project into luck and psychic ability. Free entry into a prize draw (£50) was offered as an incentive. Each participant completed ten non-intentional, forced-choice precognition trials in one session.

Materials

Questionnaire of Beliefs about Luck (QBL; Luke, Sherwood, Delanoy, 2003) – a 41-item questionnaire, scored on a seven-point Likert scale from strongly disagree to strongly agree, to assess belief in four polar concepts of luck: Luck (Luck is primarily controllable, but also internal, stable and non-random), Chance (Luck is random, unpredictable, unstable and inert), Providence (Luck is reliably managed by external higher beings or forces), and Fortune (Luck is meant as a metaphor for life success rather than as a literal event). Each subscale has ten items scoring from 10-70 in total. These four factors allow for a diverse range of conceptualisations about luck, complementing a fifth measure of Perceived Personal Luckiness (one item) scored the same as the QBL subscales, with a score range of 1-7.

Anomalous Experience Inventory (AEI; Kumar, Pekala, & Gallagher, 1994) – Includes five subscales of which only data from the Anomalous/Paranormal Belief subscale (12 items) were used in the present study. This scale includes items such as "I believe that mind can control matter", and "I believe that many paranormal occurrences are real". Scored nominally as either True or False, with a score range of 0-12.

Sheep-Goat (S-G)/Demographic Questionnaire - This short questionnaire presents two demographic questions (age, gender), as well as four items corresponding to the different criteria of the sheep-goat variable (Palmer, 1972) of belief in psi, and one extra item relating to how much the participant believes that their luck can influence the psi-task outcome. True or false answer format for belief items.

Erotic Reactivity Scale - (ERS; Bem, 2003) – Consists of two items relating to erotic reactivity: "I enjoy watching many of the erotic scenes in movies", and "I prefer to date people who are physically exciting rather than people who share my values". The Likert-type scale has five points ranging from strongly disagree to strongly agree with a total score range of 2-10.

PMIR Visual Basic program – A software program in Visual Basic (v.6) was written specifically for this experiment by the first author. The program consists of a fully automated, non-intentional precognition task with a concomitant pleasant/unpleasant outcome task. The program has a pool of fractal images as the decoy and target images for the psi task. No images were repeated in any run. The entire 40 images for this program were selected previously via a standardisation procedure from a pool of 72 such images, which had themselves been created randomly (using the freeware fractal generator program Fractalus v4.02). Images had been presented to five independent judges via a presentation program written in Visual Basic, and standardised using a similar rating process to that used in the creation of the 'International Affective Picture System' (IAPS; Lang & Greenwald, 1993). Images had then been grouped together into the ten best pools of four images based upon the homogeneity of their individual scores on scales of pleasantness and arousal (Luke, 2007).

Procedure

Participants were asked if they would like to take part in a study of psychic ability and beliefs about luck. Before volunteering, potential participants were warned that they might see some erotic images. Once recruited, the experimenter took participants individually to the test room and briefed them about the study, reiterating the possible inclusion of erotic images, although the non-intentional nature of the precognition task was not divulged. After giving their informed consent, participants completed the questionnaire battery. Participants were given detailed instructions of what to do next on the computer, and were then left in the room alone until they had completed the PMIR computer task. Participants were asked to complete the post-session validation questions concerning their perceived nature of the experiment and their evaluation of how pleasant they considered the last computer task, and then they were debriefed.

The initial screen of the PMIR-task computer program asked participants to relax, to follow the instructions, and indicated that they would be informed when they needed to try and use any psychic (psi) ability. The following screen contained a reminder to participants that they may see some erotic images and a prompt to select a preferred sex for erotic images – either males, females, or heterosexual couples. At this point participants were also given a last option to quit. Further instructions were displayed explaining how to select fractal images in the following (non-intentional) task. The task required the participant to indicate which one out of four possible images they most preferred for each of a series of ten "preparatory" trials. Images were fractal patterns, displayed in a random arrangement from a unique pool of four images for each of the ten trials.

Unknown to participants, the ten "preparatory" fractal trials were actually a non-intentional precognitive psi task. In each trial, once the participant had made their target selection, the computer then randomly selected one of the four fractal images as the (*post factum*) precognition target. Thus, randomised selection of the target occurred each time an image preference was selected. This randomisation and that of the image position arrangement was conducted via the RND function in the Visual Basic program, which is seeded by the timer. No feedback was given to the participant on target success to prevent the detection of any inadvertent patterns in the randomised target selection. Nevertheless, in fulfilment of stipulated guidelines for pseudo-RNG psi research (Milton & Wiseman, 1997) both randomisation processes were tested for randomness within the test conditions of the program using the actual randomisation data and were found to be acceptable using the goodness of fit test (chi-square = 4.32, df = 3, p = .229 for target, and chi-square = 22.3, df = 23, p = .505 for image position).

Depending upon the participant's performance on each of the ten PMIR trials the participant was then directed towards the second part of the program. Participants correctly identifying either none, one

or two targets (i.e. below the MCE of 2.5) in the ten non-intentional precognition trials were directed towards an unpleasant vigilance task. Participants correctly identifying three or more (i.e. above MCE) targets in the ten non-intentional precognition trials were directed towards a pleasant erotic-images task.

The unpleasant vigilance task presented a set of instructions describing the task and requesting participants to observe the following display of numbers, and to press the left mouse key (or the return key) for every complete run of three consecutive odd numbers (e.g., 3,7,5 or 9,1,5), or three consecutive even numbers (e.g., 8,4,6 or 4,2,4). Participants were then directed to the task once they had read the instructions to their satisfaction.

Once the task began, a series of singular random numbers ranging from 1-9 were presented in the centre of the screen; each digit was replaced every 500 milliseconds. Participants who failed to correctly identify any targets in the first task completed this unpleasant task for four minutes, whereas the participants who identified only one correct target completed the unpleasant task for three minutes only, and those scoring two direct hits did this task for two minutes. No group were informed how long the task would take nor did they receive any feedback on their performance. No record of the participant's performance on this dummy task was made.

Participants who performed the pleasant, erotic-images task were first notified that the task would now change but that they should continue to select the image they preferred. However, like the unpleasant task, this task was not a psi task and the erotic images presented were predetermined, not random. Each of the four sequentially displayed images had been selected from a pool of erotic IAPS images (Lang & Greenwald, 1993) and sorted into eight groups of increasing degrees of eroticism (calculated from the product of the pleasantness and arousal ratings) for each of the three image categories: male, female or heterosexual couple. Participants' previous non-intentional precognition task performance determined which images were shown, i.e. those identifying just three correct targets were presented with the lowest-rated erotic images while those who correctly identified all ten targets were shown the highest-rated erotic images.

To test that the PMIR design met the non-intentional nature required of it, several trial runs were performed with a pilot group (n = 3) who were asked afterwards about the nature of the task; none of them succeeded in second-guessing the experimental aims. In addition, post-session validation checks were implemented that asked participants about the nature of the experiment to establish if they were aware of the non-intentional nature of the experiment, and to measure how pleasant or unpleasant they found the final computer task. Out of the 100 participants only one, who is a parapsychologist, correctly identified the real nature of the psi test.

RESULTS

The final data set contained some missing data from the questionnaires but was not considered excessive. Some measures had some missing data that could not be replaced (e.g., age). However, in the case of the four compound luck-belief measures the mean score for the completed items of each measure was calculated for those participants with missing data and then multiplied by the number of items (10) for the measure to give an equivalent score.

Hypothesis 1: Overall there will be more correctly-selected fractal-image targets than expected by chance, indicating a non-intentional precognition effect; was supported. With ten trials each, and a probability of correctly identifying the correct target in each trial of .25 there was a mean chance expectation (MCE) of 2.5 per participant. The actual mean was 2.85. A t-test analysis to ascertain significance gave t [99] = 2.508, p = .007 (one-tailed, r = .244), indicating that there was a highly significant non-intentional precognition effect, leading to the rejection of the null-hypothesis.

Hypothesis 2: Some of the four variables of belief in luck (Luck, Chance, Providence and Fortune) or Perceived Personal Luckiness (PPL) will function as predictor variables of non-intentional precognition; was supported. A multiple linear regression was performed, having met the basic assumptions. From Table 1 below it can be seen that both the Luck and PPL measures demonstrated significant positive

correlations with PMIR task performance even after correcting for multiple analyses with Bonferroni (alpha = .01), albeit with coefficients small in magnitude. The remaining three measures, Providence, Chance and Fortune did not correlate significantly with psi performance.

Luck measure	Correlation Coefficient	Signif. (two-tailed) (Corrected alpha = .01)
Luck	.263	$p = .008$
Chance	-.158	$p = .116$
Providence	.169	$p = .092$
Fortune	.055	$p = .590$
Perceived Luckiness	.263	$p = .008$

Table 1: Pearson correlations between PMIR task score and both PPL and QBL ($N = 100$)

Predictors	R	R Square	Adjusted R Square	Std. Error of the Estimate
Luck	.263	.069	.060	1.353

Table 2: Model summary statistics for the multiple regression of PPL and QBL subscales (Luck subscale only) as predictor variables of psi score

A standard multiple regression was performed. From Table 2 it is apparent that the association between the criterion variable (PMIR task score) and the predictor variables is small (R = .263), with Luck alone accounting for just 6% of the variance in PMIR task score (adjusted $R^2 = .06$), this result being highly significant (Table 3). Despite independently correlating with the criterion variable with equal magnitude as Luck (Table 1), the Perceived Personal Luckiness measure did not fare as a predictor variable alongside Luck but nevertheless demonstrated a near-significant partial correlation with the criterion variable accounting for just a further 3% of the variance (Table 4). The remaining variables did not figure as significant predictor variables.

Model	Unstandardised Coefficients		Standardised Coefficients	t	Significance
	B	Standard Error	Beta		
(Constant)	.715	.802		0.99	.375
Luck	.043	.016	.263	2.70	.008

Table 3: Coefficient statistics for the multiple regression of QBL subscales and PPL as predictor variables of psi score

Variable	Beta	t	Significance	Partial Correlation
Perceived Luckiness	.187	1.782	.078	.178
Chance	-.048	-.434	.665	-.044
Providence	.050	.438	.662	.044
Fortune	-.053	.500	.618	-.051

Table 4: Summary statistics for the excluded variables from the multiple regression of luck variables as predictors of psi score

A number of exploratory hypotheses were also tested (see Luke, 2007), uncorrected for multiple analyses. Hypothesis 3: Overall belief in psi (Sheep-Goat Criteria I-IV combined) will correlate positively with non-intentional precognition direct hits; was supported with a small but significant Spearman's correlation (r_s[98]= .236, p = .009, one-tailed).

Hypothesis 4: Belief in the anomalous/paranormal (as measured by the AEI subscale) will correlate positively with non-intentional precognition direct hits; was supported (r_s[98]=.194, p = .026, one-tailed).

Hypothesis 5: Participants who believe that their luck can affect the test outcome will demonstrate greater non-intentional precognition (direct hits) than those who do not believe their luck can affect the psi test outcome, was *not* supported. The mean PMIR score for those who responded affirmatively to the item "I believe that my luck can affect the outcome of this experiment" (M = 2.98, n = 51) was greater than those who did not respond affirmatively to this item (M = 2.71, n = 49), as expected, although the effect was not significantly higher (t [98] = .953, p = .171, one-tailed).

Hypothesis 6: Participants who believe that their luck can affect the test outcome will score higher on the measure of controllable luck (Luck subscale) than those who do not believe that their luck can affect the test outcome; was supported. The mean score on the QBL Luck subscale was greater for those who responded affirmatively to the item "I believe that my luck can affect the outcome of this experiment" (M = 51.0, n = 51) than those who responded negatively (M = 47.6, n = 49), the difference between the scores being significant (t [98] = 2.08, p = .02, one-tailed).

Hypothesis 7: Erotically reactive participants will demonstrate more non-intentional precognition (direct hits) than erotically un-reactive participants; was supported. Participants were separated via a mean split into erotically reactive (mean PMIR score = 3.12, n = 42) and non-reactive (mean PMIR score =2.66, n = 58) groups providing a difference in psi scores in the predicted direction, the difference between the groups being significant (t [98] = 1.65, p = .05, one-tailed).

Furthermore, Spearman correlation analysis shows that the post-experiment validation question, which asked participants to rate how pleasant they found the outcome task on a scale of 1 to 10 (very unpleasant to very pleasant), correlated significantly with the PMIR task score (r_s [98] = .739, p = .000001 one-tailed) as would be hoped if the outcome tasks can be considered to have provided a degree of pleasantness commensurate with PMIR task success. Additionally, erotic reactivity also correlated significantly with the subjective pleasantness of the outcome task, albeit with a smaller magnitude (r_s [98] = .212, p = .017 one-tailed).

DISCUSSION

As predicted as one of the primary aims, there was an overall psi effect on the non-intentional task with an effect size of r = .244, a finding consistent with expectations from the PMIR model. The second primary aim was to investigate the notion that, for research purposes, the salience of how lucky someone perceives themselves to be is surely dependent upon what that person actually believes luck to be. To investigate this a pre-planned multiple regression was preformed on the four Questionnaire of Beliefs about Luck (QBL) subscales – Luck, Chance, Providence and Fortune – and the Perceived Personal Luckiness (PPL) measure. This produced small positive, significant correlations between psi score and both Luck and PPL, which were identical in size. This indicates that belief in one's personal control over luck and one's perceived personal luckiness are related to psi performance, thereby both supporting and extending the findings of Watt & Nagtegaal (2000) that luckiness functions in relation to PMIR. However, the Chance, Providence and Fortune correlated in the expected directions with psi score but not significantly so, contrary to expectations.

These correlations indicate that the QBL measures have some degree of relation to psi scores. However, these correlations may overlap in the variance they explain in psi performance as they are certainly not orthogonal (Luke, 2007), and further inspection of the regression analysis indicates that out of all the QBL subscales only Luck (the belief that luck is controllable) was found to be a significant

predictor variable, so that the more a person believed they had some control over their luck the better their psi performance.

Nevertheless, the results of this regression are highly instructive in indicating that, although Perceived Personal Luckiness (PPL) and Luck superficially appear to correlate equally with psi performance, Luck is shown to be a stronger predictor variable than PPL. This finding supports assertions (e.g., Luke, 2003; Rebman & Radin, 1995) that what the participant actually believes luck to be is fundamental to research investigating perceptions of perceived luckiness in relation to psi.

The findings also show that the number of direct hits, which best fit a psi interpretation, is not independent of other belief factors either. In terms of belief in psi and the paranormal, the hypothesis (H3) that participants' PMIR score would be positively correlated with participants' overall Sheep-Goat score was supported. Furthermore, the hypothesis (H4) that PMIR score would be positively correlated with belief in the paranormal was supported. However, there was no support for the other prediction (H5) that PMIR score would be higher for participants who believed that their luck could affect the psi test (the luck S-G measure) compared to those that did not.

Initially then, in relation to H3, these findings are in accord with previous research (e.g., Lawrence, 1993; Palmer, 1972) that has found a consistent sheep-goat effect in relation to psi scores. The additional finding, H4, that the AEI paranormal belief subscale also correlated with psi scores appears to be indicative of an overlap between belief in psi and belief in the paranormal, the former being a part of the latter. Indeed, a large correlation (r [398]= .52, p <.001) between the AEI Paranormal Belief subscale and the RPBS Belief in Psi subscale has been previously demonstrated (Gallagher, Kumar, & Pekala, 1994). So although the results of the present study show that psi belief (r_s[98]= .236, p = .009) is stronger than paranormal belief (r_s[98]=.194, p = .026) as a correlate of psi performance, the difference between these correlations was found not to be significant (t [97]= .823, p = .40, two-tailed) when compared *post hoc* using a Steiger calculation (Clark-Carter, 1997). Nevertheless, these findings indicate a need for further investigation into the relationship between paranormal belief, psi belief and psi performance, as Lawrence (1993) has previously urged.

Support was found for H6, that those who believe that their luck can affect the test outcome will score higher on the Luck subscale than those who do not. This indicates that there is a relationship between the belief that one's luck can affect the psi experiment and the type of beliefs held about luck. In particular, those who believed that their luck could affect the test also tended to believe in a controllable luck, as was expected because both belief types express the active nature of one's luck and one's relationship to it.

In interpreting all these findings, however, the issue of sampling should be borne in mind. The use of a unique opportunity sample in this study may have been fortuitous in permitting these results to occur because this sample appears to have had a tendency to view themselves as lucky and believe that luck is controllable, at least relatively more so than the student samples with which the QBL measure was developed (Luke, 2007). Furthermore, these two factors, Luck and PPL, are quite well positively correlated with this sample (r_s[98]= .333, p = .0007 two-tailed) lending support to the idea that those who tend to view luck as something that is controllable also tend to view themselves as lucky, as found by Smith (1998). Furthermore, these two factors, Luck and PPL, were the best predictor variables of psi performance and so this particularly 'lucky' sample (which scored relatively high on both these scales) may have contributed to the apparent expression of psi within this study.

In addition, many of the participants were successful professionals in their respective fields. As Broughton (1988) has suggested, the selection of successful psi participants probably has less to do with the experimenter's luck *per se* and more to do with the use of ordinarily successful participants, as those successful in life are also probably more proficient with psi. Such a notion would logically be expected if psi were an adaptive skill of the organism, as suggested by Stanford (e.g., 1974a). Had random sampling been used in the present study it may not have been as insightful as the sampling method actually employed.

In consideration of how beliefs about psi and the paranormal are related to psi task performance, it was expected that goats would score lower than sheep on the task in the present study, as indeed they

did. It is also understandable how beliefs related to the belief in psi might therefore also be related to psi scoring, such as the belief in the paranormal in general or the belief in the controllability of luck (this relationship has been explored further in Luke, 2007). However, it is not so clear how beliefs relate to psi performance when the psi task is non-intentional and thus unconscious, as was the case in the present study. One of the ways in which this relationship might work is that those who have more psychic experiences come to believe in psi and then their beliefs reinforce their experiences, and so on vice versa. This would lead to believers who perform better than sceptics on psi tasks, be it consciously or unconsciously, because they are more effective with psi, and this is then further reinforced by their beliefs. These issues, and how beliefs in psi relate to beliefs about luck require further research.

Given the erotic nature of the pleasant task incentives and the findings of previous research, particularly that of Bem (e.g., 2003), it was predicted that erotically reactive participants would score higher on the psi task than erotically un-reactive participants (H7), and this was found to be just significant, supporting Bem's (2003) original findings. These findings are interpreted such that participants who express a greater desire for erotic stimulation, according to Bem's (2003) erotic reactivity scale, are more prone to use their psi to encounter the erotic images task than are those participants exhibiting a lesser desire for erotic simulation. It is speculated that this is because, as Stanford's evolutionary PMIR model suggests, psi is responsive to needs or desires, and those with a greater need are expected to express greater degrees of psi, because "need strength" as Stanford puts it (e.g., Stanford, 1977, p.843) is directly related to the strength of the disposition towards a 'psi-mediated instrumental response' – i.e. towards the use of unconscious psi. This interpretation is reinforced by the post-experimental validation finding that psi score was significantly and positively correlated with the degree of pleasantness that participants attached to the supposedly pleasant and unpleasant task outcomes. Such a finding would be hoped for if the outcome tasks can be considered to have provided a degree of pleasantness commensurate with PMIR task success, thereby giving validity to the notion that psi performance is directly related to desire, and so need-strength. These findings, then, indirectly support both Bem's (2003) erotic reactivity findings and the need-strength aspect of Stanford's (e.g., 1977) PMIR model.

Furthermore, in direct complementary opposition to the notion that desire can drive psi, Stanford (e.g., 1974a) also posited that avoidance and guilt can diminish psi or cause psi-missing, such that psi works in a maladaptive fashion. Carpenter (1971) found some evidence to support this in his psi research with hidden erotic images, finding that sheep tended to exhibit less sex guilt than goats and consequently those exhibiting more sex guilt exhibited a diminished sheep-goat effect, indicating an interaction between sex guilt and belief in psi in this context. Carpenter interpreted this to mean that those who believe they have something to hide are less apt to want psi to exist. No measure of sex guilt was taken in the present research but erotic reactivity might be considered as an indicator of sex guilt if we assume that those with guilty feelings about sex would be less keen to indicate their desire for erotic stimulation. Going with this assumption there is already evidence that erotic reactivity is related to psi scores and we might further expect erotic reactivity to correlate positively with sheep-goat scores. A *post hoc* analysis indicates that this correlation is evident (r_s[98]=.230, p = .011 one-tailed), although small. Nevertheless, this finding is promising, although further research is needed to fully investigate Carpenter's (1971) ideas and findings.

Further research might also consider adding a post-experimental question asking the participants how much they considered their results to be due to luck, once they had been appraised of the probability of obtaining the results that they did. Such a question could provide a valuable insight into the relationship between the participants' beliefs about luck, and how they thought their luck related to the psi task, in relation to their belief, prior to experimentation, that their luck could affect the test outcome. This could tell us something more about the manipulation of perceived luck after the event. Stanford also supposed that the closeness in time between the psi event and the reward increased the likelihood of psi, so further research should consider comparing reaction times with psi performance. Further research might also implement a systematic test of the effectiveness of the PMIR model compared to a non-PMIR type test

of psi, such that half the participants would perform the precognition task with a psi performance-related contingent reward/punishment task and the other half had no such contingent task.

To conclude, although perceived personal luckiness is related to psi task performance, what the participant actually believes luck to be is more important to the task outcome, particularly the belief that luck is controllable, and to this end the QBL scale appears useful for further psi research. However, that belief is related at all to a non-intentional test of psi tentatively suggests that the beliefs about psi derive from one's ability and not vice versa, although further research is needed to examine this.

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TESTING FOR FORCED-CHOICE PRECOGNITION USING A HIDDEN TASK: TWO REPLICATIONS

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ABSTRACT

This paper describes two studies that were intended to replicate and extend the findings of Luke, Delanoy and Sherwood (2008), who were able to demonstrate a precognition effect using a covert task with contingent reward or punishment. Performance in their study was related to measures of belief in luck that could be considered to be related to experience of PMIR 'in the field'.

In Study 1, 25 participants completed the short-form Questionnaire of Beliefs about Luck (QBL: Luke, Delanoy & Sherwood, 2003) and a 10-trial preliminary preferences task that required them to select which of four fractal images they found most pleasant. In fact this was a precognition task and based on performance participants in the contingent condition subsequently either completed a pleasant task, involving rating cartoons for humorousness, or an unpleasant task, monitoring sequences of digits. Participants in the no-contingent condition completed neither. Overall, participants selected significantly more target images then mean chance expectation (t[24] = 2.60, p = .02), but there was no difference between the contingent and no-contingent conditions (t[23] = .73, p = .47). Performance was positively correlated with the Chance and Providence subscales of the QBL (r = .48, p = .02, and r =.39, p = .05 respectively)

In Study 2, we added measures of openness to experience and creativity that we hypothesized to be related to PMIR performance as correlates of latent inhibition (LI) and lability respectively. 32 participants completed Goldberg's (1999) measure of Openness to Experience, Holt's (2002) Creative Cognition Inventory and Luke, et al.'s (2003) long-form QBL. All then completed the contingent version of the covert precognition task used in Study 1. Overall, participants again selected significantly more target images then mean chance expectation (t[31] = 2.01, p = .03). We did not replicate the correlations between performance and the Chance and Providence subscales of the QBL, nor with creativity measures, but there was a significant positive correlation with openness to experience, as predicted (r = .46, p = .01). Suggestions are given for further research utilizing this task, particularly in testing the assumption that the psi element need be covert.

INTRODUCTION

In its naturally occurring state among unselected persons, psi may be essentially an unconscious process. Broughton (1991, p. 350) considered this possibility when he had completed his review of parapsychology and was moved to conclude: "it is entirely possible that the sort of psi ability that has traditionally attracted the attention of parapsychologists … may be aberrations, completely unlike 'normal' psi ability." If this were the case, then it would not be evident from collections of spontaneous cases, since these rely on the percipient recognising that something unusual had occurred, which clearly requires some level of conscious awareness — though this awareness may be quite rudimentary, as in Rhine's (1961) classification of intuitive cases, or Hearne's (1989) notion of a vague foreboding. It might be possible for the spontaneous effects of an unconscious psi to be detected in more subtle ways (e.g., Cox, 1956), although interpretation of the patterns observed here is fraught with difficulty.

And if psi were essentially unconscious, then it might be self-defeating to attempt to capture effects in the laboratory by asking participants to make conscious judgements about the identity of targets, even where other interventions are included that are intended to establish a psi-conducive frame of mind — or perhaps even render conscious what would ordinarily be unconscious — such as in dream ESP or ganzfeld research (Bem & Honorton, 1994; Sherwood & Roe, 2003). Asking participants to 'be psychic' to order while under the scrutiny of lab personnel is likely to increase their autonomic arousal and

disrupt performance much as it does for other forms of psychological performance (cf. Blascovich, Mendes, Salomon & Hunter, 1999; Geen & Gange, 1977). Similarly, in parapsychological tasks elevated anxiety typically inhibits performance in both PK (see Broughton & Perlstrom, 1986, 1992; Roe, Davey & Stevens, 2003) and ESP tasks (e.g. Palmer, Ader & Mikova, 1981; see Schmeidler, 1988, for a brief review). There seems to be a growing acceptance among laboratory researchers that more direct or unconscious measures of psi are more appropriate and more likely to be successful, as evidenced by the popularity of paradigms that test for prestimulus response (Radin, 1997), staring detection (cf. Baker, 2005, p. 60), precognitive habituation (Bem, 2003), and PK (Roe, Holt & Simmonds, 2003).

Perhaps the earliest systematic laboratory exploration of psi as unconscious is to be found in Stanford and associates' tests of his Psi Mediated Instrumental Response (PMIR) model. Stanford has described the evolution of this model in extensive detail in a series of publications (Stanford, 1974a, 1974b, 1990). However the essential features for the current discussion are that PMIR suggests that psi operates below the level of conscious awareness, is essentially goal oriented, responding to basic needs and environment threats or opportunities, and acts by facilitating pre-existing responses (actions, memory traces, etc.). Hence the subject needn't intend to use psi, nor be aware that the task requires them to use psi — indeed it might be counter-productive for them to know this. Empirical tests of the model have confirmed predictions it makes concerning the effects upon psi performance of (i) the hidden nature of the task (e.g., Dwyer, Stanford & Zenhausern, 1975), and (ii) the existence of a reward or punishment that is contingent upon performance (e.g., Stanford and Associates, 1976).

Recently, Luke, Delanoy and Sherwood (2008) have sought to extend this paradigm by seeking to identify those persons who might be most likely to capitalise on the action of PMIR in their daily lives to see if they perform similarly under controlled laboratory conditions. Luke *et al*. hypothesised that such people might experience the positive or negative outcomes that result from PMIR but attribute them to good or bad luck, so that if participants reported that they consistently benefited from fortuitous events they might describe themselves as particularly lucky whereas if they tended to suffer from them they might describe themselves as particularly unlucky. Luke (2003) had previously identified different characterisations of luck that seemed to be relatively independent and these were represented as different subscales of his Questionnaire of Beliefs about Luck (QBL: Luke *et al.*, 2003). Luke *et al.* (2008) were interested to discover which of these might be predictive of performance at a PMIR task. They recruited 100 participants who, after completing a battery of questionnaires, were individually presented with a computer-based selection task that was described as preparatory to the psi task. This consisted of ten trials in which they were shown sets of four fractal images and asked to record which they found most aesthetically pleasing. In fact this constituted a forced choice precognition task, since for each trial after the participant had registered their preference the computer would randomly select one as target. Over ten trials participants should select the target as their preferred image on 2.5 trials by chance alone. If participants scored more than 2.5 hits they were subsequently given a reward (to continue the preferences task but with erotic images as stimuli), whereas if they scored fewer than 2.5 hits they were given a 'punishment' that involved monitoring a sequence of randomly-selected digits to identify runs of three odd numbers or three even numbers. The amount of time spent on the punishment contingent task was proportional to the number of hits, as was the degree of eroticism of the images in the reward contingent task. As predicted by PMIR, participants did select significantly more targets than would be expected by chance, 1-sample t (99) = 2.51, $p < .01$, one-tailed, $es(r) = .245$. Performance correlated with the Luck and Providence subscales of the QBL ($r = .26$, $p < .01$, and $r = .17$, $p = .05$ respectively[1]), and with responses on a single item measuring overall perceived luckiness ($r = .26$, $p < .01$), as hypothesised by Luke *et al.*, but not with the other subscales.

[1] We should note that, in subsequently revising their paper, Luke *et al.* switched to 2-tailed tests and introduced a Bonferroni correction that reduced the Providence correlation to nonsignificance ($p = .09$); however, at the time of this study this relationship was interpreted as significant and we sought to replicate it here.

Given these promising results with an unselected sample and a straightforward off-the-shelf protocol we were encouraged to see if these effects could be replicated (hence all predictions are 1-tailed[2]). We planned to recruit participants for these replication studies among the general public and felt that it would be difficult to secure ethical clearance for the use of erotic stimuli and so planned to replace this reward task with an alternative that involved rating the relative humorousness of sets of cartoons.

We were also aware that since the study did not include a no-contingent condition we could not be sure that above-chance performance was due to the subsequent reward or penalty. Finally, Luke (2007) had conducted further psychometric analysis of the QBL that condensed the original 41-item scale to 21 items and the current study gave the opportunity to see whether this streamlining had any effect on observed relationships with performance on the precognition task. Based on previous findings we predicted:

- Participants will select more fractal image targets in the hidden precognition task than mean chance expectation
- The number of hits in the hidden precognition task will be greater for the contingent condition than for the no-contingent condition
- The number of hits in the hidden precognition task will be positively correlated with scores on the Luck and Providence subscales of the QBL

STUDY 1 METHOD

Participants

An opportunity sample of 16 female and 9 male participants was recruited. Participants were members of the public attending an exhibition on superstition at the Northampton Museum and Art Gallery entitled "Unlucky for some" over a period of two days and who volunteered to take part in the experiment. Participants were told they would be offered feedback on their performance in "the luck experiment" if they took part.

Materials

PMIR Visual Basic program – A software program in Visual Basic (v.6) was written specifically for this experiment by the first author. The program consists of a fully-automated, non-intentional precognition task with a randomised contingent/no-contingent outcome task. The program has a pool of fractal images as the decoy and target images for the forced-choice psi task. No images were repeated in any run. The entire 40 images for this program were selected previously via a standardisation procedure from a pool of 72 such images, which had themselves been created randomly (using the freeware fractal generator program Fractalus v4.02). Images had been presented to five independent judges via a presentation program written in Visual Basic, and standardised using a similar rating process to that used in the creation of the International Affective Picture System (IAPS: Lang & Greenwald, 1993). Images had then been grouped together into the ten best pools of four images based upon the homogeneity of their individual scores on scales of pleasantness and arousal (Luke, 2007).

Short-form Questionnaire of Beliefs about Luck – a 20-item questionnaire, scored on a seven-point Likert scale from strongly disagree to strongly agree, to assess belief in four polar concepts of luck: Luck ('luck' is primarily controllable, but also internal, stable and non-random), Chance ('luck' is random, unpredictable, unstable and inert), Providence ('luck' is reliably managed by external higher

[2] One referee queried our use of 1-tailed tests in this study given that on at least one occasion an outcome would reduce to nonsignificance if 2-tailed tests were used. However, on reflection we decided that it was more appropriate to make all hypotheses 1-tailed where they were attempted replications of earlier effects; it seems more risky to allow a claim to significance for a reversal of an effect (that has no empirical or theoretical justification) than to increase the potential for Type I errors, particularly where the effect sizes are reported and in fact are larger than in the original study.

beings or forces), and Fortune ('luck' is meant as a metaphor for life success rather than as a literal event). Each sub-scale has five items. The single perceived luckiness item originally included by Luke (2007) was omitted here due to concern as to its psychometric robustness relative to the overall measure (Luke, 2007).

Procedure

Participants who visited the museum exhibition were asked if they would like to take part in a study of psychic ability and beliefs about luck. Once recruited, the experimenter took participants individually to the test room and briefed them about the study and explained that the experiment involved a precognition task, although the non-intentional nature of the task was not divulged. They were informed that their data would be recorded anonymously but that they could withdraw from the study at any time by citing their unique participant identification number. Participants then signed a consent form and completed the questionnaire. Participants were given detailed instructions of what to do next on the computer, and they were then left in the room alone until they had completed the PMIR computer task.

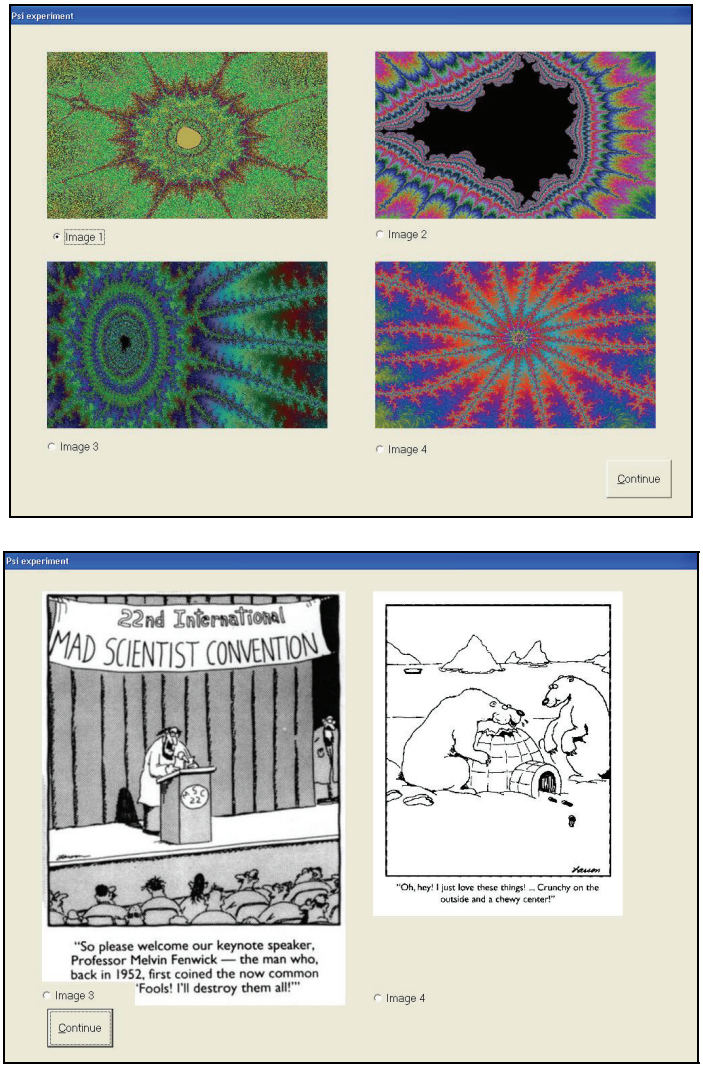


Figure 1: Screen shots illustrating the fractal image preference task and the reward task in which participants rate the relative humorousness of cartoons

The initial screen of the PMIR-task computer program asked participants to relax and to follow the instructions, and explained that they would be informed when they needed to try and use any psychic (psi) ability. Further instructions described how to indicate which one out of four presented images they most preferred for each of a series of ten "preparatory" trials. Images were fractal patterns, displayed in a random arrangement from a unique pool of four images for each of the ten trials.

Unknown to participants, the ten "preparatory" fractal trials were actually a non-intentional precognitive psi task. In each trial, once the participant had made their target selection, the computer then randomly selected one of the four fractal images as the (*post factum*) precognition target. Thus, randomised selection of the target occurred each time an image preference was selected. This randomisation and that of the image position arrangement was conducted via the RND function in the Visual Basic program, which is seeded by the timer. No feedback was given to the participant on target success.

The program also randomly assigned the participant to either a contingent or no-contingent condition, with those in the no-contingent condition ending the experiment at this point and those in the contingent condition performing either a pleasant or unpleasant task depending upon the participant's performance on the ten PMIR trials. In the contingent condition, participants who correctly identified fewer than 2.5 of the precognition targets (i.e. who scored below MCE) were directed towards an unpleasant vigilance task, whereas those who correctly identified more than 2.5 targets were directed towards a pleasant cartoon-preference task.

The unpleasant vigilance task presented a set of instructions describing the task and requesting participants to observe the following display of numbers, and to press the left mouse key (or the return key) for every complete run of three consecutive odd numbers (e.g., '3', '7', '5'), or three consecutive even numbers (e.g., '4', '2', '4'). Once the task began, a series of singular random numbers ranging from 1-9 were presented in the centre of the screen, each digit was replaced every 500 milliseconds. Duration of the unpleasant task was dependent on degree of success at the precognition task: those who correctly identified none of the precognition targets completed this unpleasant task for four minutes, those who identified only one correct target for three minutes, and those scoring two hits did this task for two minutes. No group were informed of how long the unpleasant task would take nor did they receive any feedback on their performance. No record of the participant's performance on this dummy task was made.

Participants who performed the pleasant, cartoon-preference task were first notified that the task would now change but they should continue to select the image they preferred. However, like the unpleasant task, this task was not a psi task and the cartoon images presented were predetermined, not random. Participants' previous non-intentional precognition task performance determined how long the cartoon-preference task continued, such that the task lasted 30 seconds if they obtained 3 direct hits and increased by 30 seconds for every additional direct hit.

STUDY 1 RESULTS

We hypothesised that participants would select more fractal image targets in the hidden precognition task than mean chance expectation. Hit rates are summarised in Table 1 and show that, as predicted, the overall mean hit rate for this sample, at 3.4, is significantly higher than MCE of 2.5.

Table 1: Mean hit rates (and standard deviations) for precognition task performance scores, with 1-sample t-test comparisons against chance expectation

	Mean hit rate	*SD*	*1-sample t*	*p* (1-tailed)	*Es (r)*
Overall performance (*N* = 25)	3.40	1.73	2.60	.01	0.469
Contingent condition (*N* = 13)	3.15	1.91	1.24	.12	0.337
No-contingent condition (*N* = 12)	3.67	1.56	2.60	.02	0.617

Our second prediction was that the number of hits in the hidden precognition task would be significantly greater for the contingent condition than for the no-contingent condition. We can see that, in fact, better performance was achieved in the no-contingent condition, contrary to prediction, although the difference between conditions is not significant (t[23] = .73, p = .47). We should note, however, that only scoring in the no-contingent condition deviates significantly from chance, as illustrated in Table 1.

We finally predicted that the number of hits in the hidden precognition task would be positively correlated with scores on the Luck and Providence subscales of the QBL. Pearson correlations are given in Table 2 and show that the positive association with Providence was observed here but the correlation with Luck, although positive, is not significant. However, there was also a significant positive association with Chance that had not been predicted.

Table 2: Pearson correlations (with 1-tailed significance levels) between precognition task performance and QBL subscale scores

	QBL subscales			
	Luck	Chance	Providence	Fortune
Psi score	.14	.48	.39	.15
	(.26)	(.01)	(.03)	(.24)

DISCUSSION AND RATIONALE FOR STUDY 2

Despite the relatively modest sample size recruited here, this study was able to replicate Luke *et al.*'s (2008) finding that participants were able to score significantly better than chance at a hidden precognition task. Although the result is consistent with the prediction derived from PMIR that psi might operate below the level of conscious awareness and act by facilitating pre-existing responses (in this case simply indicating aesthetic preferences) rather than by generating novel ones, the claim that this process is essentially goal oriented was not supported since performance in the no-contingent condition was actually superior to that in the contingent condition, although these outcomes did not differ significantly. The effect size reported here for the no-contingent condition (along with that for overall performance) is actually larger than that reported by Luke *et al*,. and so only serves to question the importance of providing a reward or punishment for performance. It is difficult to be certain, of course, that those in the no-contingent condition did not receive any tangible reward: perhaps subsequently being informed by the experimenter that one has done well may provide a sufficient reward to motivate performance — certainly much other parapsychological research depends upon that being the case — or indeed leaving the experiment without having to perform either the pleasant or unpleasant contingent task may have been a better incentive than either! Given this difficulty in ensuring a true no contingent condition, it was therefore decided to omit this condition from a second replication attempt and instead concentrate on ensuring that the reward and punishment contingencies were

sufficiently distinct to be effective. To this end, it seemed essential that we included a validation check to document how enjoyable those different outcomes were perceived to be.

There was some support here for speculations that those who tend to believe in a particular type of luck may be more predisposed to capitalise on PMIR and this extends to fortuitous events that occur in the laboratory. Here we confirmed our prediction that scores on the Providence subscale would be positively correlated with performance at a hidden precognition task, and although we were unable to replicate the relationship Luke *et al.* found with Luck we did find a significant positive relationship with Chance that had not been reported previously. These unexpected findings seem to contradict Luke *et al*.'s suggestion that it is those who tend to perceive luck to be a controllable element (as measured by the Luck subscale) who tend to perform well on hidden precognition tasks — in this study, those tending to believe that luck is random and inert (as measured by the Chance subscale) actually performed better. Possibly this result may stem from the different populations used in the separate studies, with those used in this study scoring relatively higher on the Chance subscale (M = 4.9) and relatively lower on the Luck subscale (M = 4.4) compared to the scores in the original Luke *et al*. study (where Chance = 4.1; Luck = 5.0), perhaps indicating that the magnitude of belief is related to psi performance, such that the degree of conviction in a belief and not the belief itself is the determining factor.

We were interested to conduct a further replication that might allow us to evaluate the robustness of the effect and clarify its relationship with the luck variables investigated previously (in particular to see if we could confirm our unexpected finding with respect to Chance and our unexpected failure to replicate Luke et al.'s finding with respect to Luck). But we also wished to extend this replication by considering other variables that might be expected to covary with performance on a covert psi task. To this end we were guided by Stanford's (1990) claim that certain attributes of the person may make them more or less likely to exhibit PMIR, particularly where they affect the person's sensitivity to the psi stimulus and their likelihood to act upon such a stimulus, and we sought to identify indicators of both of these.

The biggest hindrance to (unconsciously) detecting the psi stimulus may be the neurological system's natural tendency to filter out information that seems inconsequential to the explicit task in hand, a tendency that is evident in the phenomenon of latent inhibition (LI: see Lubow, 1989). Individuals who have relatively high levels of LI tend to learn association rules involving stimuli that were initially irrelevant, presumably because such stimuli have been filtered out at lower levels of processing (cf. Holt, Simmonds-Moore & Moore, 2008). It seems plausible, then, that individuals who score high on LI might tend to be less sensitive to peripheral or weak psi signals. LI is not straightforward to measure experimentally, but has been found to covary with other factors that can be gauged using pencil and paper measures: for example, it has been reported that creative people tend to score lower on LI than less creative people (Carson, Higgins & Peterson, 2003), as do those who present as Open to Experience (Carson & Peterson, 2000; Carson, Peterson & Smith, 2002). In this study we propose to treat these as indicators of proneness to LI and expect that higher scores on them, reflecting *lower* levels of LI, will be associated with better performance at a PMIR task.

A hindrance to a person's propensity to act upon an unconscious psi stimulus is behavioural or cognitive rigidity. For example, a person who is subtly aware of an imminent accident, such as a train crash, may be less likely to take evasive action based on any vague sense of foreboding if their plans are relatively fixed (they already booked their seat, have arranged to be picked up at the station and have an important meeting to attend) than if they are relatively flexible. A laboratory corollary of this may be the stability-lability dimension, where persons at the stable pole are characterised as relatively fixed in their thinking styles and persons at the labile pole are relatively fluid and changeable; scores on this dimension have recently been associated with performance at a PK task (Holt & Roe, 2006; Roe & Holt, 2006). We therefore expected that more labile persons would be more able to act on any unconscious psi signal and so would perform better on a PMIR task. The lability metric used in these previous studies is rather too large to use here but a core feature was creativity, so we decided to consider one of its constituents, the Creative Cognition Inventory (an unpublished measure by Holt) in this study.

Hence in this study we make the following predictions:

- Participants will select more fractal image targets in the hidden precognition task than mean chance expectation
- The number of hits in the hidden precognition task will be positively correlated with scores on the Luck, Chance and Providence subscales of the QBL
- The number of hits in the hidden precognition task will be positively correlated with scores on the Openness to Experience scale
- The number of hits in the hidden precognition task will be positively correlated with scores on the Linear and Non-Linear subscales of the Creative Cognition Inventory

STUDY 2 METHOD

Participants

An opportunity sample of 32 psychology students from the University of Northampton was used. No demographic information was collected.

Materials

A software program written in visual basic (v.6), used previously in Study 1 to run the non-intentional precognitive task, was adapted here so that there was not a no-contingent condition, only a contingent condition. The original long-form of Luke *et al.*'s (2003) Questionnaire of Beliefs about Luck was used here but was supplemented by measures of creativity, the Creative Cognition Inventory (CCI: Holt, 2002) and Openness to Experience (Goldberg, 1999).

Procedure

Participants were approached and asked if they would like to take part in a study of extrasensory perception and personality. If they agreed to participate they were then taken individually to the test room and more fully briefed about what was involved, and informed that all of their data would be kept confidential and that they could withdraw from the study at any time without explanation if they so chose. Participants who were willing to continue signed a consent form and then completed the questionnaire measures.

Participants were then seated in front of a PC that provided on-screen instructions on how to complete the computer-based tasks. The experimenter remained outside the test room during the experiment so as to be available should participants experience any problems. The first task was presented as an activity that was intended to gauge their preferences, during which they would be shown ten sets of four fractal images and had to register which was their preferred by selecting the appropriate option (see Figure 1). For each trial, once the participant had selected one of the four images, the computer then randomly selected one of the images to be the target. Based on their performance in selecting target images across ten trials, participants went on to perform a second task: for scores below the MCE of 2.5 they were directed to an unpleasant vigilance task; for scores above the MCE of 2.5 they were directed towards a pleasant cartoon preference task.

For the unpleasant task, participants were presented with a sequence of randomly-generated digits in the range 1-9 that changed every 500 milliseconds, and were required to monitor these and respond when this sequence involved three successive odd numbers or three successive even numbers. For the pleasant task, participants were presented with sets of Gary Larson cartoons and were required to identify which of the cartoons they found most humorous.

Although participants may have believed that the secondary task would be a test of their ESP, neither the pleasant nor unpleasant task constituted a psi test, and participants' responses were not processed or analysed. Rather, engagement in the task constituted the participant's 'reward' or 'punishment' for performance on the hidden precognition task, and degree of success determined the duration for which the contingent task continued: those scoring no direct hits completed the punishment task for four minutes, one direct hit for three minutes, and two direct hits for two minutes; those scoring three direct hits completed the reward task for 30 seconds, four direct hits for 60 seconds, and so on up to a maximum of 240 seconds.

Once their allocated time had expired, participants were asked by the experimenter to describe the purpose of the two tasks so as to ensure that no participants suspected that the first task required them to use ESP, and also to rate how pleasant they found their second task on a 10-point scale where 1 = not at all pleasant and 10 = extremely pleasant, so as to ensure that the intended manipulation of pleasantness of the contingent task had been successful.

Because of the element of deception involved in a covert psi task such as this, particular care was taken to fully debrief participants in a manner that explained the necessity of the misdirection in order to investigate the unconscious or unintentional use of ESP. Participants were allowed as much time as they needed to discuss and ask questions about the study design and its aims and were reminded of their right to withdraw their data anonymously at some future point should they so wish; no participant exercised this right.

STUDY 2 RESULTS

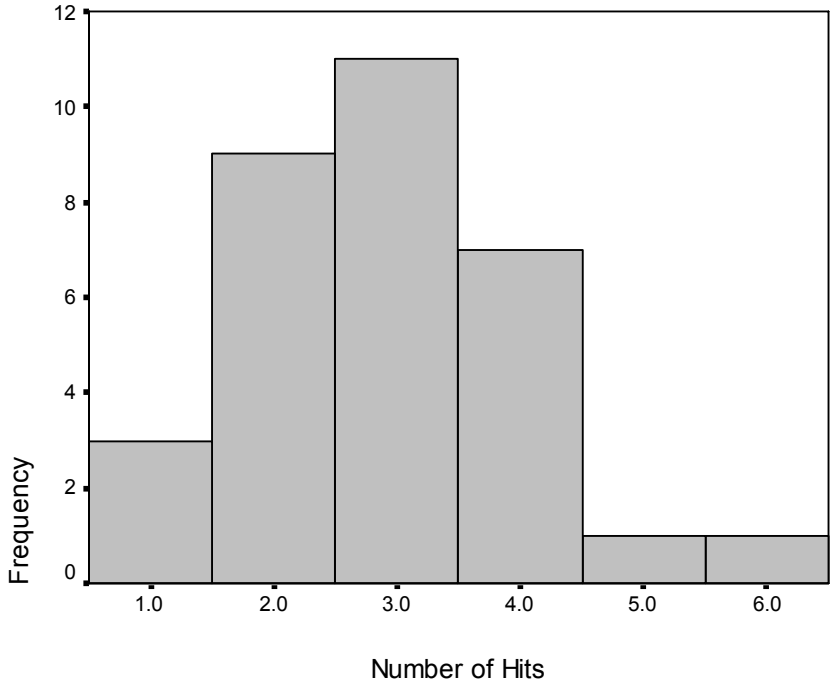
To test the effectiveness of the manipulation of the enjoyability of the two contingent conditions we asked participants to rate the secondary task they were given using a 10-point scale ranging from 1 (not at all pleasant) to 10 (extremely pleasant). Participants allocated to the pleasant task gave an average rating of 7.00 (SD = 1.12) whereas participants allocated to the unpleasant task gave an average rating of 2.42 (SD = 0.90), and this difference is significant, $t(30) = 11.98$, $p < .001$, suggesting that this manipulation was successful.

Hypothesis 1 predicted that participants would select significantly more target images in the incidental psi task than would be expected by chance. Mean chance expectation is for 2.5 hits in 10 trials; actual hit rates are illustrated in Figure 2. The actual mean hit rate was 2.90 (SD = 1.15), which although only somewhat higher than MCE is significant, 1-sample $t(31) = 2.01$, $p = .03$, 1-tailed, $r = .340$.

Our second prediction was that the number of hits in the hidden precognition task would be positively correlated with scores on the Luck, Chance and Providence subscales of the QBL. We can see from the Pearson correlations reproduced in Table 3 that none of the correlations comes close to significance, and so this study fails to replicate earlier findings.

We thirdly predicted that the number of hits in the hidden precognition task would be positively correlated with scores on the Openness to Experience scale, and in this study this gives rise to the strongest association with an effect size of .46 that is significant.

Figure 2:
Histogram illustrating distribution of hits on the covert precognition task



Finally we speculated that the number of hits in the hidden precognition task would be positively correlated with scores on the Linear and Non-Linear subscales of the Creative Cognition Inventory. These are given in Table 3 and, although in the predicted direction, give only small effect sizes that are not significant.

Table 3: Pearson correlations (with 2-tailed significance levels) between precognition task performance and scores on QBL subscales, Openness to Experience, and Creative Cognition subscales

	QBL subscales					Creative Cognition subscales	
	Luck	Chance	Providence	Fortune	Openness to experience	Linear	Non-Linear
Psi score	.12	.20	-.03	-.13	.46	.25	.20
	(.50)	(.27)	(.86)	(.48)	(.01)	(.17)	(.27)

DISCUSSION

Both studies described in this paper were able to replicate the precognition effect first reported by Luke et al. (2008) and give encouragement to the suggestion that this relatively simple paradigm might provide a straightforward means of eliciting ESP effects with a set-up that requires no more than a personal computer. The sample sizes in both these replications have been relatively small so that

capturing significance here suggests that we are dealing with quite a robust effect that merits more extensive study. We would like to encourage others to consider adopting this approach when pursuing their own research interests, and would be happy to provide a copy of the program and some support with setting up.

The method is quite inexpensive in terms of researcher time per datum collected and may provide a useful vehicle for further considering process aspects of performance such as personality and situational factors. Of the factors considered thus far, it seems clear that the Fortune subscale of the QBL is not related to performance but each of the other subscales has received at least some empirical support across the three studies conducted thus far, and would seem to warrant further attention.

The strongest predictor of performance at the psi task was Openness to Experience. This was included as a correlate of LI (after Carson & Peterson, 2000; Carson, Peterson & Smith, 2002) that might stand as a marker of a person's tendency to filter out irrelevant information. Further work needs to be done to explore this notion, possibly incorporating other instruments such as measures of transliminality (Thalbourne, 2000) or boundary thinness (Hartman, 1991), or in incorporating an experimental measure of LI (e.g., Holt, Simmonds-Moore & Moore, 2008).

The measures used to explore creativity were included as an indicator of behavioural or conceptual lability, but these gave only small positive correlations and were not significant. Perhaps the more comprehensive measure used previously (Holt & Roe, 2006; Roe & Holt, 2006) should be utilised before this suggestion is rejected altogether.

It is not clear to what extend this approach offers support for the PMIR model. A more extensive and thorough test of the effects of providing a contingent outcome is needed than that offered in Study 1 here. For instance the salience of a contingent condition needs to be validated and explored so that any supposed reward can be demonstrated to be more rewarding than just finishing the experiment without performing any further task. Clearly some tangible rewards and penalties are tied to the participant's beliefs and motivations concerning the task and psi generally, and we would advocate a multivariate approach to mapping the interactions between factors. Finally, this design makes the assumption that to be successful the psi task should be covert, but this assumption has not been tested and may be unwarranted. It would be worthwhile to directly asses the role of (non)intentionality by comparing intentional and non-intentional conditions.

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ALLAN KARDEC AND THE DEVELOPMENT OF A RESEARCH PROGRAM IN PSYCHIC EXPERIENCES

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ABSTRACT

Allan Kardec was one of the first scholars to propose a scientific investigation of psychic phenomena but details of his life and his research work are not well known and have been misrepresented. This paper is a descriptive essay briefly presenting Kardec's biography, the first steps in his seminal research, and several epistemological/methodological guidelines he proposed to develop a comprehensive scientific research program to deal with psychic phenomena. Kardec raised and tested several hypotheses to explain mediumistic phenomena: fraud, hallucination, a new physical force, somnambulism (including unconscious cerebration and clairvoyance), thought reflection (including telepathy and super-psi), discarnate spirits and several other theories. He accepted that fraud, hallucination, unconscious cerebration and thought reflection could explain many phenomena regarded as mediumistic. However, when mediumistic phenomena were studied as a whole, the best explanation would be the spiritist hypothesis, a spiritual origin for the phenomena. He named this hypothesis "Spiritism". Some guidelines he proposed to advance scientific research in psychical phenomena were: to use methods appropriate to the subject of investigation, to avoid both sterile skepticism and credulity, to be open to the novel, and to heed the need for a comprehensive and diversified empirical basis. He stressed the importance of theory for a scientific research program, and that facts are not enough to create certainty. Parapsychology/psychical research has much to gain in better knowing Kardec's and other pioneer's works, not just for a better understanding of the field's history, but also for potential scientific/philosophical tools that may be useful to move the field forward. Deeper studies on aspects of Kardec's work and life are warranted.

INTRODUCTION

Allan Kardec was a pioneer in proposing scientific investigation of psychical phenomena[1] in the middle of the XIX century. To pursue that investigation he developed a research program, including a comprehensive theory he called "Spiritism". Currently, the principle ideas of Spiritism have become a social movement spawning healing centers, charity institutions and hospitals involving millions of people in dozens of countries, most of them in Brazil (Aubrée & Laplantine, 1990; CEI, 2008; Moreira-Almeida & Lotufo Neto, 2005). Despite the fact that Kardec's books continue to be very popular, selling millions of copies, his research work and methods are still poorly known by both spiritists and parapsychologists. In both fields there is imprecise information and misunderstandings concerning his work with psychic experiences (Fodor, 1966; Melton, 1966). One probable major source for such misapprehension is a paper published by Alexander Aksakof (1875) when the first English translation of "The Spirit's Book" ("Le Livre des Esprits" the first Kardec's book on Spiritism) was published. Aksakof's paper was entirely based on an interview with the medium Celina Japhet in 1873. This medium had worked with Kardec but later had severe conflicts with him. Alvarado has previously called attention to the fact that parapsychologists throughout the 20th century have held imprecise and dismissive views of spiritualists and spiritists. Often they report that spiritists "had simplistic, unitary

[1] Although recognizing the possibility of specificities for each term, in this paper I will use quite liberally and interchangeably the words psychical, parapsychological and mediumistic to refer to the body of phenomena studied by parapsychology, psychical research, and spiritism.

views about the nature of psychic phenomena" (Alvarado, 2003:76-7). However, as this paper will show, a more in depth analysis of Kardec's works reveals that this was not the case with him.

The purpose of the current paper is to present a brief description of Kardec's life and his first steps in the development of the research program he called Spiritism. I will also present some methodological/epistemological guidelines that Kardec proposed for a fruitful investigation of psychical phenomena. Intending to grasp more directly Kardec's ideas and methods, and not what has been written about him, we focused this paper, as much as possible, on primary sources, that is, Kardec's writings: his books and the twelve volumes of *"Revue Spirite"*, a monthly journal he edited and published from 1858 until his death in 1869.

ALLAN KARDEC – A BRIEF BIOGRAPHY

Allan Kardec is a pseudonym for Hippolyte Léon Denizard Rivail, a Frenchman who was born on October 3rd, 1804 (Martins & Barros, 1999; Wantuil & Thiesen, 1979). From 1815 to 1822, he studied in Switzerland at the world famous Yverdon Institute, directed by Johann Heinrich Pestalozzi, the well-known Swiss pedagogue and educational reformer who proposed the development of a science of education and emphasized that education should foster the individual's faculties to think for himself. Rivail, for several decades, was committed to advancing Pestalozzi's pedagogy in France (Hess, 1991; Incontri, 1996; 2004; Pestalozzi, 2008; Wantuil & Thiesen, 1979).

From his return to Paris in 1822 until his first contact with mediumistic phenomena in 1854, Rivail worked mainly as an educator and writer, who published approximately 21 texts about education and schoolbooks on topics such as grammar and arithmetic. Rivail founded schools and worked as both a translator and teacher. He was a member of several scholarly societies such as the Historic Institute of Paris (*Institut Historique*), Society of Natural Sciences of France (*Société des Sciences Naturelles de France*), Society for the Encouragement of National Industry (*Société d'Encouragement pour l'Industrie Nationale*), and The Royal Academy of Arras (*Académie d'Arras, Société Royale des Sciences, des Lettres et des Arts*). The latter awarded to him a prize of honor for an essay on education (Blackwell, 1996; Hess, 1991; Wantuil & Thiesen, 1979).

Rivail always emphasized freethinking, religious tolerance, and the need for using reasoning and scientific knowledge. In a speech in 1834, commenting on the child who receives a good scientific education:

> "(...) Then, the children will no longer believe in souls from another world, nor in ghosts; they will no longer believe that *ignis fatuus* are spirits; they will no longer believe in fortune tellers; they will no longer believe in shooting stars as being the sign of the death of a person, (…) they will laugh at the superstitious credulity of the ignorant, their spirits will be widened contemplating the immense and without boundaries space, in which circulates many thousands of worlds (…)" (Rivail, 1998:83).

By 1854, Rivail had been involved with studies on "animal magnetism" for more than 30 years (Kardec, 1858; Leymarie, 1875), but there is not much information regarding this involvement. Anna Blackwell, Kardec's contemporary and translator of his spiritist books to English, stated that he "took an active part in the labours of the Society of Magnetism, giving much time to the practical investigation of somnambulism, trance, clairvoyance, and the various other phenomena connected with the mesmeric action" (Blackwell, 1996:11). In fact, it was among people involved with magnetism that Rivail had his first contacts with mediumistic phenomena in 1854. It was a magnetizer, Mr. Fortier, who first told Rivail, about turning tables. At first, Rivail was not interested in it because he thought that a table's movement could be due to some physical cause, some new physical force such as electricity or magnetism. Some months later, Rivail heard the claim that tables could not just move but also answer questions.

Rivail answered:

> "I will believe it when I see it and when it has been proved to me that a table has a brain to think and nerves to feel and that it can become somnambulist. Until then, allow me to see nothing in this but a fable told to provoke sleep" (Kardec, 1890/1927:206).

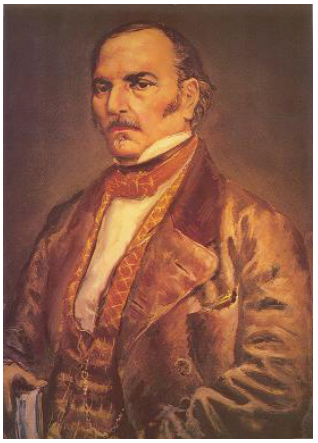


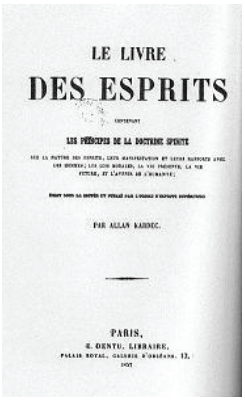
Figure 1- Allan Kardec's portrait by Monvoisin (1790-1870)

In 1855, another of Rivail's friends persuaded him to attend a mediumistic séance where he observed table turning and mediumistic writing using a basket (mediums lightly touched an overturned small basket with a pencil attached to it to write upon a sheet of paper placed beneath the basket). After this séance, he decided to start an in depth investigation of these phenomena. He attended regularly mediumistic séances with several mediums.

> "I understood from the beginning the gravity of the exploration I was undertaking. (…) the phenomena posed a complete revolution in ideas and beliefs. It was necessary therefore to act not lightly, but, rather, with circumspection, to be positive rather than idealistic, so as not to be carried away by illusions."(Kardec 1890/1927:209).

In 1857, under the pseudonym of Allan Kardec, Rivail published the first report of his studies, "The Spirit's Book" ("Le Livre des Esprits"). Since then, regarding issues related to Spiritism, Rivail started to be known as Allan Kardec. At the introduction of The Spirit's Book, Kardec created the word "Spiritism", that was later defined as:

> "Spiritism is a science that deals with the nature, origin, and destiny of spirits, and their relation with the corporeal world."(Kardec, 1859/1999:6).


LE LIVRE

DES ESPRITS

PAR ALLAN KARDEC.

PARIS,

Figure 2 – Fac simile of the first edition of "Le Livre des Esprits" (1857)

In 1858, Kardec founded the *Société parisienne des Etudes spirites,* (Spiritist Society of Paris) and the *Revue Spirite - Journal d'Études Psychologiques* (Spiritist Journal – Journal of Psychological Studies). Kardec directed the society and the journal until his death in 1869. During Kardec's last 15 years in which he devoted himself full time to the investigation of mediumship, he also published books on several aspects of Spiritism (Kardec, 1868; 1861/1986; 1864/1987; 1859/1999; 1865/2003), traveled to some French and Belgian cities to visit Spiritist groups (Kardec, 1862; 1864; 1864a) and was intensely involved in correspondence with people around the world interested in mediumistic phenomena (Fernandes, 2004).

In the next sections, I will present some of Kardec's first steps in developing a research program to investigate psychic phenomena. Here, I use "research program" as referred to by the philosopher of science Imre Lakatos (1970), who proposes that a science is characterized by a "scientific research programme" composed of a conceptual framework and guidelines to advance the scientific exploration of the subject investigated. Lakatos' concept of "scientific research programme" has been one of the most relevant in the contemporary philosophy of science (Chalmers, 1982).

SEARCHING FOR A CONCEPTUAL FRAMEWORK TO EXPLAIN MEDIUMISTIC PHENOMENA

Kardec did not accept the existence of the supernatural or miracles. He assumed that every phenomenon that happens in nature must have a natural explanation following some kind of natural law suitable to scientific investigation. Something may be unexplained, having its causes unknown at a certain historical period, but it is not unexplainable (Kardec, 1859/1999; 1868). Kardec stressed several times that we should be very careful in attributing to spirits all sorts of phenomena that are unusual or that we do not understand.

> "I cannot stress this point enough, we need to be aware of the effects of imagination (…). When an extraordinary phenomenon is produced – we insist – the first thought should be about a natural cause, because it is the most frequent and the most probable." (Kardec, 1860a:77)

When facing table turning and other mediumistic phenomena, Kardec proposed to use a scientific approach to understand them:

> "As a means of elaboration, Spiritism proceeds in exactly the same course as the positive sciences[2]; that is to say, it applies the experimental method. Some facts of a new order present themselves, which cannot be explained by known laws. It teaches us to observe, compare (…), deduces the consequences, and seeks for useful applications; *it establishes no preconceived theory*. (...) It is rigorously exact to declare that Spiritism is a science of observation, and not the product of imagination. Not until its studies were based on experimental methods did the sciences begin to make serious progress. Although it was believed that this method could only be applied to matter, it is just as well applied to metaphysical things" (Kardec, 1868/2003:18)[3].

It is worth noting that Kardec's books on Spiritism contain basically the theories he developed based on his explorations of mediumistic manifestations, as well as the rational foundations for these theories. His books discuss what he called the "philosophy" that emerged from his investigation. They sometimes contain some brief case reports or empirical evidence to support the theory. He presented case reports and other empirical evidence in the *Revue Spirite*. In that journal he described many cases witnessed by him or by one of his many correspondents around the world. These cases were usually not reported in as detailed a manner as was usual later at the Society for Psychical Research. He used to present reports and to discuss possible explanations of all sorts of physical and mental mediumistic manifestations. He regularly presented hypotheses in the *Revue* to be tested and analyzed by its readers. Kardec considered this journal as a "trial-ground". Many texts and theories first published at the *Revue* were later published in a developed form in one of his books (Kardec, 1858i; 1868).

Below I will present and briefly discuss Kardec's first approach to mediumistic phenomena and the main hypotheses he explored in searching for an explanation for the whole group of observed psychical phenomena. In opposition to statements from some parapsychologists that spiritists/spiritualists were not able to realize an alternative explanation to mediumistic phenomena beyond survival, Kardec, like several others, considered a diversity of possible hypotheses, including the influence of the minds of both the mediums and sitters (Alvarado, 2003, Ballou, 1853; Barkas, 1876; Harrison, 1873).

Fraud:

Kardec recognized that many alleged mediumistic manifestations were caused by trickery or charlatanism (Kardec, 1861/1986). He stressed that it is necessary to be always aware of the possibility of fraud and one should denounce it without ceremony. "Spiritism has only to gain in exposing impostors" (Kardec, 1959:96). This having been said, Kardec denied that trickery could explain all kinds of observations. Below I list some of the reasons he provided to support this claim:

- Often the accusation of fraud is raised with no evidence, but just because someone had witnessed an order of facts that he/she is not able to explain (Kardec, 1859/1999).
- Because many mediumistic manifestations can be imitated, it does not imply that there cannot exist a real manifestation. "Abuses exist everywhere; but the abuse of a thing is no argument against the thing itself" (Kardec, 1861/1986:33). It is hard to think that thousands of people involved with mediumship around the world are involved in the same fraud (Kardec, 1859/1999).
- Fraud is much more probable with mediums that make mediumship a source of pecuniary profit, especially when mediums state that they are able to produce mediumistic manifestations at their will. Kardec was always in strong opposition to paid mediums:

[2] By "positive science", Kardec meant empirical sciences ("based on facts"), in opposition to "purely speculative" ones (Kardec, 1864a).

[3] Always when available, quotations were extracted from published English versions of Kardec's works. Otherwise, I translated from French original and Portuguese versions. When necessary to improve fidelity to French originals, I made some changes to passages from published English versions.

> "We are well aware that our severity with regard to mercenary mediumship has gained us the ill-will of those who are tempted to make of spiritism a source of worldly gain, and of their friends (...) we do not see how any one can maintain that there is not a greater risk of fraud and of misuse of the mediumistic faculty, when the latter is made a matter of speculation, than when it is exercised with entire disinterestedness and if our writings have contributed, in France and other countries, to discredit the turning of mediumship into a trade, we believe it will not be the least of the services they will have rendered to the cause of Spiritism" (Kardec, 1861/1986:391).

- Physical mediumship is more subject to fraud than intellectual mediumship, because in the latter it is possible to judge the content of the mediumistic communication. It is hard to explain as fraud when mediums show knowledge of facts, even private affairs, and personality traces of late people unknown to them and to anyone at the séance (Kardec, 1861/1986).

Hallucination

Kardec accepted that superstitious or credulous persons often accept as psychic experiences what actually are hallucinations due to a physiological cause. But he stressed that hallucination can not explain all kinds of anomalous perceptions. According to Kardec, the best way to exclude hallucination is when the perception has what he called "intelligent signs", i.e. when it provides evidence of veridical and verifiable information unknown to the person who has the experience (Kardec, 1860; 1861/1986): "every apparition that does not give any intelligent sign should definitely be listed as an illusion" (Kardec, 1861:196). In addition to these signs, hallucination becomes an unlikely explanation when "several persons are witnesses to the same fact" or when a table is seen to be raised in the air and "is broken in its fall to the floor" (Kardec, 1861/1986:34-5).

Between the middle of the XIX century to the beginning of the XX century, it was common to consider mediums and anyone involved with spiritualism as mentally insane. Kardec wrote several papers refuting this claim using several methodological and epidemiological arguments that are discussed elsewhere (Almeida, 2007; Moreira-Almeida & Lotufo Neto, 2005; Moreira-Almeida et al., 2005).

Physical Cause

As explained in the previous section, physical cause was the first explanation raised by Kardec when he was told about table turning. But the physical manifestations he observed were not merely mechanical; they showed will and intelligence:

> "when those movements and raps gave proof of intelligence, when it was recognized that they responded to our thoughts with complete freedom, one was impelled to draw the conclusion that, *if every effect has a cause, every intelligent effect must have an intelligent cause*. Is it possible to accept that a fluid produces these phenomena unless one admits that there must be an intelligent fluid? (Kardec, 1859/1999:26).

After reaching the conclusion that the phenomena observed were real and caused by an intelligent source, investigating the source of this intelligence became Kardec's main focus. He discussed in more depth three potential sources of mediumistic manifestations: medium's mind (somnambulism), sitter's mind (thought-reflection), and discarnate spirits (Kardec, 1861/1986). Kardec considered these as high value hypotheses:

> "Two objections (to the spiritist theory) still remain to be examined, the only ones really deserving of the name, because they are the only ones founded on a rational basis. Both admit the reality of the material and moral phenomena of Spiritism, but deny the intervention of spirits in their production" (Kardec, 1860/1996:52-3).

I will now present those Kardec's comments about the two hypotheses that he regarded as of high value: Somnambulism and Though-reflection.

Somnambulism (Unconscious activity, including clairvoyance)

According to this theory, while the medium is in an altered state of consciousness ("waking somnambulism"), there is "a momentary superexcitement of his mental faculties, a sort of somnambulic or ecstatic state, which exalts and develops his intelligence" (Kardec, 1861/1986:39). "In this state the intellectual faculties acquire an abnormal development; the circle of our intuitive perceptions is extended beyond its ordinary limits; the medium finds in himself, and with the aid of his lucidity, all that he says, and all the notions transmitted by him, even in regard to subjects with which he is least familiar in his usual state" (Kardec, 1860/1996:53). Kardec recognizes that this explanation is true for many alleged "spiritual communications" and that in all mediumistic communications there is an influence of the medium's mind (Kardec, 1861/1986); however he denies that this hypothesis could explain all kinds of observed mediumistic phenomena, among them:

- "the way in which the basket moves under the influence of the medium, through the mere laying of his fingers on its edges, and in such a manner that it would be impossible for him to guide it in any direction whatever. This impossibility becomes still more evident when two or three persons place their fingers at the same time on the same basket, for a truly phenomenal concordance of movements and of thoughts would be required between them, in order to produce, on the part of each, the same reply to the question asked. And this difficulty is increased by the fact that the writing often changes completely with each spirit who communicates, and that, whenever a given spirit communicates, the same writing re-appears" (Kardec, 1860/1996:30).
- Mediumistic answers to questions posed by sitters. Many times these answers are "notoriously beyond the scope of the knowledge, and even of the intellectual capacity, of the medium, who, moreover, is frequently unaware of what he is made to write, since the reply, like the question asked, may be couched in a language of which he is ignorant, or the question may even be asked mentally" (Kardec, 1860/1996:30).
- "we cannot comprehend how trance should make a man write who does not know how to write, or give communications through the tilting and rapping of tables, or the writing of planchettes and pencils. (…) the proofs of the action of an intelligence independent of the medium are so incontestable that they leave us in no doubt in regard to it. The fault of the majority of theories raised in the early times of spiritism is the drawing of general conclusions from isolated facts" (Kardec, 1861/1986:40).

Thought Reflection (Telepathy, Super-Psi)

Kardec called "thought reflection" what Myers would call "telepathy" some decades later (Gauld, 1968). Below we have Kardec's description of this theory:

> "The medium is a sort of mirror, reflecting all the thoughts, ideas, and knowledge of those about him; from which it follows that he says nothing which is not known to, at least, some of them" (Kardec, 1860/1996:54).

This hypothesis was Kardec's initial supposition for the origin of the intelligent source that produced mediumistic phenomena (Kardec, 1859/1999). Following his investigations, Kardec accepted that this may happen and actually happens (Kardec, 1858d), but it cannot explain the whole body of available empirical evidence:

> "proved by the evidence of facts that the communications of the medium are often entirely foreign to the thoughts, knowledge, and even the opinions of those who are present, and that they are frequently spontaneous, and contradict all received ideas" (Kardec, 1860/1996:54).
>
> "How, again, can reflection of thought explain the production of writing by persons who do not know how to write? replies of the widest philosophical scope obtained through illiterate persons? answers given to questions propounded mentally, or spoken in a language unknown to the medium? and a thousand other facts, leaving no doubt as to the independence of the intelligence which manifests itself? The theory of reflection can only be held by those whose observation is of superficial and limited character" (Kardec, 1861/1986:38).

As the source of the communication was not found to be among the sitters, Kardec finally discussed a last hypothesis, one that would currently be called "super-psi" or "super-ESP" (Braude, 1992; Gauld, 1961;1982):

> "The radiation of thought, they say, extends far beyond the circle immediately around us; the medium is the reflection of the human race in general; so that, if he does not derive his inspirations from those about him, he derives them from those who are further off, in the town or country he inhabits, from the people of the rest of the globe, and even from those of other spheres" (Kardec, 1860/1996:54).

In answering to this hypothesis, Kardec uses an epistemological reason, that, when, for a given domain of facts, there are two rival theories with similar explanatory power and other heuristic properties, one usually should choose the simpler of them (Hempel, 1966; Chibeni & Moreira-Almeida, 2007):

> "We do not think that this theory furnishes a more simple and probable explanation than that given by Spiritism; for it assumes the action of a cause very much more marvelous. The idea that universal space is peopled by beings who are in perpetual contact with us, and who communicate to us their ideas, is certainly not more repugnant to reason than the hypothesis of a universal radiation, coming from every point of the universe, and converging in the brain of a single individual, to the exclusion of all the others" (Kardec, 1860/1996:54-5).

Regarding theories of reflection and somnambulism, Kardec presented one final aspect against them:

> "We repeat (and this is a point of such importance that we cannot insist too strongly upon it), that the somnambulistic theory, and that which may be called the theory of reflection, have been devised by the imagination of men; while, on the contrary, the theory of spirit-agency is not a conception of the human mind, for it was dictated by the manifesting intelligences themselves, at a time when no one thought of spirits, and when the opinion of the generality of men was opposed to such a supposition. We have therefore to inquire, first, from what quarter the mediums can have derived a hypothesis which had no existence in the thought of any one on earth? And, secondly, by what strange coincidence can it have happened that thousands of mediums, scattered over the entire globe, and utterly unknown to one another, all agree in asserting the same thing?" (Kardec, 1860/1996:55).

Miscellaneous Theories

Kardec also discussed a number of other theories developed to explain mediumistic manifestations: cracking-muscle, collective soul (a kind of collective unconsciousness), pessimist theory (only the devil could communicate), optimist theory (only good spirits), and the unispiritist or monospiritist theory (only the Holy Spirit). We will not discuss them HERE because of space constraints. It is possible to

read Kardec's writings on these topics in some of his books (Kardec, 1861/1986; 1860/1996; 1859/1999).

Spiritist Theory

Kardec accepted that fraud, hallucination, physical causes, unconscious cerebration and ESP were the best explanations for many experiences regarded as mediumistic, however, he argued, they were not able to explain the whole body of observed phenomena. As transcribed above, Kardec describes that the mediumistic manifestations themselves proposed the theory that the source of those phenomena were extra-corporeal intelligences, i.e. spirits. However, since the beginning of his investigations, Kardec recognized that one should not accept blindly what is said in mediumistic communications (Kardec, 1860b; 1890/1927). We should always use reason and empirical evidence to judge any theory, proposed by mediums in trance or those in more normal states of consciousness. Following are some phenomena that occurred that encouraged Kardec to accept the survival hypothesis as the best explanation. This list encompasses some important mediumistic experiences not properly explained by other hypotheses:

- Mediums producing accurate information previously unknown or in opposition to their previous opinion and that of any sitter (Kardec, 1858c,d,f; 1859a,b)
- Basket writing when several mediums at the same time just barely touched the basket with the tip of their fingers
- Mediums exhibiting previously unlearned skills such as:
    - illiterate mediums writing (Kardec, 1861/1986)
    - writing with calligraphy similar to the alleged communicating personality when that person was alive (Kardec, 1858a,b; 1860a; 1861/1986)
    - painting, or drawing by mediums who do not have any training or do not show this skill in their regular lives (Kardec, 1858c,g)
    - poetry (Kardec, 1859c)
    - xenoglossy or xenography (Kardec, 1860/1996; 1861/1986)
- Mediumistic communications showing a wide range of personal psychological characteristics (such as character, humor, conciseness, choosing of words, likes, dislikes, etc) related to the alleged communicating personality (Kardec, 1858e; 1859d,e,g).

KARDEC'S GUIDELINES TO DEVELOP A RESEARCH PROGRAM IN PSYCHICAL PHENOMENA

Kardec often discussed epistemological and methodological issues relevant to the development of a comprehensive scientific research program to deal with psychical phenomena (Kardec, 1861/1986; 1859/1999; 1868). He proposed several guidelines that may be useful for contemporary researchers. Some examples are:

The use of methods appropriate to the subject of investigation

Kardec believed it is not appropriate to borrow, with no adaptation, research methods from physical sciences (such as physics and chemistry), because the latter deal with inert matter. In the investigation of mediumship we are dealing with an intelligent phenomenon.

> "The physical sciences rest upon the properties of matter, which can be manipulated at will; their phenomena use material forces for agents. Spiritist phenomena have, as agents, intelligent beings who have independence and freewill, who are not subject to our caprices, and who, therefore, escape laboratory experimentation and calculations, remaining outside the domain of physical sciences.
> Scientists deceived themselves when they attempted to experiment with spirits as they experiment with voltaic batteries. They were unsuccessful, as they well should, because they presupposed an analogy that does not hold. Then, without going any further, they concluded, by negation, that spirits do not exist." (Kardec, 1859/1999:22)

The investigation should be strongly based on qualitative studies of spontaneous phenomena:

> "They want the phenomena to happen at their will. One cannot give orders to spirits; it is necessary to await their will. It is not sufficient to say "Show me such a fact, and I will believe." It is necessary to persevere and allow time for the phenomena to take place spontaneously. (...) The sought-after phenomenon will happen when one least expects it. To the eyes of the assiduous observer the events will be countless and will corroborate one another, but he who believes that touching the crank is sufficient to make the machine go deceives himself completely.
> What does a naturalist do when he wishes to study the habits of an animal? Does he command it to do a certain thing, so as to observe it at his will? No, because he knows well that the animal will not obey him. He observes the spontaneous behavior of the animal and records them when they take place. Simple good sense dictates that one must proceed in the same way with the spirits, particularly since they are intelligent beings with more independence than animals." (Kardec, 1859/1999:27)

The unwarranted and positivistic view that to make authentic science it is necessary to measure and to use a laboratory (Chalmers, 1982) has many times been advocated by scientists in psychical research/parapsychology, since the XIX century to the present time (Moreira-Almeida, 2006; Parot, 1993: Rhine, 1937). It is worthwhile to remember that Darwin's theory on natural selection, one of the most powerful and most widely accepted scientific paradigms of contemporary science, was developed using qualitative methods (Darwin, 1958; Ghiselin, 1969).

Avoiding sterile skepticism and credulity; openness to the new

Many researchers in psychical research and parapsychology seem to be waiting for "definitive proof", a kind of perfect evidence that would be convincing to any observer. For instance, J. B. Rhine stated "truth must be established, before we can accept it, upon actual experimentation, critically and deliberately conducted, which yields results that leave only one possible interpretation" (1937:7). This appears to be especially true among skeptics of the paranormal as a whole and in the controversy regarding survival research (Cook, 1986; Ducasse, 1962; Moreira-Almeida, 2006; Richet, 1924; Rhine, 1956). For more than a century, philosophers of science have shown that this goal is unattainable in any scientific enterprise (Chalmers, 1978; Popper, 1963; Kuhn, 1970):

> "scientific hypothesis or theories cannot be conclusively proved by any set of available data, no matter how accurate and extensive. (…) even the most careful and extensive test can neither disprove one of two hypotheses nor prove the other: thus strictly construed, a crucial experiment is impossible in science" (Hempel, 1966:27-8).
> (…) "a favorable outcome of even very extensive and exacting tests cannot provide conclusive proof for a hypothesis, but only more or less strong evidential support, or confirmation" (…)(Hempel, 1966:33).

Several times, Kardec recognized that there is no way to provide definitive proof that would be accepted by everyone:

> "there are skeptics who deny even the evidence and to whom no phenomenon or argument would be convincing enough (…)Many would be disturbed, if the evidence forced them to believe, for confessing that they had been in error would wound their self-pride" (Kardec, 1859/1999:27).

Kardec asserted that a real scientist should be open to accept well-based hypotheses and evidences even when they are in disaccord with one's previously held beliefs. He said that this was the case when he accepted the theory of reincarnation (Kardec, 1858h; 1862a). Following is one of his writings on the progressive nature of Spiritism:

> ""[Spiritism] is, and must be, essentially progressive, like all sciences based upon the observation of facts (…) Therefore, it does not regard anything as an established principle unless it has been patently demonstrated, or inferred logically from observation. (…) [It] will always assimilate all progressive doctrines, provided they have attained the condition of practical truths, and left the domain of utopia (…). Going *hand in hand with progress, Spiritism will never be superseded, since if new discoveries happen to show that it is in error on any point, it would modify itself on that point*" (Kardec, 1868:29).

According to Kardec, we should be "on guard against the exaggeration from both credulity and skepticism" (Kardec, 1858i:2). Regarding credulity:

> "Exaggeration is always hurtful; in Spiritism, it engenders a too blind confidence in everything that proceeds from the invisible world; a confidence which sometimes becomes puerile, causing people to accept, too easily, and unreasoningly, what reflection and examination would have shown them to be absurd or impossible. Unfortunately, enthusiasm finds it hard to reflect, and is apt to get dazed. Such adherents are more hurtful than useful to the cause of spiritism; they are unfit to convince, because their judgment is not trustworthy; they become the easy dupes, either of spirits who play tricks on them, or of men who take advantage of their credulity. (…) such persons unintentionally put arms into the hands of the incredulous" (Kardec, 1861/1986:26).

The need for a comprehensive and diversified empirical basis

Kardec often stated the need for a wide and diversified empirical base. He stressed that a researcher should try to collect all kinds of phenomena that could be related to one's subject of study (Kardec, 1858i). According to him, many mistakes and unsatisfactory theories were produced because investigators have based their studies and conclusions in a narrow range of observations covering a poor variety of phenomena (Kardec, 1861/1986). Enlarging the empirical base, making it more comprehensive, was essential to scientific revolutions such as those produced by Galileo and Darwin (Darwin, 1958; Moreira-Almeida & Koenig, 2008).

Kardec requested that reports of mediumistic manifestations from all over the world be sent to him (Kardec, 1858:i). He reported receiving "communications from almost a thousand serious spiritist centers, scattered over highly diversified areas (Kardec, 1864/1987:8). Fernandes, (2004), investigating the amplitude of Kardec's correspondence, surveyed Kardec's publications on Spiritism and found published references of contacts related to Spiritism from 268 cities in 37 countries (in Africa, Asia, Europe, and from the three Americas).

The importance of a theory to a scientific research program

In contradiction with the positivistic thought of his time, Kardec highlighted that just collecting facts is not enough to make science, that a theory is essential to make the observed facts understandable and to guide future research (Kardec, 1859e,f,h): "Every science should be based on facts, but these, by themselves, do not make a science. Science is built from the coordination and logical deduction of facts; it is the collection of laws that govern the facts" (Kardec, 1958i:3). He describes his role in the development of Spiritism as "that of an attentive observer who studies facts to seek their cause and extract their consequences" (Kardec, 1868:23).

He also called attention to the fact that proposing complex names to certain phenomena is not the same as explaining them (Kardec, 1859/1999). Another important point is that the theory needs to be comprehensive, explaining a large range of related phenomena and not just a few kinds:

> "[a physician who had proposed the theory of cracking muscle] has proclaimed a verdict without having examined the matter in dispute, and must be allowed to regret that scientific men should be in a hurry to give, in regard to what they do not understand, explanations disproved by the facts (…)
> the characteristic of a true theory is its capability of accounting for all the facts to which it refers; if contradicted by a single fact, the theory is seen to be erroneous or incomplete" (Kardec, 1861/1986:36-7)

Facts are not enough to promote conviction

Also diverging from the positivistic prevailing view, Kardec stated that facts alone many times are not sufficient to persuade even *bona fide* skeptics. Preconceived objections should be first addressed, after that, one should move gradually from what is well known and accepted to more challenging topics. This strategy was also used some decades later by Frederic Myers (2001; Kelly et al., 2007) to present his studies on psychical research.

> "It is generally supposed that, in order to convince, it is sufficient to demonstrate facts. Such would indeed appear to be the most logical method; nevertheless, experience shows us that it is not always the best (…) All methodical teaching should proceed from the known to the unknown" (Kardec, 1861/1986:20-1)

> "It may even be said that, for most of those who are not previously prepared by reasoning, physical phenomena have but little weight. The more extraordinary these phenomena are, and the more they diverge from ordinary experience, the more opposition they encounter; and this, for the very simple reason, that we are naturally prone to doubt whatever has not a rational sanction; each man regarding such a matter from his own point of view, and interpreting it in his own way. (…) a preliminary explanation has the effect of disarming prejudice, and of showing, if not their reality, at least, their possibility. Those, who begin by an explanation, comprehend before they have seen. Since one has acquired the certainty that the phenomena are possible, the conviction of their reality is easily arrived at." (Kardec, 1861/1986:26-7)

> "When one sees a fact one does not understand, the more extraordinary it is the more suspicion it arouses and the more our thought tries to attribute an ordinary cause to it. However, if it is understood, it is soon acknowledged as rational, and its marvelous or supernatural character just vanishes." (Kardec, 1859/1999:44).

CONCLUSIONS

Few researchers in parapsychology and psychical research know Allan Kardec and his works on psychical phenomena. In addition to this lack of awareness, there are also several misunderstandings and incorrect facts regarding his life and studies. Referring to a related subject, Alvarado wrote that many "important aspects of our history are sometimes forgotten by modern practitioners", he emphasized the need to remedy the fact that many "scientifically trained parapsychologists suffer from this lack of historical memory" (Alvarado, 2003:87). We are not aware of any academic study focused on Kardec or his works. There is evidence that Kardec deserves to be remembered as a French intellectual who developed pioneering research on mediumistic and other psychic phenomena. He was one of the first to propose and to pursue a scientific approach to a subject that used to be considered metaphysical or unsuitable for an empirical and rational investigation. He advanced the main theories to explain paranormal experiences that are still debated in parapsychology today. He also produced several very informative discussions on epistemological and methodological aspects of scientific exploration of psychical phenomena. It would be worthwhile to know his work better, not just for a better comprehension of the history of parapsychology/psychical research, but also for potential scientific/philosophical tools that may be useful to move the field forward.More and deeper studies on aspects of Kardec's work and life are warranted.

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ESP IN A COMPUTER GUESSING TASK: DECISION AUGMENTATION AND ANOMALOUS ANTICIPATION

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ABSTRACT

The purpose of this experiment was to test several psi and nonpsi hypotheses in an RNG computer guessing task. Only the psi results are reported here. Participants (Ps) were 64 normal volunteers, 32 self-described strong believers in the paranormal and 32 self-described strong skeptics. Ps guessed sequences of the numbers 1–4 by calling each guess out loud and simultaneously clicking the mouse to register the response. The responses were also tape-recorded for later cross-checking. In the 1st 2 runs, the target sequence (80 scored trials per run) reflected either pure repetition avoidance or pure counting, e.g., 2,3,4,1,2,3,4,1,2…. After Run 2, Ps completed several psychological tests while the experimenter calculated their response bias in the preceding 2 runs, considering the frequency of both individual targets and pairs (or shifts). The 100 scored targets for Run 3 were random, except that every time P clicked the mouse when a computer address registered a 1 ("1-state"), which occurred randomly 20% of the time, they would receive a target for the next trial that matched their response bias calculated from the preceding 2 runs, increasing the chances of a hit. In Run 4, with 90 scored trials, half of the Ps received subliminal target feedback and half supraliminal feedback. Within each subgroup, half of the Ps received as targets, after the 1st 10 trials, their own previous responses with a lag of 10 (pro-bias targets). The other Ps received a target sequence diametrically opposite to the response bias calculated from their 1st 2 runs (counter-bias targets). As predicted from May's decision augmentation theory, in Run 3 believers clicked the mouse more frequently than chance when the computer was in the 1-state, and significantly more often than skeptics. The second ESP hypothesis concerned the anomalous anticipation effect found in 2 previous ISL experiments. Based on these results, it was predicted that skeptics would correctly anticipate the nature of the bias (pro or counter) in Run 4 by manifesting the corresponding bias in Run 3, and that believers would anticipate incorrectly. After the target bias for Run 4 had been determined as for Runs 1 and 2, the conformity to this bias in Run 3 was calculated by counting the proportion of responses corresponding to the Run 4 bias minus the proportion of diametrically opposite responses. The hypothesis was confirmed, but only if the Run 4 targets were subliminal. Both random and total hits in Run 3 were positively and significantly correlated with scores on the AT-20 test of tolerance for ambiguity. Believers predicted a significantly higher proportion of hits on Run 3 than did skeptics, although the variance of their predictions was also significantly higher. At the end of the session, Ps underestimated the number of trials in Run 3 by about one-third.

INTRODUCTION

In recent years, many of the major psi testing paradigms have involved what I call *implicit psi*. These paradigms share in common that the designated psi sources are not asked to produce the hypothesized effect and may not even be aware that they are being tested for psi. Examples include research on presentiment (e.g., Bierman & Radin, 1997; Radin, 1997), the mere-exposure effect (e.g., Bem, 2003), and the global consciousness project (Nelson, 2001). The theoretical foundation for implicit psi, at least from a psychological perspective, is Stanford's (1977, 1991) psi-mediated instrumental response model, and, more recently, Carpenter's (2004, 2005) first sight model.

Decision Augmentation Theory

Another model with the potential for contributing to our understanding of implicit psi is decision augmentation theory (DAT). Proposed by Edwin May and colleagues, DAT is intended primarily to explain ostensible micro-PK effects as in fact due to ESP (May, Spottiswoode, Utts, & James, 1995a;

May, Utts, & Spottiswoode, 1995b). Although controversial (Dobyns & Nelson, 1998), DAT appears to account successfully for at least some of the relevant data. Most of the experiments that the theory has addressed itself are of the random number generator psychokinesis (RNG-PK) type. In most such experiments, a "hardware" RNG converts electronic noise into binary numbers, the distribution of which should follow the stochastic laws of chance. Most notably, the numbers of each digit generated should be exactly equal in an infinite sequence and approximately equal in finite sequences, the approximation improving as the length of the finite sequence increases.

The traditional interpretation of data from these experiments is that participants (Ps) use PK to bias the noise source such that it yields a significantly unequal distribution of the two binary numbers. DAT rejects these "force" models. It maintains instead that P intersects the target stream being produced by the RNG at that point at which a "biased" subsequence is about to appear, i.e., a sequence with an excess of one of the binary digits. Such subsequences will occasionally occur even in a true random sequence. The anomalous mechanism that P uses to detect (or predict) the point at which the target stream should be intercepted is what we call ESP, or more precisely, precognition. In DAT experiments, P decides when to intersect the target stream by pressing a button to initiate the test or run. In an important sense the button press *is* the ESP response, and the theory is best tested in situations where the number of these button presses is relatively large. DAT and the existing force models make different predictions about the relationship between the length of the sequences and the ESP scores resulting therefrom, and it is on the basis of tests of these predictions that May and colleagues claim confirmation of the model (May et al., 1995b).

DAT can be applied to ESP as well as PK data, and it is especially well suited to ESP experiments of the RNG type. One way it could work would be for P to use the DAT mechanism to enter the target stream at the time it was about to produce a "biased" subsequence that is consistent with a naturally occurring response bias of P. This would then create a bias-matching situation and thereby yield an increase in ESP hits.

I tested the DAT-inspired model in this experiment by assigning Ps a hit in the first non-feedback run whenever they made a mouse click registering their guess at the same time a hidden computer address was in a certain state, determined randomly with a 1/5th probability. Moreover, Ps were rewarded for these hits by being given on the next trial a target that matched their response bias, as determined from the preceding runs.

Anomalous Anticipation Effect

The anomalous anticipation effect (AAE) was serendipitously discovered in the reanalysis of an experiment originally intended to study the effects of belief in the paranormal and levodopa on implicit sequence learning (ISL). In an RNG guessing task with trial-by-trial feedback of targets (Palmer, 2006), 40 male Ps completed one run with random targets (a de facto ESP task) followed by two runs with biased targets (the ISL task). Post-hoc analyses revealed that Ps either correctly (psi-hitting) or incorrectly (psi-missing) mimicked in the first half of the random run, the response bias they would exhibit in the biased runs. The effect was parapsychological because at the time of the random run the Ps did not know which of two randomly assigned types of target bias they would receive in the biased runs. Bias type was determined in advance by the condition assignments. Contrary to the normal sheep-goat effect, believers in the paranormal anticipated the bias incorrectly whereas skeptics of the paranormal anticipated it correctly. The AAE was found again in a similar experiment with 40 female Ps (Palmer, 2006).

Although the AAE was also looked for in the present experiment, the primary purpose of this experiment was to test DAT and two psychological hypotheses.Thus the context for the AAE was different from that in the previous experiments, which means a confirmation of the effect would represent a conceptual rather than a strict replication. I believe that effects are more interesting and important if they appear in a variety of different circumstances. Specifically, the AAE was tested by noting if Ps' response tendencies in the last non-feedback run would mimic the target bias they would

receive in the immediately following feedback run. As in our previous ISL experiments, Ps did not know at the time of the non-feedback run which target bias they would receive in the feedback run.

Perception Without Awareness

The present experiment was designed in part to assess the effect of subliminal versus supraliminal feedback on ESP. Subliminal stimuli are thought to interact more directly with unconscious mental processes than do supraliminal stimuli, and ESP is generally unconscious. For this reason, subliminal stimuli might register more strongly in the mind than supraliminal stimuli and thus have more influence on subsequent cognitive processing. There is evidence suggesting that subliminal stimulation influences responses on a variety of tasks more than or differently than stimulation above the awareness threshold, and some of these changes (e.g., those involving memory) fall in the category of performance enhancement (Bornstein & Pittman, 1992). However, I am not aware of any ESP experiments in which subliminal and supraliminal feedback have been compared.

Belief in the Paranormal

There is ample evidence in the parapsychological literature that believers in ESP score on average more positively than skeptics in ESP tests (Lawrence, 1993; Palmer, 1971; Schmeidler & McConnell, 1958/1973). Most of this evidence comes from ESP tests of the forced-choice type. Since DAT is postulated to be the mechanism by which ESP operates, I would expect it to have comparable correlates, including belief. For this reason, I expected DAT to function more positively in believers in the paranormal than in skeptics. This is especially likely in the present experiment, because one would expect the "reward" for using DAT (the opportunity to enhance one's score on the overt ESP test) to in fact be rewarding for believers but not skeptics.

However, in the two previous AAE experiments (Palmer, 2006), skeptics scored significantly higher than believers in the first half of the random run. The reversal of the traditional sheep-goat effect was speculatively attributed to goats being more comfortable than sheep in the test situation, a circumstance created by the fact that, in contrast to most sheep-goat experiments, both experimenters were skeptics re psi. In the present experiment, I was the experimenter and I am better classified a believer in psi. However, the experiment was conducted in a department in which most of the faculty are skeptics, and that could define the department's reputation. Given the ambiguity of this situation, I decided to predict that skeptics will again show a positive AAE and believers a negative AAE. However, this prediction was made with little confidence.

Hypotheses

The formal ESP hypotheses for the experiment are as follows:

DAT:
(1) Ps will register their responses more often than expected by chance when the computer is in a state leading to a favorable target on the next trial.
(1a) Hypothesis (1) will be confirmed more strongly for believers than for skeptics.
(1b) Ps will score significantly above chance on those trials with biased targets.

AAE:
(2) Skeptics will demonstrate a positive AAE and believers a negative AAE in the nonfeedback run immediately preceding the feedback run.
(2a) The AAE will be stronger in the subliminal condition than in the supraliminal condition.

METHODS[1]

Participants

Sixty-four volunteers were recruited from the University of Zürich community and the city of Zürich. Written informed consent was obtained at the beginning of the test session.

As an additional requirement, these recruits had to indicate either that they have a strong belief in ESP and have had previous psychic experiences, or that they have a strong disbelief in ESP and no previous psychic experiences. This variable will be referred to hereafter as "belief". This specification was included in the recruitment poster.

Midway through the experiment I became concerned that I would not be able to obtain a sufficient number of Ps before I had to leave Zürich. I thus decided partway through the experiment to offer a prize of 500 Swiss Francs (approximately $400) to the P who achieved the highest score in the experiment. To which runs this scoring applied was left undefined so Ps would be equally motivated for all the runs in the experiment. In fact, the prize applied only to the first 3 runs, as the procedure for Run 4 was not the same for all Ps. Although all Ps were eligible to win the prize, only those 38 Ps who were tested after the prize was decided upon knew about it before their test session. The winner was a skeptic.

Questionnaires

The Australian Sheep-Goat Scale (ASGS). The ASGS (Thalbourne & Delin, 1993) was used as a check on the status of Ps who assigned themselves to the believer and skeptic groups. It consists of 18 items reflecting both belief in and experiences of various types of psychic phenomena. The items were presented in a visual analogue format, with scores on each item ranging from 0 to 13.

The Post-Test Assessment Scale (PTAS) Scale. This rating scale was developed by Peter Brugger to assess how Ps react to the test procedure in implicit learning experiments of the type conducted by himself and his associates. The most important question asks Ps whether and, if yes, at what point in the testing, they came to expect that a target sequence was biased, and the nature of that bias. Ps who can correctly identify the bias are classified as "detectors." In past research of this type conducted by Brugger and associates, about 15% of the original sample have proven to be detectors. In this experiment, data from detectors were not included in the formal analyses, and they were replaced by new Ps with the same belief in ESP.

A second set of questions asks Ps to estimate how many trials were included in each run. Third, Ps are asked if they responded intuitively, adopted a logical strategy, or a combination of the two. Finally, they are asked to describe any guessing strategies they used and when they used them.

Drawing Task. This test was developed as a measure of cerebral lateralization with respect to perceptuo-motor organization (Alter, 1989: Alter, Rein, & Toro, 1989). Ps are asked to rapidly draw on separate sheets of paper six familiar objects: bicycle, walking dog, bus, facial profile, airplane, and pitcher (ewer). The score is the number of drawings in which the object is facing right minus the number in which it is facing left, divided by the total number of drawings. The scale has a range from -1 to +1. Drawings in which the object faces neither right nor left are not counted. Right-handers tend to produce drawings facing left, and left-handers tend to produce drawings facing right, but the discrimination is not absolute (Alter, 1989).

[1] As this experiment was funded primarily to test specific hypotheses regarding response biases and implicit sequence learning, the ESP tests had to be fit into the experimental protocol without compromising the tests of these hypotheses or increasing the duration of testing. For this reason, the ESP tests are more complicated than they would have been otherwise.

LIMBEX Scale. The Limbex is intended to measure signs of temporal lobe dysfunction, or what is referred to more specifically as signs of complex partial epilepsy. It was developed by Brugger, who chose those 13 items from a longer scale by Makarec and Persinger (1990) that had the highest point biserial correlations with the total score in a sample of 40 volunteers. Each item of the LIMBEX is a 6-point scale, resulting in a theoretical range of scores from 0 to 65. Although persons with complex partial seizures have been shown to score high on the original scale, some others also obtain high scores, and a high score by itself is not diagnostic of a seizure disorder.

Ambiguity Tolerance Scale (AT-20). This 20-item true-false scale is a revision of the 16-item Rydell-Rosen Ambiguity Tolerance Scale (MacDonald, 1970). MacDonald defines a high scorer on the scale as a person who seeks out ambiguity, enjoys ambiguity, and excels in the performance of ambiguous tasks. The task in this experiment clearly could be described as ambiguous. The AT-20 correlates in the .4 range with Rokeach's Dogmatism Scale, as well as with Gough and Sanford's Rigidity Scale (MacDonald, 1970).

Equipment

Testing was performed on a Compaq Deskpro EXM/P800 computer. Random target sequences were generated using Visual Basic, whereas the on-screen presentation was programmed with Java-Script.

Guessing Task

P was seated in front of the computer monitor, which continuously displayed squares containing the digits 1, 2, 3, 4, arranged in a vertical column in either increasing or decreasing numerical order (counterbalanced across Ps) from the top to the bottom of the screen. The reason for the vertical display was to eliminate the effect of left/right response biases potentially confounding P's choice. At the beginning of the run, a box surrounding the word *start* was superimposed over the column of digits. P mouse-clicked on this box to begin the run, at which time the box disappeared. P's task was then to repeatedly guess which digit the computer would select for the ensuing trial. Ps indicated each choice by saying the digit out loud and simultaneously clicking the mouse. The experimenter (E), who was seated next to P, immediately entered Ps response on the computer keyboard. P's oral responses were tape recorded, and after the session E checked the typed responses against these oral responses to check for possible entry errors.

The number of milliseconds between the appearance of the array and P's mouse click to indicate their guess was recorded by the computer as a measure of reaction time. The computer also recorded and stored the target sequence type (see below), the run number, the targets, and P's responses.

Target randomization employed an algorithm developed by Marsaglia and Zaman (1987) and thoroughly tested to assure passage of numerous tests of nonrandomness. The 1st pair of seed numbers for the formal experiment was 1 and 2,[2] and every time in the experiment that a new sequence was called for, the seeds were advanced to the next pair. This procedure provided each P with unique target sequences (no stacking effect).

Procedure and Test Protocol

Each P completed 2 sets of 2 runs. The 1st run was preceded by as many practice trials as necessary to assure that P understood the procedure and that P and E were "in synch" regarding their respective mouse and keyboard entries. If 2 successive mouse clicks or keyboard entries occurred without an intervening input of the opposite type, the computer indicated the error by 1 (indicating successive keyboard entries) or a series (indicating successive mouse clicks) of beeps. E then said "repeat" or

[2] The Marsaglia algorithm requires input of 2 seed numbers.

"next", thereby instructing P what to do to correct the error, and repeated the keyboard entry if necessary. This problem arose quite rarely in the formal testing.

Runs 1 and 2. The 1st 2 runs each consisted of 80 scored trials[3] and were administered without feedback. One of the runs drew exclusively biased targets generated by an algorithm created to mimic a kind of response bias often demonstrated by normal Ps, namely *repetition avoidance*. In this run the targets never repeated, but after the 1st target in the sequence each target appeared an equal number of times (i.e., 20). Otherwise the sequence was random. For the other run, targets were assigned by an algorithm that, after the randomly selected 1st target, produced the extreme form of the *counting* bias characteristic of Alzheimer's patients (Brugger, Monsch, Salmon, & Butters, 1996). For example, if the 1st target was 2, the sequence was 2, 3, 4, 1, 2, 3, 4, 1, 2, 3 …" The order of these 2 run types was counterbalanced across Ps.

Following the 2nd run, P moved to a chair facing away from E and the computer screen, and then completed, in order, the drawing task, the AT-20, and the LIMBEX scale. At the same time, E moved to the adjacent chair in front of the computer and determined P's most marked response bias in the previous 2 runs. The computer records from these runs were merged and the resulting file submitted to analysis using software developed by Towse and Neil (1998). The frequency of each *single* target (1, 2, 3, and 4) and the relationship of each target to its predecessor (*shifts* of 0, +1, +2, or +3 units) were recorded from the Towse output.[4] The chance probability for each of these 8 alternatives is .25. The summed frequencies for the 1st, 2nd, and 3rd most frequent single and shift responses respectively were then computed and recorded. A table had been developed which indicated the chance likelihood for each of these frequencies and ranked them, with the least likely alternatives getting the highest ranks (see Appendix). The table provides ranks for each of 24 possible response biases, i.e., the sum of the most frequently called 1, 2, and 3 choices for singles and shifts respectively. For example, conformance to the counting bias would yield a high rank for +1 shifts, whereas repetition avoidance would be reflected by a high rank for the sum of +1, +2, and +3 shifts, which is equivalent to a low frequency of 0 shifts, or repetitions. The bias that received the highest rank, and the value of that rank, were then recorded by E. For example, in the rating scale illustrated in the Appendix, repetition avoidance (+1, +2, +3) received a rank of 20, which is higher than the ranks given to the excess of +1 and +2 shifts (17.5), the excess of 1s and 2s (4), and the excess of 1s, 2s, an 3s, or a deficiency of 4s (4). Thus, repetition avoidance was chosen as the most likely response bias in Run 3 and therefore used for the DAT manipulation described below.

Run 3. Following completion of their respective tasks, P and E resumed the seating arrangements in effect for the 1st 2 runs. Following a few practice trials, Run 3 (N = 100 scored trials), which tested DAT, was initiated. From P's point of view the procedure was the same as for the 1st 2 runs, except that a 2 sec delay was introduced before each trial, during which the computer screen was blank. Ps were instructed to blank their minds during the 2 sec interval and only formulate their guesses when the column of digits returned to the screen. This modification of procedure was introduced in an effort to increase the variability of reaction times by attempting to break up the rhythm Ps often got into during the 1st 2 runs. Pilot testing had indicated this modification would have the desired effect.

An address inside the computer randomly alternated its content between 0 and 1, such that it (or, we could say, the computer) was in the "1-state" 20% of the time during the run. This outcome was programmed as follows. Thirty repetitions of the digits 2 through 6 (N = 150) were randomly permutated, separately for each P. Each digit represented a .2 sec interval, during which the computer would be in the "0-state." Following this time span, the computer would be in the 1-state for .2 sec. Thus, it would be in the 0-state anywhere from .4 to 1.2 sec (the sequence of these intervals being

[3] Each run began with an unscored trial. This was necessary because some of the target and response biases were defined by the relationship between the trial in question and the immediately preceding trial.

[4] This required that +1 and –3, +2 and –2, and –1 and +3 each be summed from the Towse table.

random) before the next 1-state, and there were never two 1-states in a row. The subroutine was activated at the time P clicked the start box on the screen, and the sequence simply recycled after it was exhausted (every 2.5 min).

Each time P clicked the mouse while the computer was in the 1-state, the next target was guaranteed to conform to Ps most likely response bias, as defined by the calculation (described above) of Ps most extreme response bias during the 1st 2 runs. (In the example in the Appendix, this was repetition avoidance.) For example, Ps who called an excess of 4s in the 1st 2 runs would be guaranteed to receive a 4 as the target for the next trial following any trial in which they clicked the mouse while the computer was in the 1-state. Likewise, if Ps had demonstrated repetition avoidance previously, their target following a 1-state mouse click would never duplicate their immediately preceding response. The effect of this procedure was to increase Ps' chances of a hit on the manipulated trials, insofar as they maintained the response bias they demonstrated in the 1st 2 runs.

Run 4. This run (N = 90 scored trials) was the feedback run. For half of the Ps (experimental condition), the 1st 10 trials were random, after which the targets repeated P's own responses with a lag of 10 trials. For example, the target for Trial 11 was P's response on Trial 1, the target on Trial 12 was P's response on Trial 2, and so forth. For the other half of the sample (control condition), a counter-bias target sequence comparable to the pro-bias target sequence created by the lag procedure described above was created, based on the response bias inferred from that P's 1st 2 runs. The response tendency (singlet or shift) having the proportion of choices most deviant from .25 was shifted two steps. For example, if a P demonstrating repetition avoidance in Runs 1 and 2 had his or her most deviant proportion of choices on 0 shifts (say .05), the target sequence in Run 4 would exhibit +2 shifts between adjacent targets on only .05 of the 100 trials, with each of the other 3 shift alternatives having the proportion (1-.05)/3 = .317. If in the 1st 2 runs P had called an excess of 1s and 3s, for a combined proportion of .70, the target sequence for Run 4 would contain a .35 proportion of targets 2 and 4 respectively, and a proportion of (1-.7)/2 = .15 of targets 1 and 3 respectively.

If the protocol called for feedback, after 1 sec the column of digits was replaced in the center of the screen by a feedback stimulus consisting of the single digit selected by the computer as the target for the trial. If P's choice matched the target (a hit), the feedback square was colored green. For some Ps, the feedback square, which was exposed for 30 ms, was both forward and backward masked with random line drawings.[5] In this condition, the green background for hits was removed. After 3 sec, the feedback stimulus was replaced by the column of die faces, in anticipation of the next trial. If there was no feedback, the column reappeared 1 sec after P's response.

After Run 4, P was administered the PATS and ASGS, in that order. During this period, E returned to his office and printed out the results of the 4 guessing runs and entered the data on the Participant Feedback Form, which also explained the rationale of the experiment. When E returned to the testing room, and after P had completed the scales, E gave P the feedback form, which P read over. E then showed P the data sheets and answered any questions P had about the experiment or their results. Finally, P was asked not to discuss the details of the experiment with anyone who might participate in the experiment at a later time, although that is no guarantee that this request was universally honored.

Summary of Design

Five between-P variables were counterbalanced: (1) *belief* in the paranormal (believer vs skeptic), (2) order of the 4 digits on the *screen* (ascending vs descending), (3) target *bias* in the 1st 2 runs (repetition avoidance vs counting), bias of *targets* in the feedback run (pro-bias vs counter-bias), and (5) *speed* of presentation of the feedback digits in the feedback run (supraliminal vs subliminal). The 4 runs served

[5] Pilot testing indicated that this double masking was necessary to render the feedback digit consciously undetectable at 30 ms, which was the fastest exposure time the software would allow.

as the single within-Ps variable. However, as the hypotheses were run-specific, no analysis was performed corresponding to this full design.

RESULTS

Elimination of Flawed Data

Eight Ps were replaced during the course of the experiment. Five were replaced because of recording errors of either targets or responses in one or more runs. This came about because of errors in the sequence of oral calls and mouse clicks by P or E that could not be resolved by listening to the tapes of P's calls. There were 5 other cases involving Run 1 or 2 in which such errors involved the final 5 or fewer trials in the run. In these cases, the suspect trials were eliminated from the calculations of the run scores. One P was replaced because she had been defined as a skeptic but scored above the midpoint in the ASGS, i.e., in the believing direction. One believer was replaced because in Runs 3 and 4 she called the same number many times in succession, creating extreme response bias scores. Finally, 1 believer was replaced because she correctly detected during Run 4 that the targets were related to her own responses. This caused her to obtain an extremely high number of hits.

After completion of testing it was found that for 1 skeptic in the control condition of Run 4, the protocol for defining the target bias for this run was grossly violated, such that the targets reflected the Ps response bias in Runs 1 and 2 positively rather than negatively. There was not sufficient time to replace this P, so her Run 4 guessing data were eliminated from the analyses.

Decision Augmentation Theory

Hypothesis 1 was tested by examining how frequently Ps clicked the mouse when the computer was in the "1-state" in Run 3 -- 20% of the time by chance. The actual mean percentage of such clicks was 20.80 (SD = 3.34), $t(63) = 1.94$, $p = .057$.[6] As this result does not quite reach significance, Hypothesis 1 is suggestively supported. However, the percentage for believers was significantly high (M = 21.7; SD = 3.23), $t(31) = 3.06$, $p = .006$, and significantly higher than the nonsignificant percentage for skeptics (M = 19.85; SD = 3.21), $t(62) = 2.36$, $p = .022$. Thus hypothesis 1a was strongly supported.

On trials in which Ps received targets consistent with their response biases in the preceding runs – trials in which the computer was in the 1-state for the preceding trial – the percentage of hits was quite high (30.92; SD = 11.18) and strongly significant, $t(63) = 4.23$, $p = .0001$. Thus, Hypothesis 1b was strongly supported. The observed mean was compared to the mean chance expectation of .25 that would apply under null conditions, that is, no matching target and response biases, which means that this is not an ESP effect.This result confirms that 1-state trials produced the intended positive reinforcement. However, this advantage was not enough to produce significant positive scoring in the entire Run 3 for either believers (M = 26.06; SD = 4.56), $t(31) = 1.32$, or skeptics (M = 25.84; SD = 3.07), $t(31) = 1.55$. However, due to greater power, the mean for the whole sample just missed significance (M = 25.97; SD = 3.86), $t(63) = 1.97$, $p = .053$.

Anomalous Anticipation Effect

To test for the AAE, the same bias analysis was applied to the targets of Run 4 as had been applied to the responses in Runs 1 and 2 during the session break (see above). This allowed the target or target pair (shift) for which the bias was greatest to be determined. The relative pro-bias responding in Run 3 was then determined by counting the number of responses representing the target bias in Run 4 minus the number representing the opposite bias. For example, if the target bias in Run 4 was an excess of 3s, for Run 3 the number of 3 calls minus the number of 1 calls would be calculated. Because the number of

[6] All p-values in this report are two-tailed.

trials considered in these analyses differed widely among Ps, these difference scores were converted to *z*-scores, with an expected value of 0 by chance.

The two AAE hypotheses predicted that skeptics would show a positive AAE and believers a negative AAE (Hypothesis 2), and that the effect would be stronger with subliminal feedback of targets in Run 4 than with supraliminal targets (Hypothesis 2a).

An ANOVA of the *z* scores was performed using belief, speed (supraliminal vs subliminal), and targets (pro-bias vs counter-bias) as independent variables. Hypothesis 2 was tested by the belief main effect. Although, as predicted, the z-score mean was positive for skeptics (M = 0.38; SD = 2.59) and negative for believers (M = -0.30; SD = 3.17), the difference was not significant, $F(1,55) = 2.27$, p = .137. Neither mean differed significantly from chance. Thus, Hypothesis 2 was not supported. Hypothesis 2a was tested by the speed by belief interaction, which was significant, $F(1,55) = 5.66$, p = .021. The means confirmed that the AAE is, as predicted, stronger in the subliminal than the supraliminal condition. Thus, Hypothesis 2a was supported. In the subliminal condition, skeptics showed a positive AAE (M = 1.08; SD = 3.17) and believers a negative AAE (M = -0.72; SD = 3.17). Neither mean differs significantly from chance, but the difference between them is significant, $t(29) = 2.08$, p = .046. This means that Hypothesis 2 was supported in the subliminal condition. The AAE reversed slightly in the supraliminal condition (skeptics: M = -0.27; SD = 2.55, believers: M = 0.11; SD = 3.91), $t(25.8) = 0.32$, *n.s*. The variance was significantly greater for believers than for skeptics (F = 7.94, p = .008) by Levene's test.

Exploratory Analyses

The only predictor variables from the questionnaires to correlate significantly with the ESP scores in Run 3 are listed below. They should not be taken too seriously unless or until they are replicated.

Ambiguity tolerance. There was a significant positive correlation between scores on the AT-20 Scale and the proportion of hits in Run 3, both for all trials, $r(61) = .320$, p = .010, and for the random trials, $r(61) = .266$, p = .035. This means that the greater the tolerance for ambiguity, the higher the proportion of hits.The means on the ambiguity scale were quite similar for believers (M = 11.09; SD = 3.16) and skeptics (M = 10.82; SD = 3.18), $t(61) = 0.34$.

Post-test Rating Scale. Not surprisingly, believers estimated a higher proportion of hits for Run 3 than did skeptics (M = .343 vs .250), $t(45.6) = 2.32$, p = .025, but the variance was also significantly higher for believers (F = 6.38, p = .014, by Levene's test). Estimated success in Run 3 correlated negatively with success in the random trials of this run to a significant degree among all Ps, r_s (N = 61) = -.346, p = .006. The average number of trials Ps estimated for Run 3, which consisted of 101 trials, was 62.3. This marked underestimate occurred despite the fact that the written instructions mentioned that the number of trials per run would vary between 80 and 120.

DISCUSSION

Decision Augmentation Theory

DAT predicts that in RNG "PK" experiments positive scoring is achieved by P intersecting a random stream of binary digits at a time that captures a scored subsequence tending to match the designated target. I operationalized this principle in the present experiment by allowing Ps to create targets matching their response biases, as estimated by the response biases they demonstrated in previous runs. Ps could create these targets by making their responses at an opportune time, namely at a time in which the computer was randomly in the "1-state." Doing so would allow them to improve their score, and I thus predicted that Ps would generate more 1-state trials than predicted by chance. This hypothesis was suggestively confirmed with $p < .10$. As believers are more likely than skeptics to be motivated to attain

a high score, it is not surprising that, as hypothesized, a significant excess of 1-state trials was achieved only by believers. The fact that trials determined by the manipulation yielded a high percentage of hits (30.92%) demonstrated that the manipulation had the intended effect, although it was not strong enough to yield overall significant positive scoring in Run 3 for either believers or skeptics. The bottom line is that these results confirm the DAT hypothesis and show that it applies to ESP as well as PK test paradigms.

In a DAT experiment of the PK type, the DAT effect is generally created by a keyboard button press that intercepts a rapidly moving bit stream of 0s and 1s in the computer. It thereby selects a long sequence of subsequent numbers that, if DAT is operating, will have an excess of, say, 1s. In the present experiment, there was also a rapidly moving sequence of 0s and 1s that, unlike in the PK example, P intercepts on each trial, using a mouse click. Thus, P selects an individual target rather than a sequence of targets. This is actually a more challenging task than P confronts in the PK case. In the former, it is likely that any of several adjacent sequences could be selected that have the necessary bias. This means that P could press the button at any one of several adjacent moments and still achieve the desired result. That leeway is not provided by the design of the present experiment. Offsetting this disadvantage is the fact that the number stream moved more slowly in the present experiment than in a typical PK task.

These results represent what I call "implicit psi", that is, psi occurring without awareness by Ps that psi is being tested. Although Ps probably realized that ESP was tested in Run 3, they were not informed that the timing of their mouse clicks had any influence on their results. It is noteworthy that in the other test of implicit psi in this experiment, the AAE, the positive evidence of psi was produced by skeptics rather than believers. I will discuss this paradoxical finding below.

Anomalous Anticipation Effect

The AAE was only a minor consideration in the design of this experiment, and one consequence of this fact is that the AAE component of the design differed from that of the previous ISL experiment in three key respects. First, the random run in the present experiment (Run 3) did not include feedback of the targets. For this reason, I could not define the response bias as the relationship between the response and the previous target, as in the previous experiments. I thus defined it as the relationship between each response and the immediately succeeding response. Second, the time interval between the random run and the biased run was longer than in the previous research, because in the present experiment this was the period in which E calculated P's response bias and P was filling out questionnaires. Third, whereas in the previous experiments the two opposite target biases in the feedback run always involved a relatively large and fixed number of either CW or CCW relationships between successive targets, the opposite biases in this experiment were geared to each P's individual response bias.

Despite these differences, a significant AAE was obtained, but only if the target feedback in Run 4 was subliminal. Although a stronger AAE in the subliminal condition was predicted, the failure to also find an AAE in the supraliminal condition is disappointing, because the feedback was supraliminal in the two previous experiments in which the AAE had been demonstrated. So in this sense, the current experiment failed to replicate the earlier ones. This pattern has occurred in other ESP experiments where a manipulation was added to increase the strength of a previously found effect, only to have it turn out that the added manipulation, rather than building on the previous effect, replaced it (e.g., Bem & Honorton, 1994). It is as if there is a ceiling that these anomalous effects cannot exceed.

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APPENDIX

RANKS FOR RESPONSE SUMS

ANY 1		ANY 2		ANY3	
42	1	82	1	122	1
43	2	83	2	123	2
45	3	85	3	125	3
46	4	86	4	126	4
48	5	88	5	128	5
50	6	90	6	130	6
51	7	91	7	131	7
53	8	93	8	133	8
54	9	94	9	134	9
56	10	96	10	136	10
58	11	98	11	138	11
59	12	99	12	139	12
61	13	101	13	141	13
62	14	102	14	142	14
64	15	104	15	144	15
66	16	106	16	146	16
67	17	107	17	147	17
69	18	109	18	149	18
70	19	110	19	150	19
72	20	112	20	152	20
74	21	114	21	154	21
75	22	115	22	155	22
77	23	117	23	157	23
78	24	118	24	158	24
80	25	120	25	160	25
82	26	122	26		
83	27	123	27		
85	28	125	28		
86	29	126	29		
88	30	128	30		
90	31	130	31		
91	32	131	32		
93	33	133	33		
94	34	134	34		
96	35	136	35		
98	36	138	36		
99	37	139	37		
101	38	141	38		
102	39	142	39		
104	40	144	40		
106	41	146	41		
107	42	147	42		
109	43	149	43		
110	44	150	44		
112	45	152	45		
114	46	154	46		
115	47	155	47		

RESPONSE BIAS RATING SCALE: RUNS 1 + 2 (SAMPLE)

Name: _____ Date:_____

SN: _____

Single:

Bias	Tot	Rnk
1	46	1
2	40	2.5
3	40	2.5
4	34	4

Shift (sum):

0	8	4
1	50	2
2	58	1
3	44	3

Shift (1):

Bias	Tot
-3	26
-2	30
-1	22
0	8
+1	24
+2	28
+3	22

Single	Sum	Rnk	Numbers
Highest 2:	86	4	1 2
Highest 3:	126	4	1 2 3

Shift	Sum	Rnk	Numbers
Highest 2:	108	17.5	+1 +2
Highest 3:	152	20	+1 +2 +3

Choice: (~~Single~~/Shift) +1 +2 +3 Rank: 20

AURA VISION AS A HALLUCINATORY EXPERIENCE: ITS RELATION TO FANTASY PRONENESS, ABSORPTION, AND OTHER PERCEPTUAL MALADJUSTMENTS

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ABSTRACT

Aura vision has a long tradition in the religious, occult, and psychical research literatures. Perceptual illusions, afterimages, and contrast effects have been offered as scientific explanations for aura reports. Among a sample of 586 undergraduates, it was predicted that those who reported an aura vision experience would score higher than nonexperiencers on the Betts Vividness of Imagery Scale (visual and tactile), Barrett's Hallucinations Questionnaire (visual and tactile), the Creative Experiences Questionnaire (measuring fantasy proneness), the Tellegen Absorption Scale, the Dissociative Experiences Scale, and the cognitive-perceptual subscale of the Schizotypal Personality Questionnaire. All the predictions were significantly confirmed except those concerning visual and tactile hallucinations. It was concluded that persons who "see" auras are likely to have a rich imaginal life.

INTRODUCTION

Auras are thought to be related to the etheric subtle body and to serve as a visual measure of the state of health of the physical body (Alfred, 2006). According to Western traditions, each color of the aura has a precise meaning that indicates a specific emotional state (Leadbeater, 1902; Stanford, 1978; Swami Panchadasi, 1916). Some New Age thinkers identify the aura as an electromagnetic field that surrounds all living beings and many nonliving objects and can be revealed by Kirlian photography (Krippner & Rubin, 1974; Lindgren, 1995a, 1995b; Moss, 1979). Although aura vision has a long tradition in the religious, occult, and psychical research literatures, the proposition that humans can see these "fields" with the naked eye (perhaps as colors) is controversial (Alvarado, 1987; Baltz & Lindgren, 1997; Montandon, 1927; Perera Molina, 1981; Regush, 1977; Spence, 1920). Observations of the aura have been recorded in a variety of contexts. The old hypnosis literature contains reports of hypnotized participants claiming to see a luminous "fluid around the eyes, fingers, nose, and ears of the magnetizer and other persons with whom they were in rapport" (de Rochas, 1904, p. 14; Kilner, 1965), reports of various luminous effects around mystics and saints (Alvarado, 1987; Zolla, 1994), and descriptions of auras surrounding seemingly gifted individuals or self-proclaimed psychics (e.g., Garrett, 1939; Karagulla, 1967). Butler (1978) associates auras with paranormal cognition (clairvoyance) and emotional outbursts, and he divides them into two main types: etheric and spiritual. Bruce (2000), on the other hand, divides them into three types: etheric, main, and spiritual. According to Bruce, auras cannot be seen in complete darkness or if part of the person or object emitting the aura cannot also be seen.

The occult and experiential traditions postulate the existence of subtle bodies and energies that are not acknowledged by science. They are supposedly perceived by means of extrasensory perception (ESP; e.g., Leadbeater, 1902; Schwartz, 1980; for reviews see Bigu, 1976; and Tart, 1972). Many anecdotal observations suggest that "aura reading" may be used for unconventional medical diagnosis, perhaps by serving as a vehicle for the expression of ESP-acquired information (e.g., Karagulla, 1967) or unconscious information acquired through the normal senses. Aura vision has also been associated with the development of psychic sensitivity after near death experiences (Greyson, 1983) and with other extraordinary claims such as seeing apparitions and having an out-of-body experience (OBE; Kohr,

1980; Palmer, 1979). Some gifted participants who have shown evidence of psychic functioning in experimental contexts have reported aura vision as an aspect of their psychic experiences (e.g., Garrett, 1939; Swann, 1975). There have also been reports of a collectively perceived anomalous "glow" surrounding a human body (Alvarado, 1987). In the history of psychical research, aura vision has also been associated with possible human emanations, such as the "mesmeric fluid" and the "od force" (Ungaro, 1992), which were thought to cause ESP and psychokinesis (Montandon, 1927; Sudre, 1975).

Perceptual illusions, afterimages, contrast effects, and entopic phenomena (the perception of spots or "floaters" in the field of vision for which the experiencer has no physical explanation) have also been offered as explanations for the aura (e.g., Dale, Anderson, & Wyman, 1978; Fraser-Harris, 1932; Neher, 1980; Owen & Morgan, 1974; Rawcliffe, 1952). Gardner Murphy, writing with Laura Dale (1961), argues there are no data on aura reports that justify taking the topic seriously for research. More recently, Nash (1986) has classified aura reports under the heading of "questionable ESP phenomena."

A few serious studies have examined aura vision in relation to psychological variables, mostly from a phenomenological perspective. For example, some recent surveys have reported the incidence of aura reports in specific populations. In those using random sampling, the reported incidence of aura vision has ranged from 0% to 7% (Haraldsson, Gudmundsdottir, Ragnarsson, & Jonsson, 1977; Palmer, 1979). The incidence with nonrandom sampling has been somewhat higher, ranging from 9% to 48%.

Participants who report spontaneous experiences of the aura or related "energies" tend to score higher on imaginative/fantasy activity or fantasy-proneness than those not having such experiences (Wilson & Barber, 1982). This relationship supports Wilson and Barber's (1982) concept of the fantasy-prone personality and may also support suggestions by Blackmore (1978) and Siegel (1980) that such experiences could be hallucinatory fantasies, which would be very easy for fantasy-prone persons to produce. During such episodes, these individuals reveal a high capacity for absorption, which is defined as "a full commitment of available perceptual, motoric, imaginative, and ideational resources to a unified representation of the attentional object" (Tellegen, 1981, p. 218). As absorption is conducive to hypnotic trance (Tellegen & Atkinson, 1974), there may be an association between the traits of hypnotic susceptibility and openness to paranormal experiences. Individuals concerned with and attentive to their own mental processes may be more likely to see auras than other persons.

Compared to nonexperiencers, those who experience paranormal events have been found to have a much greater capacity for absorbed mentation (Glicksohn, 1990; Irwin, 1985; Myers, Austrin, Grisso, & Nickeson, 1983). Furthermore, there are indications that experiencers with high absorption capacity are more likely to report parasomatic forms, tactile sensations, and experiences of subtle energies (Irwin, 1985). This association with absorption capacity is compatible with observations that paranormal experiencers are relatively likely to practice meditation (Palmer, 1979), have lucid dreams (Irwin, 1988b), and be hypnotically susceptible (Palmer & Lieberman, 1976).

A review by Siegel (1980) shows that people need not be confused or delirious to experience hallucinations, and that hallucinations are typically "as real as real", and sometimes "more real than real." Slade (1976) and Slade and Bentall (1988) have invoked arousal as one of a number of key factors in the aetiology of auditory hallucinations. Their surveys indicate that a state of high internal arousal, when it interacts with the individual's current disposition toward hallucinating, can be a crucial factor in triggering such hallucinatory episodes.

Although there is no empirical research linking aura vision and schizotypal traits, aura viewers score significantly higher than non-experiencers on schizotypy, perceptual aberrations, magical ideation, and synesthesia. Schizotypy is considered to be normally distributed throughout the population, and its defining characteristic is a heightened susceptibility to psychotic breakdown. However, schizotypy is correlated with a variety of other phenomena besides psychosis, in particular, creativity (Claridge, Prior, & Watkins, 1989).

Auras are a part of human experience and as such deserve study in and of themselves, not only in relation to their possible paranormal components**.** This perspective is consistent with Palmer's (1979) and Alvarado and Zingrone´s (1994) discussion of the importance of distinguishing conventional models of explanation from paranormal ones in parapsychology. It is also consistent with recent pleas to

consider the experiential aspects of psychic claims in parapsychological research, without necessarily focusing on paranormal explanatory models (e.g., Schouten, 1986; White, 1990). To quote Irwin (2004, p. 10), "human experience includes many 'different dimensions' and there are many more aspects of psi experiences to be studied other than ostensible paranormality." Little is known about the psychological factors and processes that underlie aura vision, but there are indications in the psychological, parapsychological, and psychiatric literature that the cognitive variables are important.

Hypotheses

Why do some people report aura vision but not others? To answer this question, the following six hypotheses were tested: persons who report aura vision (aura experiencers) have higher levels of (1) absorption, (2) dissociation, (3) fantasy proneness, (4) visual/kinetic imagery, (5) visual/tactile hallucinations, and (6) cognitive-perceptual schizotypy than nonexperiencers.

METHOD

Materials

Six questionnaires were used to measure cognitive-perceptual experiences and traits. (1) The Betts Vividness of Imagery Scale consists of 35 short descriptions rated on a 1–7 scale (Sheehan, 1967; Richardson, 1990). The participants must try to create mental images in seven different sensory modalities: for example, "the sun as it is sinking below the horizon" (visual), and "reaching up to high shelf" (tactile). (2) Barrett's Hallucinations Questionnaire consists of 22 short descriptions rated on a 0–5 scale (Barrett, 1993; Barrett & Etheridge, 1992, 1994). It measures the propensity toward hallucinating in six sensory modalities, of which two (visual and tactile) were used in this research. (3) The Creative Experiences Questionnaire, which consists of 25 true/false items, measures fantasy proneness (Merckelbach, Horselenberg & Muris, 2001). (4) The Tellegen Absorption Scale, which consists of 34 true/false items, measures how frequently people engage in absorbing activities (Tellegen & Atkinson, 1974). (5) The Dissociation Experiences Scale consists of 28 short descriptions rated on a 0–100 scale and measures a variety of dissociative tendencies (Bernstein & Putnam, 1993). (6) The Schizotypal Personality Questionnaire (SPQ) which consists of 74 yes/no items, measures three components of schizotypy (cognitive-perceptual, disorganized, and interpersonal; Raine, 1991, 1992; Raine & Baker, 1992; Raine & Benishay, 1995). This experiment uses only the cognitive-perceptual factor because this factor measures perceptual abnormalities. Sample items are: "Have you ever seen things invisible to other people?", and "Are your thoughts sometimes so strong that you can almost hear them?"

I also developed an 18-item self-report inventory to collect information on spontaneous paranormal experiences. It is based on the English version of the Anomalous/Paranormal Experiences Inventory (Pekala, Kumar, & Cummings, 1992), and Palmer's (1979) survey of students and townspeople in a mid-sized university town in the Mid-Atlantic state. To assess aura vision experiences, participants were asked how frequently they " have had the experience of seeing energy fields or lights around the body of a person" ("never", "once", "sometimes", or "frequently.") If they reported having such an experience at least once, they were asked for their subjective explanation of their experiences ("rational", "unknown", or "paranormal"), and their emotional impact (7-point scale, with 1 the most negative and 7 the most positive). Students who claimed at least one aura vision experience were classified as "experiencers" and students who claimed to never have had such an experience were classified as "non-experiencers" (see Table 1).

Procedure

A total of 678 undergraduate students recruited from the psychology department of the Universidad Abierta Interamericana were given a test envelope during single class periods previously agreed upon with the teachers. The envelopes contained the six questionnaires described above, which were collectively given the pseudo-title "Questionnaire of Psychological Experiences, Form A [B or C]". The forms represented a counterbalanced ordering of the individual questionnaires to reduce biased responding. Approximately the same number of students received each form. The students received vague information about the aims of the study, and they were asked not to write their names on the questionnaire to preserve anonymity. They were told that their participation was voluntary and they were not paid. They filled out the questionnaires in class.

RESULTS

Usable questionnaires were returned by 588 of the 678 students (85.3%). There were 83 experiencers (32% male, mean age of 24.72 years) and 503 non-experiencers (22% male, mean age of 25.34 years).

Table 1: Means (Standard Deviations) of Frequency, Emotional Impact, and Explanations of Aura Vision by Experiencers

		Males (N = 26)	Females (N = 57)	Total (N = 83)
Frequency	One time	5 (19.2)	18 (32.1)	23 (27.7)
	Sometimes	17 (65.4)	30 (53.6)	48 (57.8)
	Frequently	4 (15.4)	9 (14.3)	12 (14.5)
Emotional Impact	Mean (1–7)[a]	Mean= 2.27 SD= 1.31	Mean= 2.52 SD= 1.54	Mean= 2.44 SD= 1.47
Explanation	Rational/Explicable	11 (42.3)	17 (31.5)	28 (35)
	I do not know	9 (34.6)	23 (42.6)	32 (40)
	Paranormal/ Unexplained	6 (23.1)	17 (25.9)	23 (25)

[a]1 = most negative; 7 = most positive

Tests of Hypotheses

The two-sample KS test was used to compare experiencers and non-experiencers, as it is sensitive to differences in both location and shape of the empirical cumulative distribution functions of the two samples. (For TAS, $p < .001$; CP-SPQ, $p = .08$; DES, $p = .001$; CEQ, $p = .004$.) The Mann-Whitney U test was used to test the hypotheses, as the data were not normally distributed.

Hypothesis 1 was that experiencers would score higher on absorption than non-experiencers on the TAS. This hypothesis was supported ($z = 2.77$, $p < .008$, one-tailed).

Hypothesis 2 was that experiencers would score higher on dissociation than non-experiencers on the DES. This hypothesis was supported ($z = 2.67$, $p < .006$, one-tailed).

Hypothesis 3 was that experiencers would score higher on fantasy proneness than non-experiencers on the CEQ. This hypothesis was supported ($z = 4.24$, $p < .001$, one-tailed).

Hypothesis 4 was that experiencers would score higher on visual and tactile imagery than non-experiencers on the Betts Vividness of Imagery Scale. This hypothesis was not supported (visual $z = 0.78$, p = n.s.; tactile $z = 0.35$, p = n.s.).

Table 2: Comparison of Personality and Schizotypy Scores of Students Who Report Aura Vision Experiences With Those Who Do Not Report Them

Variables[a]	Groups	*N*	*M*	*SD*	Mann-Whitney *U*	*z*
TAS	Non-experiencers	504	24.00	13.21	11640.00	2.67**
	Experiencers	83	28.58	14.43		
DES	Non-experiencers	504	23.21	11.68	11531.00	2.77*
	Experiencers	83	26.68	12.3		
CEQ	Non-experiencers	504	31.89	15.01	9923.00	4.24***
	Experiencers	83	41.20	17.85		
Visual imagery	Non-experiencers	504	12.38	6.64	13699.50	n.s.
	Experiencers	83	11.53	6.05		
Tactile imagery	Non-experiencers	504	13.56	7.16	14173.00	n.s.
	Experiencers	83	13.34	7.07		
Visual hallucination	Non-experiencers	504	1.49	2.64	11843.50	2.75*
	Experiencers	83	3.88	4.35		
Tactile hallucination	Non-experiencers	504	1.55	2.15	10722.50	3.79***
	Experiencers	83	3.57	3.99		
CP-SPQ	Non-experiencers	504	7.58	4.91	9641.50	4.50***
	Experiencers	83	10.34	4.84		

[a]*TAS* = Absorption (*M* = 24.41; *SD* = 13.48; *Mdn* = 21.87; *CP-SPQ*= Cognitive-perceptual schizotypy (*M* = 7.87; *SD* = 4.93; *Mdn* = 7.00); DES = dissociation (*M* = 32.86; *SD* = 15.79; *Mdn* = 31.60); and *CEQ* = Fantasy proneness (*M* = 32.86; *SD* = 15.79; *Mdn* = 31.60).
*$p < .05$. **$p < .01$. ***$p < .001$ (All *p* values are two-tailed.)

Hypothesis 5 was that experiencers would score higher on visual and tactile hallucinations than non-experiencers on Barrett's Hallucinations Questionnaire. This hypothesis was supported (visual $z = 2.75$, $p = .006$, one-tailed; tactile $z = 3.79$, $p < .001$).

Hypothesis 6 was that experiencers would score higher on cognitive-perceptual schizotypy than non-experiencers on the CP-SPQ. This hypothesis was supported ($z = 4.50$, $p < .001$, one-tailed).

To test for sex differences, males and females who obtained scores at or above the mean were compared with those who obtained scores below the mean, using Fisher's exact probability test. Analyses of the relative frequencies of males and females among experiencers, non-experiencers, and the two groups combined, showed no significant effects. In other words, there was no evidence of sex differences in the data.

Logistic Regression Analysis

Which of the eight variables best discriminate experiencers and non-experiencers of auras? A binary logistic regression was used to answer this question. Partly due to colinearity, after verifying that the assumptions of the test were met, the forward Wald method was applied. To reduce colinearity, the

scales measuring visual imagery, kinetic imagery, and tactile hallucinations were excluded from the regression. For the sample of 504, the best model revealed (in step 2) that visual hallucinations was the best predictor of aura experiences, β = .18, Wald = 11.24; *df* = 1; *p* = .001; Exp(B) = 1.20; Nagelkerke´s R^2 = .063. Cognitive-perceptual schizotypy was the second-best predictor, β = .05, Wald = 3.98; *df* = 1; *p* < .04; Exp(B) = 1.05; Nagelkerke´s R^2 =.075. Only visual hallucinations had a significant beta (.18). The remaining variables contributed nothing of significance to the prediction.

DISCUSSION

The present study examined the differences between persons who do and do not report aura vision experiences on various cognitive and personality measures. The main analyses confirmed five of six hypotheses, demonstrating a significantly higher level of cognitive-perceptual schizotypy, absorption, dissociation, fantasy proneness, and visual/tactile hallucinations among experiencers. The results suggest that persons who experience auras are likely to have a rich imaginal life, and they are consistent with other studies that have found measures of fantasy proneness to be successful predictors of psychic phenomena other than aura vision (Kohr, 1980; Myers, Austrin, Grisso & Nickeson, 1983; Palmer, 1979; Wilson & Barber, 1983).

Healy (1984) has suggested that sensitivity to auras and related phenomena is due to permeable ego boundaries. This sensitivity may be related to field dependence, absorption, or dissociation. Marks and McKellar (1982) have suggested that auras are a form of eidetic imagery. This hypothesis could be examined in the laboratory with tests based on drawings and diagrams, such as those employed by Matsuoka, Onizawa, Hatakeyama and Yamaguchi (1987). Image persistence—tested by presenting flashes of light to participants—has been studied in relation to hypnotic susceptibility and visuospatial skills (Atkinson & Crawford, 1992). The results of this study also support a model that assumes that hallucinatory processes such as absorption and fantasy proneness underlie aura vision.

It is also tentatively concluded that the constellation of interrelated factors that make up the construct of the "fantasy-prone personality" (Wilson & Barber, 1983) identifies a psychological predisposition to aura vision experiences. However, rather dissociation scores seem to be important in separating aura viewers from non-viewers but they may well be used to separate other types of experiencers from non-experiencers. Perhaps future researchers can collect the type of data that will let us delineate the degree to which various personality correlates can distinguish between those who have waking dreams and other more mundane paranormal experiences from those who have these plus aura vision or who only have aura vision. Similarly "dissociative aspects" of the aura vision experience are not specifically proved here. In other words, these personality profiles may not be specific to aura viewers and while there is positive evidence of strong connections between these personality characteristics and aura vision; these strong connections may also be present in a variety of other reported psi experiences other than aura vision.

The results also support the proposition that aura vision of the type described here may have important clinical implications. Many therapists still regard a client who reports aura vision (or other possibly parapsychological experiences) as mentally ill or deluded. For this reason, fantasy-prone persons, fearing ridicule, often do not tell anyone about their experiences (Tart, 1983a, 1983b, 1984; Gómez Montanelli & Parra, 2003, 2005).

Aura vision is not necessarily psychopathological, but its dissociative aspects may be a particularly important element of the cognitive processes presumed to underlie altered states of consciousness and a variety of perceptual or quasi-perceptual experiences. Aura viewers are probably prone to synesthetic and other perceptual-anomalous experiences, but that doesn't mean that they are more neurotic than non-experiencers. In this study, cognitive-perceptual variables including schizotypy, dissociation, and absorption, seem to be predisposing factors for experiencing an aura.

A possible theoretical model that emerges from the present results is that of the "happy schizotype" (McCreery & Claridge, 1995), a person who is functional despite, or perhaps even partly because of, his

or her anomalous experiences. The term *hallucination* has pejorative connotations because of its almost exclusive association with mental illness and abnormal states. However, the apparently widespread occurrence of anomalous perceptual experiences in the normal population suggests that such experiences are not exclusively characteristics of mental illness. It is interesting that some persons report beneficial effects from "aura viewing," such as the apparent ability to "observe" a person's state of physical health, to heal others, and to improve their ability to see auras (Brennan, 1988). If this is the case, individuals who have aura viewing experiences should also experience shifts in other cognitive maps, such as those that presumably underlie depersonalization. This proposition is supported by studies that have found positive relationships between perceptual anomalies such as synesthesia and a variety of hallucinatory and perceptual distortions (see Marks, 2000).

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AN EMPIRICAL TEST OF THE THEORY OF MORPHIC RESONANCE USING RECOGNITION FOR CHINESE SYMBOLS

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ABSTRACT

Rupert Sheldrake's theory of morphic resonance suggests a means by which the thoughts or behaviours of physically isolated individuals may nevertheless converge in a manner that is reminiscent of ESP, and tests of the predictions of his theory have the appearance of ESP tests involving millions of potential senders. Empirical tests to date have been broadly consistent with the theory's predictions, but evaluation of these findings may be stymied by the tendency for results to be reported in popular accounts rather than peer reviewed journal papers, so that essential methodological detail may not be available. In this study we sought to replicate earlier findings with word-based stimuli in a laboratory-based study that was intended to form part of the scientific record whatever the outcome. We also planned to extend the paradigm to consider individual differences in susceptibility to morphic resonance, and as a preliminary step looked at the effects of transliminality on performance. Sixty unselected participants were exposed to 10 stimuli consisting of 5 genuine Chinese characters and 5 false characters that were derived from genuine characters with the assistance of a native Chinese speaker in such a way as to appear authentic. Subsequently participants were asked to identify which characters they could recognize among a sheet of 20 that included all 10 that were originally presented intermixed with 10 decoys (also 5 real and 5 false). As predicted by the theory of morphic resonance, participants accurately recognized more of the genuine than false characters, $t(59)= 2.40$, $p = .020$, but also were more likely to report false memories (i.e. claim that they recognized items that were never presented) that were genuine characters than false ones, $t(59)= 3.805$, $p < .001$. These effects were not a function of presentation order. Participants' transliminality scores were significantly related to their performance with presented characters ($r = .38$, $p = .003$) but not with decoy characters ($r = .14$, $p = .28$). These findings are interpreted in terms of Sheldrake's theory, and designs for further empirical tests are suggested.

INTRODUCTION

Rupert Sheldrake's theory of morphic resonance may have been proposed as a means of addressing supposed explanatory gaps in the means by which the ontogeny of different species is controlled (Sheldrake, 1981), but it also has implications for certain parapsychological phenomena and empirical tests share some properties with ESP testing designs. The present study was intended to represent a conceptual replication of these tests and explore how they might be extended.

The theory postulates that all organisms have an associated 'field' that shapes, organizes and stabilizes the form that they take; these morphogenetic (or morphic) fields of an organism are influenced by all previous similar organisms (Sheldrake, 1981, chap. 4). Figuratively, they are a blueprint that imposes a pattern upon development. Their structure is molded by what has occurred in the past. They are non-material, non-local, and have a non-separable connectedness. They are embedded within and around the organism. According to Sheldrake, morphogenetic germs (DNA, proteins, etc., that are characteristic to an organism) 'resonate' with past similar morphic fields, and thereby facilitate development. Thus, the field of a fertilized human egg will begin to resonate with past human egg fields in a vibratory manner. The resonance Sheldrake describes is cumulative and not precise; it is more like an amalgamation that is probabilistic in nature. The degree of resonance between fields depends upon similarity. DNA of an organism enters into and receives non-energetic information from like or similar

morphic fields thus guiding its own development. An organism acquires information from its species' field and in turn contributes to it, strengthening patterns already found within the field. Thus, the influence between them has a two-way flow, organism to field and field to organism. Sheldrake posits that morphic fields are hierarchical, in other words there are fields within fields; the smallest units up to the largest of an organism each have a morphic field, for example at the level of a cell, an organ, a human, and even at macroscopic levels to include social groups and cultures in which patterns of behavior exist and may develop into habits (Sheldrake, 1988a, p. 279). Therefore a species' morphic field is collective and any changes that have been contributed to it in a species' lifetime can influence future organisms. This is akin to the largely discarded theory of inheritance of acquired characteristics, which states that adaptive changes, learning, habits, instincts etc. gained within an organism's lifetime can be inherited by its offspring (Lamarck, 1809). Likewise, according to Sheldrake, organisms can draw upon acquired characteristics of other similar organisms (within their own lifetime or from the past) through morphic resonance (Sheldrake, 1981, p. 279). Habits and instincts can be strengthened or weakened through the use or disuse of patterns of behavior. However, this would not be easy to verify as many habits and instincts are so ingrained that any deviations are likely to be too small or subtle to be readily apparent. The theory has been criticized as being only vaguely specified (see, for example, Rose, 1992), and it does seem to be the case that terms such as 'field' and 'resonance', while sharing superficial features with established physical concepts, are described in only general terms that give few hints as to how they might be instantiated in practice. However, the theory does make explicit predictions that are amenable to refutation and we shall summarise those attempts that have been made thus far to subject the theory to empirical test, with particular emphasis on how they may be relevant to parapsychology.

In expanding his theory, Sheldrake (1988a) has suggested that it could encompass convergences of thought or behaviour between individuals who have no normal means of communication, and thus might be interpreted as instances of telepathy. Some of his earliest illustrations of the theory in action derive from field observations of animal behaviours that suggest such convergence. For example, Sheldrake (1988a, p. 177-181) describes how blue tits in Southampton discovered how to open the caps on milk bottles that had been delivered to doorsteps so as to drink some of their contents. This novel behaviour spread rapidly throughout the UK with some instances being recorded farther away in Holland, Sweden and Denmark, despite these birds having very restricted territories that would seem to preclude transmission by imitation. Sheldrake proposed instead that the spontaneous discovery of opening milk caps was reinforced by their motor fields for pecking and after a critical number of blue tits had learned the behavior it increased the possibility for others in isolated regions to express the behavior due to morphic resonance. Similarly, Sheldrake (1988b) has claimed that herds of cattle in the American West that have not previously been exposed to cattle grids nevertheless avoid fake ones, suggesting a form of learning that does not depend on direct experience or imitation of others. However, with such field observations there is a multitude of unmonitored factors that could plausibly affect observed behaviours (cf. Lefebvre, 1995) so that it is virtually impossible to rule out normal explanations, and we need to look to controlled tests in order to fairly evaluate the theory.

There have been surprisingly few published accounts of controlled tests of the predictions made by the theory of formative causation. Perhaps the earliest research that has a bearing on the theory is the collection of experiments by McDougall that were intended to test for Lamarckian inheritance of acquired characteristics — and which were among J.B. Rhine's first experiments at Duke University. McDougall found, as he had predicted, that the offspring of rats who had learnt through trial and error how to escape from a tank of water were themselves able more quickly to learn the appropriate escape behavior; this trend towards committing fewer errors continued across successive generations in a manner that suggested acquired learning (cf. Mauskopf & McVaugh, 1980, pp. 83-4; Sheldrake, 1981, pp. 185-191). Agar, Drummond, Tiegs, and Gunson (1954) attempted a replication of this effect, testing 50 generations of rats over 20 years and found a similar pattern of improvement. However, they also reported improvement in the performance of control rats (who had been bred from rats that had not been exposed to the task), which could not be interpreted in terms of Lamarckian inheritance but which

Sheldrake (1981, p. 190) interprets as consistent with formative causation. A more explicit test was conducted by Sheldrake and Rose (Sheldrake, 1992), who conditioned chicks to associate pecking an LED light with subsequent nausea by injecting them with lithium chloride so that they would learn to avoid pecking at such stimuli. When new batches of chicks, who had not had previous contact with the conditioned chicks, were exposed to the LED light they nevertheless showed an increasing aversion to it, according to Sheldrake (1992). It should be noted that Rose (1992) did not concur with this interpretation of the data and felt that the outcome disconfirmed the hypothesis of morphic resonance. Mikulecky (1996) reanalyzed the data from the Sheldrake/Rose experiment and concluded that there was indeed some possibility of information transfer between the chicks through as yet unknown means and called for further research on the topic.

Lab tests with humans

The effects of morphic resonance are supposed to be evident in human behaviour as well, either in the form of more rapid than expected acquisition of new skills (such as solving novel puzzles) or via its modulating effects upon already learned skills (Sheldrake, 1988a, p. 189).

The former has been tested by Sheldrake (1983) using two specially constructed pictures that contained hidden images. One of these images was selected at random and was shown along with its solution on British television to an audience of about 2m. Sheldrake hypothesized that such exposure should make that puzzle easier for others to solve despite their having no prior experience of it. The two images were distributed to research associates in different countries and success rates were recorded in terms of participants correctly identifying the embedded image within 1 minute. Some trials were conducted before television exposure and serve as a control to gauge the relative difficulty of the images, and indicated that the target image was somewhat more difficult (3.9% of participants were successful compared with 9.2% for the comparison image). After the programme aired, however, there was a significant increase in success with the target image (to 6.8%) but only a modest and nonsignificant increase in success with the comparison image (to 10.0%), which supports Sheldrake's prediction. A subsequent replication (described in Sheldrake, 1995, pp. 255-6) gave mixed results, however.

Modulating effects have typically been tested using a learning paradigm. For example, Mahlberg (1987, cited in Sheldrake, 1988a, pp. 193-4) conducted a study in which three groups of students learned the Morse code along with an novel Code that was matched for intrinsic difficulty. Given that millions of people had previously learned Morse's system, and thus this pattern was claimed to be represented in the collective memory or morphic field, it was expected that participants would find this easier to learn than the novel code. Mahlberg's analysis confirmed this and also found that the novel code became progressively easier to learn as more participants undertook the task, as predicted.

More commonly tests of the effects of morphic resonance upon learning in humans have used material from other languages as stimuli: according to Sheldrake (1988a, p. 183), the acquisition of language depends upon the morphic resonance of past similar speakers, so that this would seem to be an ideal vehicle for testing the theory. In one such experiment, Sheldrake (1983) asked participants who had no prior knowledge of Japanese to memorize three sets of nursery rhymes in the language. One set consisted of an actual Japanese nursery rhyme; the other two sets were recently composed by a Japanese poet. Participants, who were blind to which set was old and which were new, chanted the rhymes to try to memorize them. When later tested on their recall, significantly more participants learned the old rhyme better than either of the new ones result (62%, where chance expectation is 33%). Interpreting this effect is difficult, however, given that the nursery rhyme may have become culturally established in part because it was inherently easier to learn than other word strings, for example by adopting a more rhythmic metre. Tests involving single words or characters may overcome this concern.

Two studies that focused on individual words were undertaken by winners of a competition to test the hypothesis of formative causation (both described in, Sheldrake, 1988a, pp. 191-2). In one study Schwartz asked over 90 students to guess the meanings of real Hebrew words and anagrams of Hebrew

words, and were then asked to rate how confident they felt in their guesses. Confidence ratings for real words were statistically higher than for anagrams, and higher for more common words than rarer ones. However, once the participants were made aware that some of the words were anagrams and tested again, results reduced to chance levels. In the other winning study Pickering asked 80 students to reproduce (by drawing) real and fake Persian words after viewing one or the other for 10 seconds. Reproductions of the real words were rated by independent judges as significantly more accurate than fake words.

Taken together these studies give a remarkably consistent pattern of findings in support of the theory's predictions, despite researchers adopting a rather heterogeneous set of approaches. Unfortunately very few of these studies have been published in journals and so have not been subject to peer scrutiny, and indeed may not have been described in sufficient detail to allow for such scrutiny. It was therefore felt worthwhile to attempt a replication that would be intended for the scientific community.

The present study

In this study we were interested to conduct a test of morphic resonance using word stimuli and decided to use Mandarin Chinese because its distinctiveness from English would make it difficult to identify cues that might distinguish genuine from fake characters, and its wide usage currently and in the past should, according to Sheldrake's theory, provide a deeply entrenched morphic field that might more strongly affect behaviour. We planned to have a native Chinese speaker construct the meaningless false characters by adapting genuine characters so as to closely match genuine characters in plausibility and aesthetic appeal.

Little attention has been paid to personality attributes that might be associated with sensitivity to morphic fields — although Mahlberg (1987) did report a significant positive correlation with introversion. As a preliminary venture in this direction we were interested to see whether performance would be related to transliminality, since high labiles are characterized as having a more permeable consciousness threshold (Thalbourne, 2000) which may allow them to be more sensitive to putative ambient morphic fields. Hence we formulated the following predictions:

- Participants would correctly recognize more of the genuine Chinese characters than the false characters that they had previously been exposed to
- Participants would falsely recognize more of the genuine Chinese characters than the false characters that they had not previously been exposed to
- Transliminality scores will correlate with performance at the morphic resonance task as measured by recall score for genuine characters compared with recall score for false characters

METHOD

Design

This study adopted a 2x2 related design to look at the effects of exposure (presented versus decoy items) and stimulus type (genuine versus false characters) upon recognition memory for Chinese symbols. The dependent variable was the number of stimuli (out of 5) recorded as recognized. Transliminality scores were correlated against performance as an exploratory measure.

Participants

A convenience sample of 60 volunteers (37F, 23M; Mean age: 25, range: 18-53 years), consisting of friends, family, and other students, participated in this study. Approximately 80% were undergraduate

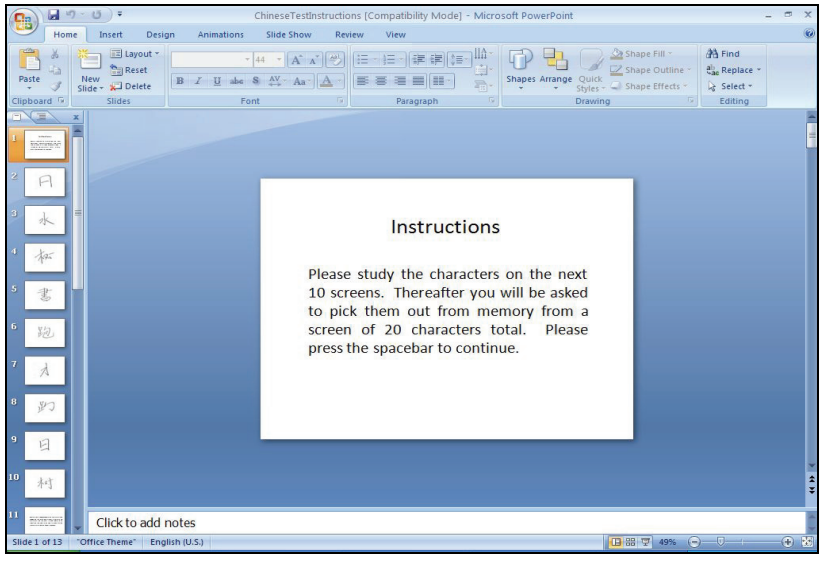
students at the University of Northampton. Participants were not selected on the basis of prior experiences or belief, but were screened for prior familiarity with Chinese characters.

Materials

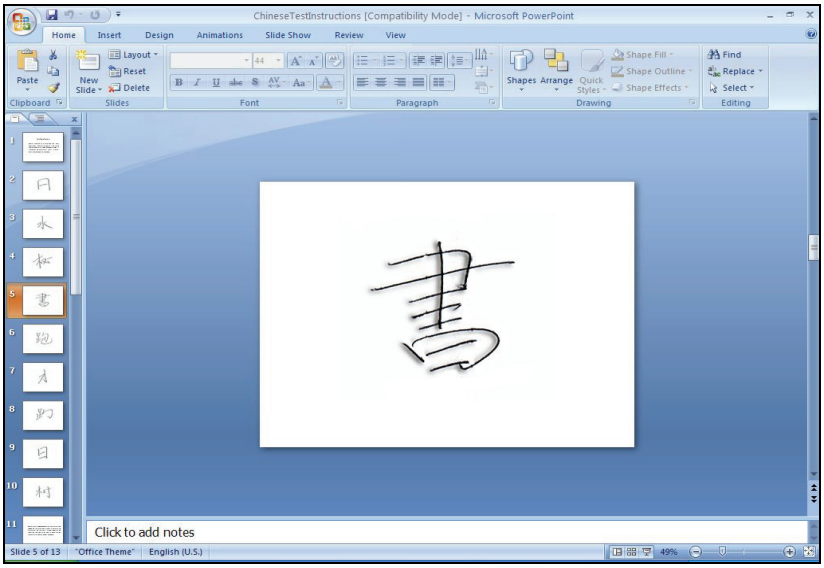
Participants completed Thalbourne's (2000) revised transliminality scale: Form B. This is a 29-item measure that asks about a variety of beliefs and experiences that are characterized by a "tendency for psychological material to cross thresholds into or out of consciousness from the subliminal, the supraliminal, and the outside world" (p. 31). Responses are given using a T/F format. The scale has adequate internal consistency (Cronbach's α = .87: Thalbourne, 2000, p. 11) and has been shown to have convergent validity with measures such as the Mental Experience Inventory and the Unusual experiences subscale of the Oxford-Liverpool Inventory of Feelings and Experiences (Thalbourne, 2000, p. 11).

A native Chinese speaker[1] was recruited to draw 10 genuine Chinese characters and help construct 10 false characters. The real words were chosen based upon their frequency of use and their relative simplicity. The real characters used were: 'Book', 'Tree', 'Sun', 'Water', 'Run', 'See', 'Grass', 'Cloud', verb ending '-ed', and the preposition 'in' (see appendix for a reproduction of these characters). The 10 false characters were generated by the native Chinese speaker based on the genuine characters but altered so that they were not meaningful in Chinese but had the appearance of authenticity. All characters were scanned and saved as jpegs. Five real and five false characters were selected randomly for inclusion in the PowerPoint presentation, with the remainder to serve as decoys during the recognition task; the same characters were presented to all participants.

Figure 1: Screen shots of PowerPoint presentation



[1] We should like to thank Ms Yi Lu for her assistance with this project.



A stimulus sheet was generated for the recognition phase that consisted of all 20 stimuli presented in random order. A second version of this sheet was produced that reversed the order of presentation in order to counterbalance any position effects.

A PowerPoint presentation was created that presented 10 of the 20 stimuli (5 real characters and 5 false characters) in full screen mode, each for 3 seconds. This utilized a function within PowerPoint to randomize across participants the order in which slides were presented so as to control for primacy and recency effects.

Procedure

Among the participants that were not students most were tested at their home. Those participants that were students were tested at the University of Northampton either in the library or a classroom. This allowed for a quiet environment with little distraction. Participants were shown a PowerPoint presentation (Figure 1) in which the 5 real Chinese characters are randomly presented along with the 5 false characters. Each character was shown separately for a total of 3 seconds. No delay or distracter tasks were used in between exposure and recognition. Following this they were given a recognition sheet that included the 10 presented characters intermixed with a further 10 characters that had not been presented ('decoys') made up of 5 real characters and 5 false ones. They were asked to circle the characters that they could recall being shown during the presentation. Participants were reminded verbally by the experimenter that there were a total of 10 characters in the presentation. Participants were then given Thalbourne's Transliminality Scale questionnaire. Once completed participants were debriefed and told that their information would remain confidential. They were also reminded that they could withdraw their information up to a certain date.

RESULTS

The numbers of characters (out of 5) for each condition recorded by participants as recognized from the earlier exposure are given in Table 1. We can see that, as expected, participants reported that they recognized more of the stimuli that they had previously been exposed to than those that they had not (an average of 3.52 characters compared with 1.51), and this difference is significant, $F_{1,59} = 215.53$, $p < .001$. This finding is trivial, and can be regarded as a manipulation check that confirms that participants

were attending to stimuli when they were originally presented, although the number of false memories after so short a delay between exposure and recognition is remarkably high.

Sheldrake's theory of morphic resonance predicts that participants will recognize significantly more of the genuine Chinese characters than false characters due to the former having been well learned by generations of Chinese writers. We can see from Table 1 that there is some support here for this prediction, as participants reported that they recognized on average 2.79 of the real characters compared with 2.23 of the false characters. This difference is small but statistically significant, $F_{1,59} = 16.58$, $p < .001$.

This advantage for real characters over false ones is not restricted to those stimuli that were originally presented but appears consistent across both presented stimuli and decoys, so that there is no significant interaction between exposure and stimulus type on likelihood of recognition, $F_{1,59} = 1.90$, $p = .17$. This impression is confirmed by t-tests that show that for stimuli that were originally presented, participants were more likely to recognize genuine characters than false ones, $t(59) = 2.40$, $p = .02$, and for stimuli that were *not* originally presented, participants were more likely to report false memories for genuine characters than false ones, $t(59) = 3.81$, $p < .001$.

We were concerned that an artifact may have been introduced into this study design by having a fixed rather than individually randomized order for listing characters on the recognition sheet, so two versions of the recognition sheet were produced that counterbalanced that order. Treating this presentation order as a pseudo-IV in a 2x2x2 ANOVA allows us to gauge the impact of recognition sheet order upon the effects described above. This analysis indicates that there is no main effect of listing order, $F_{1,58} = .04$, $p = .56$, nor any interaction between listing order and prior exposure, $F_{1,58} = .45$, $p = .51$, nor any interaction between listing order and character type, $F_{1,58} = 1.07$, $p = .31$, and therefore suggests that this did not constitute an artifact. However, there was a marginally significant three-way interaction between listing order, prior exposure and character type, $F_{1,58} = 4.70$, $p = .03$. Further analysis of this finding revealed that the non-significant interaction overall between prior exposure and character type when analyzed separately for the two listing orders gave a nonsignificant interaction for the second presentation order, $F_{1,29} = .38$, $p = .54$, but a significant interaction for the first presentation order, $F_{1,29} = 5.12$, $p = .03$.

Table 1:
Mean (and standard deviation) recognition scores by stimulus and presentation type (N = 60)

	Real characters	False characters	Average
Presented	3.72 (0.87)	3.32 (0.83)	3.52 (0.87)
Not presented (Decoys)	1.87 (0.95)	1.15 (0.90)	1.51 (0.99)
Average	2.79 (1.30)	2.23 (1.39)	2.51 (1.37)

Transliminality

A metric that would reflect the strength of any morphic resonance effect was calculated by subtracting the number of false characters accurately recognized from the number of genuine characters accurately recognized; a similar metric was calculated for false memories. These values were correlated against participants' transliminality scores, and the results are given in Table 2. Pearson correlations indicated that there was a significant positive relationship between transliminality and performance in

recognizing presented characters, whereas for the other analyses there were small but non-significant positive correlations[2].

Table 2:
Pearson correlations and 2-tailed significance values between transliminality scores performance in recognising the presented decoy characters

	Presented characters	Decoy characters
Transliminality	.38 (.003)	.14 (.28)
Presented characters		.18 (.18)

DISCUSSION

In this study participants accurately recognized significantly more of the genuine than the false Chinese characters that they had previously been exposed to. This is consistent with the theory of morphic resonance which suggests that by dint of the repeated learning of the genuine characters among generations of Chinese speakers a morphic field exists that directs or channels future learners such that it is easier to learn what others have learned before than something novel. It also conceptually replicates earlier findings by Schwartz using Hebrew words and nonsense anagrams of Hebrew words, and by Pickering with real and fake Persian words (as described in Sheldrake, 1988a), although the outcome measures across these studies are very different. We are careful here to describe our result as consistent with Sheldrake's theory rather than as a confirmation of it, since there remain concerns that the theory is at present too vaguely specified to offer unique and easily falsifiable predictions, and it is to be hoped that refinements of the theory will allow for more refined tests of it in due course. In particular the predictions tested here may also be hypothesized to result from other mechanisms, including the possibility alluded to in the introduction that we may be simply dealing with an extremely large-scale telepathy experiment in which vast numbers of native speakers are (unwittingly) acting as senders, so that there is no need to posit a morphic field on which participants must draw. It would be useful for the theory to be developed so that it could distinguish between the effects of a morphic field that shapes behaviour and the effects of access to other minds that hold task-relevant information.

With so few empirical tests we also can not yet rule out the possibility that results are due to some as-yet unidentified artifact. For example, despite special care being taken to ensure that the false characters were adapted from genuine stimuli and appeared plausible to a native Chinese speaker, it is of course possible that the genuine characters were inherently more memorable than those contrived for this study. Any such difference may be restricted to just one or two of the stimuli used here, but since all participants were presented with the same small sample of five real and five false characters, even this could be sufficient to generate an overall difference between conditions. This finding therefore warrants replication in a design that incorporates more stimuli to minimize any idiosyncratic effects, and randomizes across participants the selection of stimuli to be presented.

A similar advantage for genuine characters was evident for false recognitions of characters that had not previously been presented; indeed, this gave rise to the larger effect. We are not aware of any similar

[2] One referee queried whether one should expect a linear relationship between a personality variable such as transliminality and performance on this task. As an alternative we used a median split to identify high and low scorers on transliminality and found a significant difference in their scores on the performance metric for accurately recognised stimuli, $t(58) = 2.79$, $p = .007$, but no difference for false memories, $t(58) = 1.41$, $p = .158$, which is consistent with the correlation analyses reported above.

effects in tests of morphic resonance, and perhaps would not expect to find any since false recognitions do not fit with a learning paradigm. The effect is more reminiscent of research on false memories that has sought to induce reality-imagination confusions in order to elicit ESP (e.g., Blackmore & Rose, 1997; Roe, 2003). These studies typically increased the incidence of false memories by introducing a delay before the recognition task (typically 1 week) or a distractor task to prevent rehearsal. It would be interesting to see whether inducing greater numbers of false memories would have any effect on the superiority of genuine characters.

In this study there is a danger that some false memories may have arisen as an artifact of the procedure. Participants were reminded verbally by the experimenter that there were a total of 10 characters in the original presentation, and so might have felt an obligation to recognize exactly 10 stimuli even where they could confidently recognize fewer. Their final selections may have reduced to guesses and so inflate the number of false memories recorded here; this should not have led to the skewed preference for genuine characters observed here unless the false characters were insufficiently plausible. It is difficult to imagine a way of testing this when using established words or symbols from other languages, since any differences in plausibility or aesthetic ratings could conceivably also be explained in terms of morphic resonance effects.

In terms of future designs, arguably it would be better to not inform participants of how many items they were presented with and, taking a lead from false memory research, it might also be informative to ask participants to register their confidence in their recognitions so as to more accurately gauge which selections amount to guesswork.

We had some concern that the order in which stimuli were presented on the recognition sheet could have affected outcomes. To address this we included a counterbalanced sheet order and found that there was no main effect of order and, crucially, no interaction effects between order and character type, indicating that the apparent advantage for genuine characters was not a function of how they were arranged at the recognition stage. There was a significant three-way interaction between listing order, prior exposure and character type, which highlighted that a significant interaction between prior exposure and character type for the first presentation order was not present for the second presentation order. The implications of this finding are unclear.

Finally we hypothesized that some persons may be more sensitized to the effects of morphic fields than others, and identified transliminality as a possible marker of such sensitivity since it is characterized as reflecting a greater permeability of boundaries between conscious awareness and more subtle or unconscious sources of information (Thalbourne, 2000). As predicted, participants' transliminality scores were positively associated with their performance (as measured in terms of an advantage for genuine over false characters), but this was only significant for presented. In seeking to expand on this finding it would be useful to incorporate other, related variables such as openness to experience and creativity, but also to extend it to cover measures of cognitive and behavioural lability.

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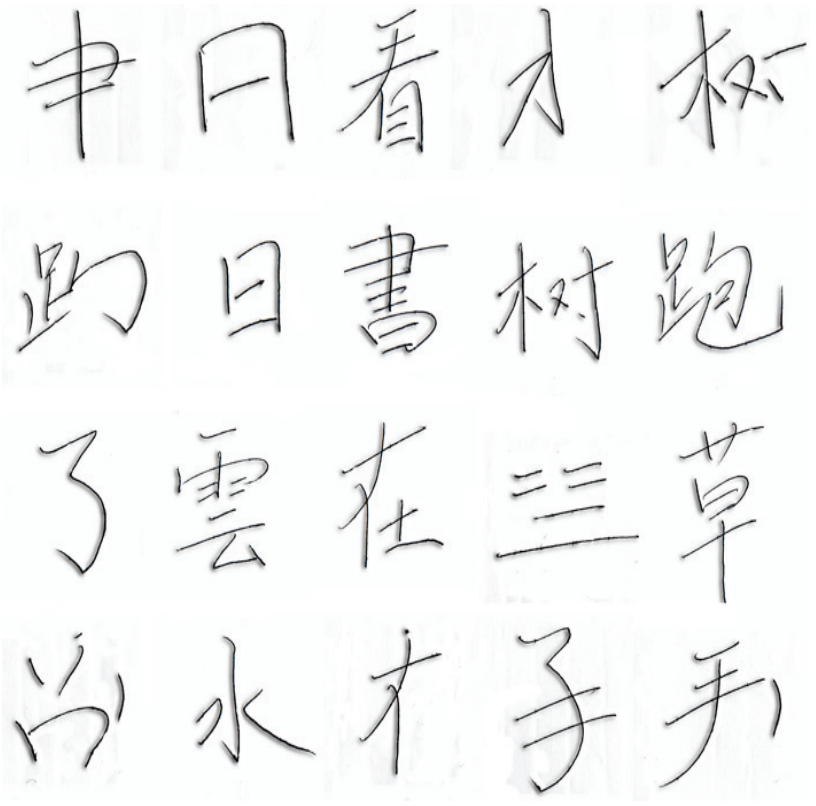
APPENDIX: REAL CHINESE AND DECOY CHARACTERS



In order from top left to bottom right: Decoy, Decoy, ‘See’, Decoy, Decoy, Decoy, ,’Sun’, ‘Book’, ‘Tree’, ‘Run’, ‘-ed’, ‘Cloud’, ‘In’, Decoy, ‘Grass’, Decoy, ‘Water’, Decoy, Decoy, Decoy. A second version was also used that reversed the item order.

EXPLORING THE RELATIONSHIP BETWEEN TWO TIBETAN MEDITATION TECHNIQUES, THE STROOP EFFECT AND PRECOGNITION

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ABSTRACT

Previous research into the effect of meditation with more advanced practitioners suggests that meditation affects consciousness in some way that gives a degree of more reliable psychic awareness. This study continues the earlier work with a preliminary investigation into two different types of meditation technique: mantra and visualisation. The same free-response design (Roney-Dougal & Solfvin, 2006, Roney-Dougal, Solfvin & Fox, in press) was again used for this study. 10 Tibetan Buddhist monks, who had done at least 5 years meditation practice, completed 8 sessions each: 4 mantra and 4 visualisation. A precognition computer programme (PreCOG) chose a target set at random from a pool of 25 sets, and a picture at random from a 4-picture pool. The targets were static pictures of Tibet and India. The participants aimed to visualise the target picture at the end of their meditation session and then rated the 4 pictures according to the degree of correspondence with their visualisation. A meditation attainment questionnaire (MAQ) assessed the number of years the participants had practised different disciplines, including different types of meditation practise. A Stroop test was designed for Tibetans by University Massachusetts, Dartmouth computer students. The Stroop effect is highly correlated with attention. This test was done by all participants prior to doing the main psi test. A control sample of 10 student monks who don't practice meditation also did the test 8 times. Using the participants' normalised ratings of the target pictures, overall, psi results showed that the two most experienced meditators, gave independently significant psi-hitting ($t=2.25$, $p=.04$). This is a replication of the previous research, suggesting that years of meditation practise appears to be related to more consistent and reliable psi. There was no difference in psi scoring between the mantra and visualisation sessions. 4 of the 12 MAQ variables were statistically significantly correlated with the psi scores and an additional 3 variables were marginally significant, all in the predicted direction. The amount of time spent practicing visualisation meditation gave the strongest correlation with the psi (Pearson's $r = 0.734$, $p < 0.01$, 1-tail); followed by length of time spent in retreat, ($r = 0.572$, $p < 0.05$); practicing pranayama ($r = 0.569$, $p < 0.05$); and asanas ($r = 0.559$, $p < 0.05$). The marginally significant variables were: the number of years spent practicing meditation, ($r = 0.49$, $p = .075$), and pranayama ($r = 0.505$, $p = .068$), and the amount of time spent practicing the ngondros ($r = 0.464$, $p = .088$). Sadly, owing to a programming error the main Stroop effect could not be computed, but the Stroop test error scores, which is a measure of accuracy and so a secondary Stroop effect measure, gave non-significant overall results.

INTRODUCTION

Research into the effect of meditation with practitioners of many years suggests that meditation may affect consciousness in some way that gives more reliable psychic awareness (Roney-Dougal & Solfvin, 2006; Roney-Dougal, Solfvin & Fox, in press). There has, however, been no research on what it is about meditation that is psi-conducive. This study is a preliminary foray into that area, working with Tibetan Buddhist monks.

Tibetans use many different types of meditation. There are, however, two basic types: shamatta, which is where the meditator focuses in one-pointed concentration on an object of some sort such as the breath, and vipassana, otherwise known as insight meditation where you let your mind contemplate more freely on a particular topic. Most early research into meditation and its effect on psychic awareness (see Roney-Dougal & Solfvin (2006) for a survey of psi research with meditation

practitioners) has used shamatta-type techniques, such as TM and other yogic meditation techniques. More recent research (e.g. Bierman, 2007) has used vipassana practitioners. The yogic and Buddhist teachings state that it is the shamatta techniques which result in psi once you have attained Samadhi (the state of total awareness beyond thought), the Yogis calling the result "siddhis," and the Buddhist teachings calling it "clairvoyances." There is a further requirement amongst Tibetan Buddhists of attainment in "vipassana on emptiness" (special insight), and overcoming the obstacles of the desire realm, after the attainment of Samadhi (Khangser & Khensur Rinpoches, personal communication, 8th May 2006).

However, these shamatta techniques are very varied, so it was decided that, whilst we had the opportunity of working with more advanced practitioners, we would ascertain if there was a differential effect dependent on the type of meditation: mantra and visualisation. Mantra is used by all Tibetans whether lay person or monastic, and is the practice of chanting, either mentally or out loud, a specific phrase whilst keeping count on a special bead necklace (mala), similar to the Christian rosary. Mantra meditation is called a "ngondro," which is a technique that is a required preliminary for Tibetans prior to practicing other meditation techniques. Mantra is also used in the yogic traditions where it is called japa yoga, and again is considered to be a preliminary method. This technique was popularised in the West in the 1970s by the Maharishi who set up schools in Transcendental Meditation (TM), a form of personalised mantra meditation. In contrast, visualisation meditation techniques are used more extensively within the tantric traditions of both Yogis and Tibetan Buddhists, and tend to be used by more advanced meditators. In visualisation meditation one visualises a specific object, for example the Buddha, and aims to hold this visualisation for a certain period of time. Some Tibetan tantric visualisation practices can be extremely complex.

One aspect of parapsychology relating to these two techniques, which was first studied in the 1970s, is the effect of tasks which supposedly differentially activate the two hemispheres of the brain. Braud & Braud (1975) attempted to elicit right hemisphere (RH) mentation using tapes so as to maximise psi. There were only suggestive results, but in the hypothesised direction. Andrew (1975) found that the "RH group" scored significantly above chance on a PK test. Broughton (1976) also found that RH functioning enhanced psi. In his study tasks, such as reading, were used intended to "occupy" the left hemisphere (LH), the rationale being that this would leave the RH available for psi processing. This may or may not be a correct inference and the data from later tests (Broughton, 1978) did not corroborate his finding. More recently brain imaging studies have also suggested that RH functioning may enhance psi (e.g. Persinger et al, 2002). Research relating to this topic is summarised by Williams & Roll (2007).

Participants, who consider themselves to be clairvoyant, state that they rely on visualisation to a certain extent (White, 1964). In general it seems that psi is associated with a broad definition of RH functioning, since altered states such as dreaming and the psychological technique of the "Ganzfeld" which supposedly facilitates the hypnagogic state, have been found to be psi-conducive techniques (Ullman, Krippner & Vaughan, 1973; Radin, 1997).

Mantra meditation, being a primarily verbal task would therefore "occupy" the LH, this hemisphere being the primary one for language. There is a Tibetan tradition of chanting mantras whilst undertaking a clairvoyant task, as witnessed with one of the Dharamsala oracles Youdrun—Ma, and also their use of mantra when doing Mo divination, as witnessed on two occasions with different practitioners, Geshe Topgyal-la and Drakser Rinpoche, (Roney-Dougal, 2006). On the other hand visualisation is considered to be a more RH type of activity and to enhance psi. We therefore ran this series of sessions as purely exploratory with no specific hypothesis regarding this, other than the possibility of a difference in psi scoring, since it is not clear whether "occupying" the LH or partaking in RH-type activity is more efficacious for facilitating psi.

One of the problems we encountered in our previous studies was how to accurately assess meditation attainment. Up to now we have used a meditation attainment questionnaire (MAQ), but there are intrinsic problems with self-report. So it was decided to see if the Stroop test could provide an objective

measure of shamatta meditation attainment. The "Stroop effect" was discovered by John Ridley Stroop (Stroop, 1935), and is the delay in naming a colour when a conflicting word is presented simultaneously, such as the name of a different colour. When the word is the name of a colour that is different from the colour it is printed in, the Stroop effect occurs - a response latency due to the incongruent word and print colour. The Stroop effect is highly correlated with attention and is often used to measure fatigue, deficit, or distractibility of one's attention. The Stroop effect test was included in this series as a measure of focus and concentration, a possible objective measure of change in conscious awareness as a result of meditation, in line with research being done by Mind-Life scientists (Field, 2008).

Research suggests that the Stroop effect can be altered by various factors such as meditation (Alexander et al, 1989; Wenk-Sormaz, 2005). Alexander et al (1989) studied Transcendental Meditation (TM), mindfulness and relaxation training with elderly people. They measured several parameters, including the Stroop test, and found that the TM group improved most, followed by mindfulness (vipassana), in contrast to relaxation and no-treatment groups. Saron (2008) used a Tibetan version of the Stroop in an unpublished pilot field study in 1992. There were no differences between yogis and lay age-matched controls. This was compounded by the poor verbal differentiation between the Tibetan words for blue and green. More recently the Stroop has been used in the "Shamatta project," but the results are not yet available from this study (Field, 2008).

Further, several studies have showed either a decrease or elimination of the Stroop effect. Raz et al (2007) found that a specific post-hypnotic suggestion, to construe words as meaningless symbols of an unknown foreign language, substantially reduced the Stroop effect in highly hypnotizable individuals. This finding should be treated with caution as it has not yet been fully replicated (Hung & Barnier, 2005). Raz et al (2007) considered that their results supported other research describing the effects of attentional training and meditation. For example, Carter et al. (2005) worked with 23 Tibetan Buddhist monks, who had up to 25 years of meditation practice. They were studying binocular rivalry, as a measure of the neural mechanisms underlying consciousness and attention. They asked the monks to control the flow of items being attended to and found that meditation altered the inherent fluctuations in conscious state associated with binocular rivalry. The monks practiced two types of meditation: shamatta (one-pointedness) and a form of vipassana called bodhicitta (compassion). They found that bodhicitta and shamatta meditation had different effects on the visual switching during rivalry. Like the TM research, vipassana led to no change in rivalry rate, whereas shamatta meditation led to increases in self-report of perceptual dominance durations in 50% of the monks. The most extreme finding came from the most experienced meditator who had spent 25 years intense practice in a mountain retreat. These results support recent electrophysiological studies which suggest that meditation leads to changes at the neural level (Lutz et al, 2004; Newberg et al, 2001; Pardo, Fox & Raichle, 1991). These findings suggest that the Stroop, and other seemingly automatic processes, can be affected in certain circumstances.

Hypotheses

1) Mantra versus visualization instructional set will differentially affect psi scoring, as measured by the normalised rating score.
2) Meditation attainment will correlate significantly with performance on the psi task. The previous ashram studies indicated that there are 2 suitable methods for assessing meditation attainment: correlation of psi score with self-report on the MAQ (particularly as defined by the number of years of meditation); and comparison of the psi scores of the different groups according to official status within the monastic hierarchy.
3) Meditation attainment will correlate with reduced Stroop effect scores – more meditation experience and attainment will lead to a greater ability to hold one's attentional focus and, therefore, reduced distractibility, as measured by a decrease in reaction times to the incongruent words, and an increase in accuracy, as measured by a decrease in the number of errors made. Therefore,
4) Psi awareness will correlate with reduced Stroop effect scores.

METHOD

Design

A basic free-response precognition design was used in which all participants were required to complete 8 sessions: 4 mantra and 4 visualisation. A precognition computer programme (PreCOG) chose a target set at random from a pool of 25 sets, and a picture at random from a 4-picture pool. PreCOG was used so that the sessions could be run without any assistants, enabling SRD to work with the percipients at any time that was mutually convenient for them and under whatever conditions there might be. As the target was chosen by the computer, this precognition design has both a randomised double-blind design and inbuilt fraud control, so there is no need for specially designed rooms, multiple linked-up computers or any of the other laboratory facilities. Therefore it is ideal for research "in the field." It is also a suitable method to use with Tibetans who have a tradition of precognition (oracles and Mo divination) being used by both monks and lay people. They are therefore very open to the possibility of precognition. For further details of these practices see Roney-Dougal (2006).

With regard to the two different sorts of meditation technique being compared, the participants were given different instructions, for mantra or for visualisation meditation during the reception period. These two randomly controlled conditions were administered via printed instructions (in Tibetan) to which the experimenter was blind, which participants read prior to the first and fifth sessions. For each participant, the first four of the eight trials involved one of the instructional sets, randomly determined, and the last four trials involved the other instructional set.

The Stroop test was administered prior to each experimental psi session, and the MAQ was administered after completion of all 8 sessions, together with an interview concerning the participant's experience. A control sample of 10 student monks (who were not meditators and so did not participate in the psi sessions) also did the Stroop test 8 times.

Materials

The precognition computer programme (PreCOG), originally developed for this field research in India by Jezz Fox for an Apple Macintosh G4 Powerbook, was further developed for this study using an Apple Macintosh MacBookPro with OsX. Custom written software (preCOG) was developed for the presentation of the materials and recording of data. The software was written using RealBasic (www.realbasic.com). The software guided the researcher and participant through the procedure, beginning with a data entry screen to enter trial and participant details, to the preparation and trial periods, and ending with the rating and feedback stages. A configuration file allowed specifics of the design to be set including: 1) the number of trials each participant would take part in; and 2) the point in the procedure at which the target would be selected (before the trial period for a clairvoyance protocol, after the trial period for a precognition protocol, or randomly before and after). The after selection was used in this study.

There were 25 target sets, which were static pictorials adapted to be appropriate for Tibetan monks living in India, comprising pictures of Tibet and of India. Target selection was a two-stage process, firstly a selection of the judging set was made, such that the participant never received the same set more than once, then a random selection of the target from within the judging set was made.

For the judging/rating stage preCOG displayed the 4 items initially simultaneously in the judging set at half size, and then one at a time on the screen at their full size, always in the same order. When all 4 had been viewed they were again displayed simultaneously on the screen at half of their full size for rating on a scale of 1 to 100, with the restriction of each item having to be awarded a unique rating. Following the ratings the data were recorded to disk before providing feedback to the participant by displaying the target for the session. All the randomisation was performed using pseudo-random algorithms.

The participant's mentation was recorded throughout the session, which permits qualitative analysis as well as the more customary quantitative statistical analyses.

The MAQ was designed with help from David Luke. This questionnaire assessed the number of years the participants had practised different disciplines, such as physical asanas (yoga practices), breathing techniques (pranayama), and meditation, including the different types of meditation practice the person had done. It also assessed the preliminary practices (ngondros), which all monks must complete prior to starting meditation practices and which are normally done in a retreat situation. This enabled the amount of meditation practice to be clearly specified, each participant estimating the number of hours per day or week that they practised the various techniques, as well as specifying the number of years for which they have practised them. In addition they stated whether or not they were practising regularly at the time of doing the research. This enabled us to see how much experience the participants had with the two different techniques, and whether or not this related to their psi score.

The Stroop test was designed for Tibetans by a team of University Massachusetts, Dartmouth upper level computer science students (E. Balcarcel, B. Lafond, D. Bates, P. Sands, Y. Thao) under the guidance of Professor Jan Bergandy. There are numerous ways to test for Stroop effects. Ours was computer based – to reduce subjectivity; sensitive to Stroop effects across the spectrum, from very low to very high functioning individuals or circumstances. The software was cross platform (Mac and PC); required minimal computer familiarity or skill, so that the participant could be trained to use it within the first two sessions; had selectable design features (language, stimuli, output); and stored the participant data and results.

The participant read a printed word and was asked to respond by indicating on the computer keyboard the colour of the printed word. In this version the names of the colors blue, green, red and orange were printed in Tibetan characters and displayed on the computer screen. Sometimes the colour names were the same as the colour in which the word was printed (congruent) and sometimes the colour name was different (incongruent). The attentional focus measure is the difference in average response latency and accuracy between congruent and incongruent trials – incongruent minus congruent, so greater distractibility yields higher positive values.

Participants in the current study completed the Stroop effect test immediately prior to each of the 8 psi testing sessions. Participants completed a 10-trial practice run in the first session, followed by one 10-trial plus two 20-trial runs (beginner, intermediate and advanced). Subsequent sessions dropped the practice run. This resulted in a total of 410 trials per participant.

Participants

The study included any Tibetan monks, who had done at least five years meditation practice, other than the one Rinpoche, (a Rinpoche, also called tulku, is considered to be a reincarnation of a high lama and therefore to already be a high adept). There were a total of 10 participants, who completed 8 sessions each. These comprised two Nyingma lamas (a lama is a monk who has completed a 3 year, 3 month and 3 week retreat), one Gelugpa Rinpoche, and 7 Gelugpa Geshes (a monk who has a degree, equivalent to a PhD, in Buddhist philosophy). Geshes do not normally start practicing meditation until completion of their studies, which sometimes includes an extra year in tantric college. Only some Geshes practice meditation regularly. Most are more involved in teaching Buddhist philosophy or other work. Nyingma and Gelugpa are two sects within Tibetan Buddhism. They have different training in meditation.

Sampling was conducted by personal visits to two Tibetan Buddhist Monastic Universities in Bylakuppe, South India: Sera Jey a Gelugpa monastic university with approximately 5,000 monks, and Namdroling a Nyingma monastic university with approximately 3,000 monks. The director (in Sera Jey this was the monastic abbot, and in Namdroling Penor Rinpoche, who is head of the Nyingma sect) had been contacted for the first study, the project described, permission formally requested, and assistance solicited in locating potential participants. A personal meeting with potential participants was arranged, normally by the translator, who was the English teacher at the Secondary school in Sera Jey, and a

student monk in Namdroling. The project was described in detail and an invitation to participate was made. Any candidate who volunteered was included in the study.

Procedure

The procedure for each session was the same. The same time-of-day and location was used, wherever possible, for each session with a given participant. Participants did only one session per day. On arrival for the first session the participant was fully informed of the protocol and what was expected of them.

Initially the participant completed the Stroop test. When this was complete they were set up for the main psi test and the experimenter and translator left the room. The procedure was recorded on the computer in English and on to tape in Tibetan, which guided the participant through the session (see appendix A). This procedure was also written in Tibetan for the participant to refer to if needed. There was a 5-minute relaxation period, a statement of intent, followed by a 15-minute meditation practice. At the end of this there was a 4-minute awareness period in which they were instructed to allow their mind to go blank and allow any target-related experience to occur.

On completion of the awareness period the participant drew out their experience relating to the target. They then asked the experimenter and translator to return and described the experience to them. This was recorded on the computer. The participant then saw all 4 pictures starting with picture A, and rated them on a 1–100 point rating scale, according to the degree of confidence with which they considered the picture to be the target. Finally the computer showed the actual target picture. This self-judging method is in line with Tibetan practice.

After they had completed all 8 sessions, they completed the MAQ and a short interview asking them about their previous experience of, and belief in, psychic abilities, as well as various aspects of the present study.

RESULTS

Overall Results

The basic unit of analysis for the psi scoring (free-response test) was the individual participant's rating of the actual target for the session. This is operationalised by a score, TrDev, which is standardized relative to the mean and standard deviation of all ratings assigned in the trial;

$$\text{TrDev} = \frac{\text{Target rating} - \text{Mean of trial ratings}}{\text{SD of trial ratings}}$$

Where:
Target rating: the rating (1-100) assigned in the session to the actual target
Mean of trial ratings: average of all 4 ratings assigned to trial pool
SD of trial ratings: standard deviation of all 4 ratings assigned to trial pool

This variable was developed and used in the previous Tibetan study (Roney-Dougal, Solfvin & Fox, in press).

All rating scores can be depicted in terms of rank, i,e, the picture chosen as the one the participant thought would be the target is given the highest rating and so can be depicted as their first choice; the next highest rating is their second choice, and so on. This gives a clear picture of the participants' scoring levels but is less sensitive than the rating scores. The raw data for the 8 sessions in terms of ranking is shown below.

Table 1. Ranking Data for the Targets of Monks by Official Title.

Monastic Status	Rank			
	1	2	3	4
Lama 1	2	3	3	0
Lama 2	3	3	0	2
Rinpoche	4	0	2	2
Geshe 1	3	2	1	2
Geshe 2	2	2	3	1
Geshe 3	2	0	2	4
Geshe 4	3	2	0	4
Geshe 5	2	1	1	3
Geshe 6	3	2	1	2
Geshe 7	1	2	2	3
Total	25	17	15	23

The mean psi (TrDev) scores for Lamas, Rinpoche, and Geshes are shown in Figure 1 and Table 2.

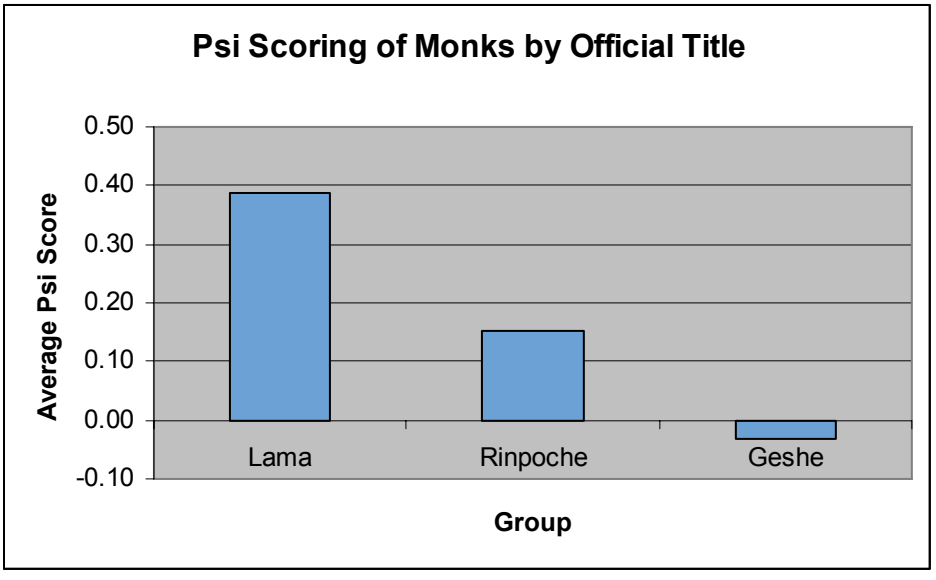

Fig. 1 Mean Psi (TrDev) Scores for Lamas, Rinpoche, and Geshes

These same data are displayed in tabular format in Table 2.

Table 2. Psi Scoring (TrDev) of Monks by Official Title

Group	TrDev	t-test	p	effect size (r)
Lamas (2)				
M	0.386	2.25*	0.04	.50
SD	0.686			
N	16			
Rinpoche (1)				
M	0.151	0.49	0.64	.18
SD	0.879			
N	8			
Geshes (7)				
M	-0.033	-0.26	0.79	-.03
SD	0.932			
N	56			
All (10)				
M	0.069	0.70	0.49	.08
SD	0.890			
N	80			

Note. The t-test is a single mean t-test against chance expectation. (H_0: $t = 0$).
*p<.05 (2-tailed).

The two Lamas scored significantly above chance while the other groups scored at chance. This is in line with the hypothesis that the more advanced meditators will show greater psi awareness. However, the Lamas average TrDev score is not significantly different from the Rinpoche ($t(22) = 1.12$, $p = .275$, two-tailed) or the Geshes ($t(70) = 1.67$, $p = .100$, two-tailed), so no one group can be said to have scored better than another. Moreover, it is important to note that no predictions or hypotheses were made about overall psi scoring or differences based on participants' ranks in the monastic hierarchy. Rather, the specific hypotheses for this study concerned differences in psi scoring due to the instructional set (mantra meditation vs visualization), correlations of psi scoring with meditation attainment (as measured by the MAQ), and correlations of psi scoring and meditation attainment with the newly introduced measure of attentional focus, as assessed by the Stroop effect. These will be discussed below.

Meditation Instructions and Psi Scoring

Upon completion of data collection the session codes were broken and double-checked by re-examining the printed instruction sheets. The different meditation techniques appear to have made no difference in outcomes as shown in Table 3.

Table 3. Average Psi Scores by Meditation Technique

Participants	Mantra	Visualisation	Overall
P1	-0.01	0.33	0.16
P2	0.25	-0.06	0.10
P3	-0.01	0.31	0.15
P4	-0.97	0.16	-0.40
P5	0.69	0.32	0.51
P6	0.38	-0.27	0.06
P7	0.03	0.08	0.06
P8	0.31	0.22	0.27
P9	0.02	0.40	0.21
P10	-0.54	-0.28	-0.41
ALL	0.02	0.12	0.07

There was no significant difference between the two conditions ($t(18) = 0.52$, $p = .61$, two-tailed). Negative TrDev values may be interpreted either as psi-missing or as non-directional bursts of psi awareness (Roney-Dougal, Solfvin & Fox, in press; Nelson & Schwartz, 2006).

In addition, the Lamas, Rinpoche, and Geshes were checked separately for differential scoring due to meditation technique, as shown in Table 4.

Table 4. Average Psi Scores by Meditation Technique for Groups

Group		Mantra	Visualization	*t*-difference
Lamas	M	0.50	0.27	0.68
	sd	0.70	0.70	
	n	8	8	
Rinpoche	M	-0.01	0.31	0.49
	sd	1.04	0.81	
	n	4	4	
Geshes	M	-0.12	0.05	0.69
	sd	0.91	0.97	
	n	28	28	

There is no difference in mantra vs. visualisation sessions for any of the three groups. Therefore, in the analyses which follow, the overall TrDev score is used as the measure of psi awareness.

Psi Scoring and MAQ

In this analysis each participant's psi scoring was correlated with the MAQ variables. Pearson correlations are shown in Table 5.

Table 5. Correlations (r) Between Psi Score and MAQ Variables

MAQ Variables	Pearson r for Psi Score
Asana years	.399
Asana hours	.559*
Prana years	.505
Prana hours	.569*
Meditation years	.490
Meditation hours	.321
Meditation types	
Type 1 (shamatta)	-.240
Type 3 (visualisation)	.734**
Type 4 (vipassana)	-.358
Ngondros hours	.464
Retreat hours#	.572*
Total hours	.419

Note. n = 10 for all correlations.
*$p < .05$. **$p < .01$ (one tailed).
Elaborating on the variables from the MAQ:
Years of meditation is years of practice of all the various meditation techniques.
Type 1 is concentration meditation, one-pointed shamatta, equivalent to yogic meditation.
Type 2 is analytic inquiry. Since the Gelugpas included their reading of scriptures, prayers, and debating practice in this type SRD and David Luke decided prior to analysis that it should not be included either separately in the analysis or go into the final meditation hours score, because, whilst it's certainly a fine mental practice, it is not what most Western people consider to be meditation proper.
Type 3 is visualisation.
Type 4 is bodhicitta (compassion) and special insight, which we put together as they are both vipassana techniques.
Ngondros are preliminary practices such as prostrations and mantra.
Retreat hours: many of the other variables are included in the retreats, so this variable is not included in the total hours of practice.
Total hours is meditation plus ngondros, asana and pranayama.

Table 5 shows four meditation attainment variables that correlate statistically significantly with psi scoring. The strongest is meditation type 3, the number of hours spent in visualisation meditation, ($r(8) = .734$, $p=.008$, one tailed). This is followed by the number of hours spent in retreat ($r(8) = .572$, $p = .042$, one-tailed), practicing pranayama ($r(8) = .569$, $p = .043$, one tailed), and performing asanas ($r(8) = .559$, $p = .046$, one tailed). In addition, several others approach statistical significance in the "marginal" range of $.05 < p < .10$. These are the number of years spent practicing meditation, ($r(8) = .490$, $p = .075$, one tailed), and pranayama ($r(8) = .505$, $p = .068$, one tailed), and the number of hours doing the ngondros ($r(8) = .464$, $p = .089$, one tailed). There are undoubtedly complex inter-correlations among these significant and near-significant correlates of psi scoring, making it impossible to identify clearly which of them is the most effective predictor of psi. The point of this study was to begin to explore the finer details of the relationship between meditation attainment, reflected by all of these variables, and psi scoring, and these results are clear pointers for future research.

These results effectively replicate our prior study (Roney-Dougal, Solfvin, & Fox, in press) in which the correlation between years of meditation and psi was $r = 0.521$, which is about the same as the current finding of $r = 0.49$. In the former study this was statistically significant due to the larger sample size of $n = 18$. Although it is not statistically significant here with n=10, the correlation coefficient value is replicated. Figure 2 shows the scatter plot of this relationship.

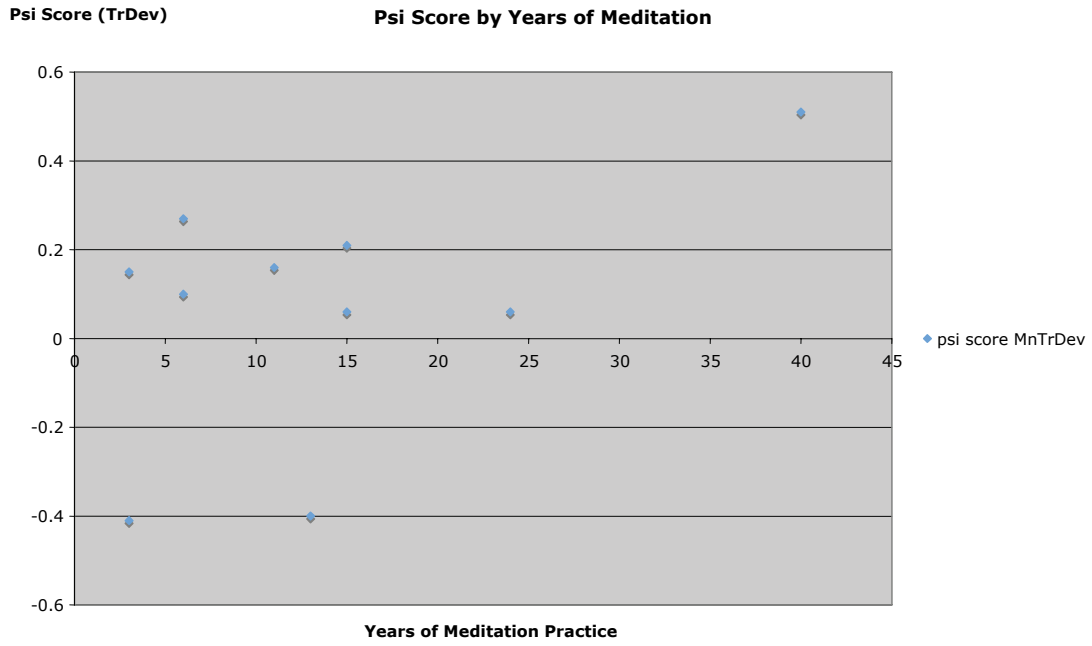

Fig. 2 Psi Scores by Years of Meditation

MAQ and Stroop Effect Test

For this study it was decided to use the data which most resembled the classic Stroop effect test. This is difference in average response latencies between trials with noncongruent and congruent colour/word stimuli during the first (intermediate level) 20-trial sequence. This primary variable was supplemented by the error count (level of accuracy) for the same run, which is the mean number of incorrect responses for the intermediate sequence, over the 8 sessions. Unfortunately there was an error in the programming which meant that the incorrect response reaction times could not be separated from the correct response reaction times, so only the error count could be used. This is a standard secondary measure of the Stroop effect, since those who are more easily distracted by the incongruent colour and word will tend to make more errors.

Table 6 below gives the scores for participants, controls and the three groups. The difference between the participants and the student controls is not significant ($t(18) = 0.05$, $p = .958$). It can be seen that whilst most participants were reasonably accurate (low error count) there were three, P6 and P8 and one student X14, who did not seem to understand what was required. This is a problem when doing this sort of task with people who are completely unfamiliar with Western scientific mode of thought, testing etc. For example, the two lamas were far more inaccurate in their scores and were both completely unfamiliar with computers, whereas the students tended to be highly accurate. They were students of a science course designed for monks, and so were familiar both with scientific testing and with computers. For these reasons the Stroop scores here are not considered to be an accurate representation of the Stroop effect.

Table 6. Average Error of Response by Participant and Group

Participant	Error count
P1	0.875
P2	2.250
P3	0.125
P4	1.125
P5	2.250
P6	4.000
P7	0.500
P8	7.125
P9	0.625
P10	1.625
Students	
X12	0.750
X13	0.625
X14	4.625
X15	1.125
X16	0.000
X17	2.125
X20	3.375
X22	3.857
X23	1.000
X24	2.571
Groups	
Geshe	2.589
Lama	4.685
Rinpoche	0.125
Student	1.619

Note. Each mean based on n=8 sessions.

We hypothesized that meditation attainment would correlate negatively with the Stroop effect scores shown in Table 6, i.e., more meditation experience and attainment would lead to greater ability to hold one's attentional focus and therefore display reduced Stroop effect. This hypothesis was tested by computing the correlation between participants' MAQ variables and the Stroop accuracy level (error count). It was hypothesised that higher attention would be related to greater accuracy and thus to lower error counts. The results are shown in Table 7.

None of the correlations in Table 7 reach statistical significance. There appears to be little here to reject the null hypothesis of no relationship between Stroop test scores and meditation attainment, even though some of the correlations are quite high, as in the correlations with hours of asana and meditation practice. However, they are sufficiently strong, despite the problems associated with lack of computer familiarity mentioned above, to suggest that it might be worth trying the Stroop test again with meditators who are familiar with Western psychological testing.

Table 7. Correlations (Pearson r) of Stroop Test Error count with MAQ Variables

Variable	Error Count
Asana years	.298
Asana hours	.486
Prana years	.307
Prana hours	.118
Meditation years	.046
Meditation hours	.422
Meditation types	
Type 1(shamatta)	-.007
Type 3(visualisation)	.322
Type 4(vipassana)	.265
Ngondros hours	.126
Retreat hours	.335
Total hours	.414

Stroop Effect and Psi Scoring

It was also hypothesized that if the ability to hold one's attentional focus affected a participant's success on a psi task, participants with the smallest Stroop effect would show the greatest psi awareness. This hypothesis was tested by computing the within and between correlations of psi scoring, on a trial-by-trial basis, with accuracy scores. Each participant has a within-subject correlation, whilst the overall result is a between-subject correlation. With 10 participants completing 8 sessions each, this provides a great deal more statistical power (n = 80) for testing this hypothesis. Table 8 shows the results.

Table 8. Correlations of Psi Score with Stroop Error Count

Participant	Error Count
P1	.163
P2	.300
P3	-.461
P4	-.254
P5	.246
P6	.146
P7	-.081
P8	.479
P9	.373
P10	.465
OVERALL	.137

Note. n = 8 for each participant, except P2 (7), P6 (6), & P8 (7). Overall n = 76.
(The data cleaning process deleted responses that were above 5sec as these were outliers; this applies for whether or not the response was accurate. If a session had too many missing data it had to be eliminated entirely – thus the holes in the data that could be analysed.)

In Table 8, only 3 of the 10 accuracy scores are in the predicted direction and none are close to statistical significance. Again some of the correlations are quite strong, but P8 needs to be discounted as their error count was so high they probably had not understood the instructions, P10's correlation is not in the predicted direction, i.e. they had high accuracy and also showed psi-missing; this is because as a young Geshe they are more familiar both with computers and the scientific method, but were also

relatively new to meditation. Which leaves one participant (P3) who had high accuracy on the Stroop and was a strong psi-hitter. So at present there is insufficient data to make any recommendations, other than that it is worth trying out the Stroop test with participants who are more familiar with computers.

DISCUSSION

As in our 3 earlier studies the most experienced meditators showed the strongest psi-hitting. Unlike the previous study with Tibetan monks, there was no significant psi-missing, perhaps because most of the monks we worked with had at least 3 years of meditation practice. The two lamas had both just completed the 3-year meditation retreat that entitles a monk to be called a lama. The fact that they showed independently significant results with so small a data sample is impressive, and is an indication of the efficacy of spending three years in silent retreat practicing meditation for 10 hours a day! The Rinpoche and one of the lamas both, though not independently significant and not apparent with this method of analysis, obtained a pretty impressive 50% direct-hit rate, where 25% is mean chance expectancy. In fact one lama chose the target with a 100-rating three times. It was the ashram studies which suggested that the design of participants doing multiple sessions, thus enabling a reasonable assessment of each individual's psi scoring level and it was here that we first noticed that the more advanced practitioner's showed a greater consistency in their psi scoring. In other words the participants who had practiced meditation for only a few years showed the typical scoring patterns of sometimes psi missing, sometimes at chance and sometimes psi-hitting, whereas the advanced practitioners consistently scored in the psi-hitting direction. This pattern has been repeated with the 2 Tibetan studies. Therefore all 4 studies have shown a consistent psi-hitting trend from the more advanced practitioners. Of course, the experimenter effect cannot be ruled out either at the psychological or the parapsychological levels, since all studies were run by the same experimenter. However, this is surely lessened by the need to use a translator, and in the Tibetan studies the most significant scoring was from those participants who spoke no English at all.

Similarly the correlation of years of meditation in itself is a reasonably strong correlation, which is non-significant merely from the lack of power, and is similar enough to our previous three studies to support the conclusion that years of meditation practice is related to a shift in consciousness which enables more reliable psychic awareness to manifest, thus corroborating the Buddhist and Yogic teachings.

With regard to this exploration of the effect of different types of meditation, mantra vs visualisation, this is just an initial pilot study and, whilst again not significant with these small numbers, the visualisation is edging towards being the stronger practice. In the correlations of the different practices with psi score it is the type-3 visualisation practice which gives the strongest correlation. Thus, those people who have done the greatest amount of visualisation practice are those who show the strongest and most reliable psi, i.e. the Nyingma lamas. So, whilst doing the visualisation practice during the session appears to have little differential effect on psi, doing it long term does have. This ties in with the findings by Carter et al (2005) in which the shamatta practice gave the strongest effect. It also corroborates the tantric practice teachings, the Tibetan practice of visualisation in lakes for psychic purposes, and other traditions around the world, e.g. scrying in Britain. And it suggests, as in other psi research, that enhancing RH activity is psi-conducive. Of interest with regard to the lamas is that in their meditation retreat they had practiced mantra with visualisation - chanting mantra of a deity whilst visualising that deity. So they were not able to separate the two practices. They both remarked on this in the interviews with them after completion of the 8 sessions.

Breaking down the meditation practice into its various components leads to some interesting, albeit very preliminary findings. The two lamas who scored independently significantly were Nyingma lamas and their practice included asanas, pranayama and the retreat, all of which independently give significant correlations with psi. The Gelugpas do not normally do these practices. Thus the significant findings for the different variables are primarily due to the lamas. The main ngondro practice for all the

monks was mantra which, whilst less significant than the visualisation, did show a marginally significant correlation with psi. These results confirm the preliminary studies done in the ashram (Roney-Dougal & Solfvin, 2006), where we found positive correlations (albeit non-significant) between years of yogic practice, which includes all these practices, and psi. Thus we can tentatively say that, whilst meditation appears to have the most profound effect on consciousness, as measured by psi awareness, the other practices do all play their part.

The idea of adding the Stroop effect test to this study was to investigate its potential role as a moderator variable between meditation attainment and psi scoring. Sadly the programming error only came to light during the analysis, and so we can only make suggestive comments. In this study the Stroop effect, as measured by accuracy of response, does not relate significantly to meditation attainment or to psi scoring. However, before anything definitive can be said, it is recommended that others working in this area try out the Stroop test.

But be aware that the Stroop is sensitive to many different factors, and there could be even more cross-cultural problems. As Raz et al (2007) point out that, "reading words is a purportedly automatic process for proficient readers and the Stroop effect is consequently considered the "gold standard" of automated performance." This suggests that if the reading process is not completely automatic that there will be alterations in the Stroop. There may well have been differences in reading proficiency amongst our participants. Raz et al also state: "However, why suggestion removes the Stroop effect in some studies, reduces it in others, and fails to produce a reliable group effect despite the presence of individual effects remains to be reconciled (p. 336)." In other words, the Stroop effect is another of these measures that is sensitive to a whole host of variables, such as different procedures, settings, participant populations, prior familiarity with Stroop, the presence of the experimenter, administration of test, etc., Thus, for example with us, the two lamas had a different translator than the Geshes, and the Rinpoche and one of the Geshes spoke good English and so needed no translator. This variable could well have made a difference.

CONCLUSIONS

Overall, the first hypothesis, that mantra versus visualization meditation practice within the session would differentially affect psi scoring, was not confirmed, though lengthy practice in visualisation meditation showed the strongest correlation with psi-hitting.

The second hypothesis, that meditation attainment would correlate significantly with performance on the psi task, was strongly confirmed. No less than 4 of the 12 MAQ variables were statistically significantly correlated with psi score, all in the predicted direction, and an additional 3 variables were marginally significant in the predicted direction. Most importantly, the magnitude of the correlation of psi score and years of meditation, found in the previous study ($r = 0.524$), was found to be nearly the same ($r = 0.49$) in the current study.

The third and fourth hypotheses showed no apparent relationship between Stroop effect and MAQ, and between Stroop and psi. Thus, while we again confirmed that meditation attainment as defined here does indeed correlate with psi success, we failed to show the Stroop effect as a moderator of that relationship. However, there are issues with the assessment of Stroop effects, especially in cross-cultural settings, which suggest that the Stroop effect, if reliably measured, may still be of interest in future research with meditation and psi.

Thus, for a fourth time, this study shows that years of practice of meditation is related to a change in consciousness in which more consistent and reliable psi awareness is manifested. This confirms the Buddhist and Yogic teachings that, as you practice meditation so, little by little, the changes occur.

Finally, this study has begun a preliminary investigation into exactly which practices are most efficacious, and suggests that it may be the shamatta meditation practice of visualisation which is the most psi-conducive meditation technique.

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APPENDIX A.

Session Instructions
(All participants were given the following instructions, spoken in English on the computer at the appropriate time interval, and recorded on tape in Tibetan for non-English speakers. They were also written in Tibetan for them to review if necessary.)

1) The session is now about to begin. Please relax your body completely for a few minutes.
2) It is now time to make your resolution. This is a short statement of intent that you will become aware of the target picture which you will see on the computer at the end of the session. Please repeat this to yourself three times in the certain knowledge that it will come about.
3) Please begin your 15-minute meditation practise.
4) Staying in your meditation state, for the next few minutes look into the space behind your closed eyes and allow any thought, image, feeling, emotion, memory, come to mind and know that it is related to the target picture.
5) Now review what you have just experienced so that you remember your experience fully.
6) It is time to complete your meditation. Please ask the experimenter to join you now.

THE PSYCHOLOGY OF SPIRITUALIST MENTAL MEDIUMSHIP

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ABSTRACT

The purpose of this study was to explore the personality profile and psychological well-being of spiritualist mental mediums compared to non-medium spiritualists. A total of 179 spiritualists (mediums = 80, non-mediums = 79) participated in a nationwide survey and completed the Dissociative Experiences Scale (DES: Carlson & Putman, 1993), Boundary Questionnaire short-form (BQ-18: Kunzendorf, Hartmann, Cohen, & Cutler, 1997) Creative Experiences Scale (CEQ: Merckelbach, Horselenberg, & Muris, 2001), Mental Health Inventory (MHI-17: Stewart, Ware, Sherbourne, & Wells, 1992), and the Big Five Inventory (BFI: John, Donahue, & Kentle, 1991). T-test analyses revealed that mediums scored significantly higher than non-mediums on psychological well-being (p =.00021), had lower psychological distress (p = .0013), higher extraversion (p = .046), higher neuroticism (p = .00044), and higher openness to experience (p = .0016). No significant differences were found between the groups on dissociation, boundary-thinness, fantasy-proneness, agreeableness, or conscientiousness. Findings suggest that mediumship is not associated with a high level of dissociative experiences or pathology. The results are discussed in relation to previous research within the extant literature which proposes that the mediumship role may serve a therapeutic function. Study limitations and suggestions for future investigation are also considered.

INTRODUCTION

Information received during spiritualist mental mediumship sittings or demonstrations is purported to demonstrate evidence of survival after death (Roll, 1960). However, controversies exist with regards to whether this information provides such evidence, and if so, whether it is due to psi by the medium (psi hypothesis or super-psi theory), or discarnate spirits (survival theory) (Braude, 2003; Gauld, 1983). This fundamental question places mediumship in a tricky arena as far as research attempting to obtain convincing evidence is concerned: Difficulties in differentiating these theories in practice severely limit the empirical value of proof-oriented approaches to mediumship. Despite this, recent investigations into mediumship, with few exceptions, have tended to focus on a proof-oriented approach, and have either tried to provide evidence for the existence of post-mortem communications (e.g., Robertson & Roy, 2001; Schwartz, Geoffrion, Jain, Lewis, & Russek, 2003), or have tested alleged mediumship abilities (e.g., O'Keeffe & Wiseman, 2005). These approaches ignore important process-oriented questions regarding mediumship such as: Are there any necessary or sufficient attributes that appear to define a medium? Therefore, rather than test whether communicating personalities derive from a discarnate source or are a product of the medium's mind, the approach taken in this research is concerned more with the psychological profile of mediums, as opposed to whether mediumship is authentic.

Besides having philosophical, sociological, and historical importance, research involving mediums could have theoretical implications regarding mental and behavioural processes such as identity and personality, in addition to applied implications for the field of mental health. Individuals who have experiences similar to mediumistic experiences have at times been pathologised by Western psychiatry

and labelled with diagnoses such as dissociative identity disorder (DID)[1]. If mediums were found to have good mental health, this would go some way towards dispelling this belief. Therefore, in addition to exploring psychological characteristics, consideration is given throughout this research to whether mediumship is associated with well-being or psychological distress.

The only psychological research in the UK, to the researcher's knowledge, that has attempted to investigate whether there are any personality characteristics that are common among mediums and distinguish them from other groups, consists of a questionnaire and personality study of 50 British psychics and mediums (Hearne, 1989). Hearne used the 16PF Personality Profile and found the group as a whole to be "self-sufficient", "undisciplined", and "affected by feelings". However, Hearne did not distinguish between the two groups in his analysis; consequently it is difficult to conclude whether this was a specific feature of mediums, or psychics. Moreover, it could be argued that contemporary personality measures are available now with better psychometric properties, for example, the Big Five Inventory (BFI: John, Donahue, & Kentle, 1991).

One of the few recent attempts to explore the psychology of self-labelled mediums, and a study which has partly inspired the current research, is a pilot survey conducted in the United States by Reinsel (2003). Reinsel tested the idea that mediumship is analogous to DID by asking whether mediums score within the normal range on personality measures, or show signs of psychopathology. Classification of respondents as mediums depended on how they answered the question: "Do you consider yourself a medium? Yes/No", however, this binary classification could not be applied to the sample, as some respondents felt they had contact with spirits but did not describe themselves as mediums. To overcome this problem, Reinsel decided to have a category labelled "sensitives" to accommodate respondents who believed they could communicate with spirits, but did not offer their services publicly. Mediums (N = 18) and sensitives (N = 14) scored higher than controls (N = 11) ($p < .05$ for both groups) on the Depersonalization Severity Scale (DSS), which measures the intensity and frequency of depersonalization experiences, such as feeling detached or unreal. There were no differences on the Somatoform Dissociation Questionnaire (SDQ-20), which measures physical symptoms that are reported more frequently in individuals with DID compared to other psychiatric diagnoses (Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1996). Mediums scored significantly higher than controls on a measure of absorption (mediums: p = .002; sensitives: p = .047) and temporal lobe symptoms (mediums: p = .024). There were no significant differences on measures of mental health, although a slight trend was detected for higher total scores on the Mental Health Inventory (MHI-17), indicative of better overall mental health in the medium sample. Findings suggest that dissociation is highlighted as a promising area for further exploration. It is interesting that mediums scored higher on one measure of dissociation, but not another and the decision was made in the current research to explore the relationship of mediumship to dissociation with a measure that assesses more types of dissociative experiences, than simply depersonalization. Results also suggested that mental health was better for mediums compared to the control group, which would seem somewhat controversial given that Reinsel was testing the assumption of mainstream psychiatry that mediumistic experiences are analogous to DID. It will be interesting to see if similar findings are obtained in a larger sample of mediums.

Waller, Putman and Carlson (1996) point out that not all forms of dissociation need be regarded as pathological and have differentiated between pathological and non-pathological dissociation. They acknowledge that experiences such as hypnotic states, altered states of consciousness and trance phenomena that presumably involve dissociation are often not pathological experiences. In the cross-cultural literature there are several studies that investigate the relationship between dissociation and mediumship and, more specifically, dissociative identity disorder, trauma and mediumship phenomena. In an unpublished dissertation, Laria (2000) pointed out that "normal" dissociation is usually associated

[1] Psychiatric diagnosis given to individuals who supposedly have two or more identities or personalities (American Psychiatric Association, DSM-IV-TR, 2000, p529). *Note*. On reviewing the *DSM-IV-TR,* it is stated in the diagnostic criterion that the phenomena must bring about clinically significant distress or impairment in social, occupational, or other important areas of functioning for all dissociative disorders *apart* from DID.

with low levels of intensity and frequency, such as "highway hypnosis" and pathological or clinical dissociation is associated with high levels of intensity and frequency, such as fugue states. Laria explored the idea that normal dissociative experiences could occur at high levels of intensity and frequency without any associated psychopathology. Spiritist mediums from Cuba were compared with individuals who had mental health problems and a control group. Mediums were found to have high levels of normal dissociative experiences, "thinner boundaries", better health status, and fewer traumatic experiences. It could be argued that comparing mediums with individuals who are having mental health problems guarantees that results will be found that confirm a lack of psychopathology in the medium sample. Additionally, their motivation could have differed as a rather lengthy total of nine questionnaires were included, which took between 90-120 minutes to complete.

In a similar study, Moreira-Almeida, Neto, and Greyson (2006) explored whether there were any similarities or differences between Brazilian Spiritist mediums and individuals with a diagnosis of DID. One hundred and eleven mediums, randomly selected from different Kardecist Spiritist centers in Brazil, were asked to complete the Social Adjustment Scale (SAS) and the Self-Report Psychiatric Screening Questionnaire (SRQ). Average SAS scores for mediums were higher than scores of the individuals with a diagnosis of DID suggesting better social adjustment in the medium sample. Similarly, SRQ results suggested a low prevalence of mental health problems in the medium sample. Correlations were also discovered between the frequency of mediumship experiences (incorporation) and better scores on the SAS (-.22, p <0.05) and SRQ (-.19, p <0.05). However, better results could have been a consequence of spiritist group membership as Moreira-Almeida et al. note that higher levels of education and religious involvement have been associated with better mental health, so one cannot be sure that the results are representative of mediumship activity. This point supports the methodological design of controlling for spiritual belief, and surveying spiritualist mediums together with non-medium spiritualists. Secondly, he acknowledges that mediums at Spiritist centers in Brazil have to attend a 2-year course and are therefore more likely to be healthy. It is hypothesized that the course could be associated with greater social support or screens out unstable individuals prior to commencement.

Differences between DID and trance channeling have been investigated by Hughes (1992). Using the Dissociative Disorders Interview Schedule (DDIS) and the Dissociative Experiences Scale (DES) Hughes compared trance channels (N = 10), DID diagnosed individuals (N = 20), and a healthy group (N = 34). Results indicated that trance channelers differed from those with a diagnosis of DID. Specifically, their DES scores were significantly lower (median DES = 5.66) than the DID group (median DES =57.06), and more in line with scores obtained by the healthy group (median DES = 4.38). Scores on the DDIS for trance channelers did not suggest psychopathology. Implicit in these results is the concept that dissociative experiences in trance channelers do not reach pathological levels as assessed by the DES. Furthermore, their experiences do not compare to DID. This may also be true for individuals who consider themselves mediums. However, the sample of trance channelers was very small, and had participated in a previous study measuring brainwave activity while both in and out of trance (Hughes & Melville, 1990). Subsequently, generalizations are difficult to make as it is possible that researchers already knew the trance chanelers would score low on dissociative experiences.

Additional support for the claim that mediumship experience is not associated with general pathology is observed in the work of Seligman (2005) who undertook a year long field study with 71 individuals in Brazil. Her study compared mediums and non-mediums from the Candomblé mediumship. No significant differences were found on the State Trait Anxiety Inventory (STAI), or emotional distress as measured by the Questionario Morbidade Psiquiatrica dos Adultos (QMPA). However, somatic symptoms were higher for mediums (p < .05). On the DES the mean scores for three religious comparison groups were significantly higher than two control groups (p < .05), although there were no differences between the medium group and the religious groups suggesting no association between mediumship and dissociation.

In contrast to the above studies, Krippner, Wickramasekera, Wickramasekera and Winstead (1998) discovered a high level of dissociative experiences (mean = 31.1) in participants (N = 7) who followed the consciousness training procedures taught by an alleged discarnate entity called "Ramtha", as four

participants scored above the cut-off point for those who are considered "severely dissociative". Additionally, participants' scores (mean score = 343) on the Boundary Questionnaire (BQ) indicated thin boundaries and were higher than average scores which range between 250 and 300 (Hartman, 1991). If these findings were to generalize to other similar groups it would suggest that mediums were also characterized by thin-boundaries. Unfortunately, the sample size in this study was too small to make any conclusive generalizations and the participants were not spiritualist mediums. However, the investigation was the first to use the combination of DES, BQ and Absorption subscale with the same sample. Selecting a combination of questionnaires in this manner with a larger sample, like the survey of spiritualist mediums in the current research, may point to a clustering of variables in the profiles of mediums that go some way towards establishing a possible formulation of mediumship experiences.

Fantasy proneness was also identified as a promising variable to explore in relation to mediumship as the autobiographies of mediums contain reports of imaginary friends, a sense of alienation, and mental impressions (e.g. Garrett, 1968). Furthermore, Wilson and Barber (1982, p. 109) suggested that fantasy-prone individuals might have been "over-represented among famous mediums, psychics, and religious visionaries of the past".

The purpose of this study was to explore whether mediums involved in spiritualism differed in some way to spiritualists that do not practise mediumship. Based on a review of the recent literature, this study planned to explore the two-tailed hypotheses that spiritualist mediums and non-mediums will differ on measures of dissociative experiences, boundary thinness, extraversion, neuroticism, agreeableness, conscientiousness, openness to experience, psychological distress, psychological well-being, and fantasy-proneness.

METHOD

Design

This study employed an independent measures design and involved a nationwide cross-sectional survey. The independent variable (IV) mediumship group had two levels: spiritualist mediums and non-medium spiritualists. There were ten dependent variables (DVs): scoring on dissociative experiences (as measured by the Dissociative Experiences Scale), fantasy-proneness (as measured by the Creative Experiences Scale), boundary-thinness (as measured by the short-form of the Boundary Questionnaire), scoring on psychological distress and psychological well-being (as measured by the subscales of the Mental Health Inventory), and scoring on extraversion, neuroticism, openness to experience, agreeableness and conscientiousness (as measured by subscales of the Big Five Inventory).

Participants and Procedure

A total of 159 participants were included in the sample for this survey study: 80 "spiritualist mediums" (67.5% females; mean age = 62.50; ranging from 35 to 90) and 79 "spiritualist non-mediums" (78.5% females; mean age = 60.96; ranging from 27 to 84 years). There were no significant differences between the groups according to age (t = .805, p = .422, two-tailed) or educational level (z = -1.294, p = .196, two-tailed).

Spiritualist Mediums: A major advantage of the sampling method was the ability to operationally define spiritual mediums in terms of membership of a recognized national spiritualist organization, as names and addresses were discovered for 233 mediums that had gained awards for demonstrating their mediumship at spiritualist churches within 14 districts in England, Scotland and Wales. This list of mediums comprised the target population for the distribution of the survey, and was available in the public domain via the National Spiritualist Union (SNU). The discovery of this list was further enhanced by personal communication with the Public Relations officer for the SNU as it was established that these mediums, by virtue of achieving the SNU award for demonstrating, were self-classified spiritualist mediums that had undergone a rigorous training programme and had been practising

mediumship for at least one year. Given that a list was readily available, easily accessible, and defined a universe (mediums who had reached a certain level of competency), it was decided that this would provide an excellent sample of spiritualist mediums.

To encourage responses there were four stages involved in distribution of the survey: Firstly, 233 packs were posted to mediums; secondly a postcard reminder was sent approximately two weeks later; thirdly another survey pack was redistributed to non-responders approximately two weeks after sending the postcard; fourthly, mediums were also telephoned to ensure they had received a survey. Out of the 233 mediums, 15 were deceased or no longer practising, reducing the actual target population to 218. One hundred and fifteen mediums responded (response rate = 53%), however the actual completion rate of the psychological measures was 82 (37%) and 91 (42%) for the mediumship activity questionnaire.

Non-medium Spiritualists: For the comparison group, individuals who attend spiritualist church services and/or mediumship demonstrations were targeted via random sampling of SNU spiritualist churches. These individuals provided a control for spiritual belief so that any differences in results on psychological measures could be attributed to the mediumship role rather than factors associated with belief in survival, or religious affiliation, such as group membership and social support. To increase the representativeness of the sample, small geographical areas or clusters were selected to ensure participants were targeted from both rural and urban areas; this process was naturally defined as spiritualist churches are already divided into 14 districts: East Midlands, West Midlands, East London, West London, Southern, Northern, South Yorkshire, North Yorkshire, Manchester, Merseyside & North Wales, South Wales, South Western, North Lancashire & Cumbria, and Scottish. After gaining permission from the Church Secretary or Church President via telephone to exhibit the survey packs in the reception area of these randomly selected churches, a total of 435 surveys were posted. To increase responses, a further 101 surveys were delivered in person. The research was explained to the Church president and survey packs were left in the Church for potential non-medium spiritualists to take and complete. An advantage to visiting the Churches in person was that any concerns about the research could be clarified and it ensured that packs would be left for distribution. Although this was the case, the number of surveys returned did not differ from the postal method. Therefore, a further 90 surveys were posted. Out of the 626 surveys distributed, 130 responded (20%), however the total number of surveys completed correctly was 90 (14%).

Materials

The survey packs included: a cover letter containing a brief introduction to the research; information on ethical issues and details of how to complete the survey; a pre-paid return envelope; a separate envelope to place personal details in; contact details of the researcher; and a questionnaire consisting of two parts: a) Mediumship Activity Questionnaire, and b) five psychological measures. The survey pack was first piloted with three spiritualist mediums to assess whether the questions or instructions were ambiguous, unclear or offensive.

Instruments

Mediumship Activity Questionnaire. A self-designed questionnaire to explore mediums' experiences and what they think is involved in mediumship. The questionnaire has 14 items and includes sections on life history and background, the process and nature of mediumship, and the content of mediumship readings. Examples of questions are: "How did you first discover you had the ability to be a medium?" and "Are there any procedures, rituals or mental actions you follow in order to receive spirit communications?" Results from this aspect of the survey will be described in a separate paper.

Dissociative Experiences Scale (DES) (Carlson & Putman, 1993). A 28-item standardized measure of dissociation, which can distinguish between pathological and non-pathological dissociation, and has highlighted differences in scores between mediums and non-mediums (Hughes, 1992; Laria, 2000;

Seligman, 2005). According to Ross (1997) the DES is the most widely used self-report measure of dissociative experiences and is the only dissociative instrument that has been subjected to a number of replication studies by independent investigators. It has demonstrated good Cronbach's alpha (.93 to .95) and test-retest reliability (r = .84 to .93) (Dubester & Braun, 1995). An example of a question is: "Some people have the experience of driving a car and suddenly realizing that they don't remember what has happened during all or part of the trip. Indicate what percentage of the time this happened to you." The respondent then circles a percentage ranging from 0% to 100% at 10% intervals. Individuals scoring over 20 are considered to be experiencing high dissociation and scores of more than 30 are classed as the clinical cut-off for severe dissociation.

Boundary Questionnaire (BQ-18), short-form (Kunzendorf, Hartmann, Cohen, & Cutler, 1997)[2]. The original Boundary Questionnaire has 138-items, which are divided into 12 categories (Hartman, 1991). Kunzendorf et al (1997) developed a shorter version of the BQ with 18-items, by selecting those items from each of the twelve subscales showing the highest correlations with the full 138-item Boundary Questionnaire. The Boundary Questionnaire has been used previously in research investigating mediumistic phenomena (Krippner, Wickramasekera, Wickramasekera, & Winstead, 1998; Laria, 2000). This shorter version has demonstrated an alpha reliability of .93 and test-retest reliability of .77 (Hartmann, Kunzendorf, Rosen and Grace, 2001). Participants are asked to rate each of the 18 item statements from 0 to 4 (0 indicates *"not at all true of me"*; 4 indicates *"very true of me").* An example of a thick boundaried statement is: "A good organization is one in which all the lines of responsibility are precise and clearly established". An example of a thin boundaried statement is: "My feelings blend into one another".

Mental Health Inventory (MHI-17) (Stewart, Ware, Sherbourne, & Wells, 1992). A 17-item scale which produces overall scores for psychological well-being (happiness, emotional ties) and psychological distress (anxiety, depression, loss of behavioural or emotional control). Reinsel (2003) used this measure in the pilot survey of mediums and it was also the primary mental health outcome measure used in the RAND Health Insurance Experiment. It has demonstrated good reliability, has a Cronbach's alpha of .93 and has been found to correlate with other similar measures (Sherbourne, Hays, Ordway, DiMatteo, & et al., 1992). Respondents are asked questions about how they have felt over the past two weeks. Examples of questions on the MHI-17 are "Have you been anxious or worried", and "Have you felt loved and wanted". Respondents are asked to circle a number between 1 and 6, where 1 refers to *"All of the time"* and 6 refers to *"None of the time".*

Big Five Inventory (BFI) (John, Donahue, & Kentle, 1991)[3]**.** A 44-item questionnaire, which measures the five personality traits of: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. The BFI has demonstrated good alpha reliabilities, which average above .80 and good three-month test-retest reliabilities ranging from .80 to .90. It has also demonstrated convergent validity (mean r = .73) with other Big Five measures, such as the NEO-FFI Personality Inventory (Costa & McCrae, 1985). Advantages of the BFI are that it is more cost effective than the NEO-FFI, as it is available in the public domain, and it is easy to administer, taking only about 5 minutes to complete. Each of the 44 items of the BFI begins with *"I see myself as someone who…"* and is rated between 1 (*Disagree strongly*) and 5 *(Agree strongly*). Examples of items are: Extraversion (8 items) *"has an assertive personality"*, Agreeableness (9 items) *"is helpful and unselfish with others*, Conscientiousness (9 items) *"is a reliable worker"*, Neuroticism (8 items) *"worries a lot",* Openness (10 items) *"is original, comes up with new ideas"*

[2] Permission to use the BQ-18 was obtained from Professor Hartmann on 13th January, 2007.

[3] Permission to use the BFI was obtained from Professor Oliver John on 10th January, 2007.

Creative Experiences Scale (CEQ) (Merckelbach, Horselenberg, & Muris, 2001)[4]. A brief measure of fantasy proneness, which contains 25-items, to which the respondent answers "Yes" or "No". An example of a question is: "Sometimes I act as if I am somebody else and I completely identify myself with that role". It has demonstrated good test-retest stability (r = .95) in a sample of 17 undergraduate students and good internal consistency (Cronbach's alpha = .72) in a sample of 99 undergraduate students. Although these studies used student samples to assess reliability levels, Merckelbach, Horselenberg and Muris argue that most research on fantasy proneness has thus far relied on the Inventory of Childhood Memories and Imaginings (ICMI), originally developed by Wilson and Barber (1981), for which psychometric information has been difficult to obtain. They also argue that the CEQ has good construct validity, in that it has been correlated with the ICMI (Pearson product-moment correlations of 0.77). The CEQ has been used effectively in other research, such as the false fame illusion in people with memories about a previous life (Peters, Horselenberg, Jelicic, & Merckelbach, 2007).

RESULTS

Data Screening

In both samples occasional missing data (<5%) were observed, however no patterns were detected, therefore the missing values were replaced with the item mean. For the psychological distress variable eight outliers in the non-medium sample and one outlier in the medium sample were identified from a box plot graph and subsequently removed. On examination of their health status, these participants reported psychological distress, such as depression, manic depression or anxiety. A Mann-Whitney analysis was performed before removal of these outliers and identified a significant difference between mediums and non-mediums on psychological distress (z = -3.717, p = .0002). This satisfied the use of parametric testing after removal of outliers, which also identified a significant difference ((t (157) = 3.26, p = .0013, two-tailed). Another participant was filtered from the medium sample due to suspected acquiescence, as they had ticked the same number on measures regardless of item meaning.

Inspection of histograms for the data revealed a positive skew for the DES. However, all other dependent variables exhibited a normal distribution. This was further supported using the ratio of standard error with variable skewness and kurtosis (standard error ratio >3) and by the finding that skewness for each variable fell within the acceptable boundaries of -1/+1 and within the boundaries of -3/+3 for kurtosis.

Hypothesis Testing

T-tests were used to examine whether there were any differences between mediums and non-mediums on scores obtained from psychological measures used in the survey study. Summary statistics from these analyses are reported in Table 1. Mean scores for the medium sample were slightly higher than the non-medium sample (mean = 13.81 vs. mean = 12.99), and as can be seen in Table 1 and 2, both groups scored higher than means reported in general population studies. There were no significant differences between groups for scores on the Dissociative Experiences Scale (DES) *(*t (157) = .514, p = .61, two-tailed). As the DES was positively skewed, a Mann-Whitney was also performed which confirmed the lack of significance (z = -.200, p = .84, two-tailed).

Similarly, there were no significant differences between groups for scores on the Boundary Questionnaire (BQ-18) (t (157) = -1.345, p = .18, two-tailed). However, it is interesting to note that mean scores for the non-medium group were higher ("thinner") than the medium group (mean = 36.59 vs. mean = 34.51). As seen in Table 1 and 2 mean scores for both groups were lower than those found

[4] Permission to use the CEQ was obtained from Professor Merckelbach on 11th January, 2007.

by Laria (1998) in his medium group (mean = 37.23) and patient group (39.31), but as one might anticipate, higher than his control group (32.16).

No significant differences between groups were reported on the Creative Experiences Questionnaire (CEQ) (t (157) = 1.65, p = .10, two-tailed). Although there is no normative data for this measure, it is suggested that scores within the 7 – 10 range are normal, while those within the 12 – 16 range are high (for example, fantasy role players score in this range) (H. Merckelbach, personal communication, 15th May, 2007). Therefore, mean scores for both groups fall within the normal range (medium = 9.75 vs. non-medium 8.54), with mediums scoring slightly higher than non-mediums.

TABLE 1
MEANS AND STANDARD DEVIATIONS OF MEDIUMS AND NON-MEDIUMS FOR PSYCHOLOGICAL MEASURES

	Medium (N=80)		Non-medium (N=79)				
Measure/ Variable	*M*	*SD*	*M*	*SD*	*t*	*p* (2-t)	Effect Size (*r*)
CEQ	9.75	4.35	8.54	4.83	1.65	.10	0.13
BQ-18	34.5	10.5	36.6	8.92	-1.34	.18	0.10
DES	13.8	10.9	12.9	9.00	.514	.61	0.04
Openness	3.75	.561	3.46	.574	3.21	.0016**	0.24
Conscientiousness	3.75	.508	3.68	.508	.924	.36	0.07
Extraversion	3.49	.721	3.25	.777	2.01	.046*	0.15
Agreeableness	4.18	.558	4.18	.499	.006	.99	0.00048
Neuroticism	3.61	.716	3.19	.755	3.59	.00044***	0.27
Well-being[a]	4.65	.784	4.11	.994	3.80	.00021***	0.29
Psychological Distress[a]	5.36	.486	5.07	.625	3.26	.0013**	0.25

Note. These exploratory computations were not corrected for multiple analyses as each measure was considered on its own merit in context of the larger study (Perneger, 1998).
[a]High scores on well-being and psychological distress subscales of the MHI-17 indicate better mental health.
*p<.05; **p<.01; ***p<.001

As illustrated in Table 1, mediums scored significantly better than non-mediums on the Well-being[a] subscale (t (157) = 3.80, p = .00021, two-tailed) and the Psychological Distress[a] subscale of the MHI-17 (t (157) = 3.26, p = .0013, two-tailed). It was noted that mean number of years as a spiritualist for mediums (mean = 34.54; ranging from 9 to 78 years; *SD* = 15.86) was higher than for non-mediums (mean = 19.01; ranging from 1 to 70 years; *SD* = 17.75). As a way to explore whether this difference contributed to the significant findings, Pearson correlations were performed between the measures, number of years as a spiritualist and number of years practicing as a medium. When controlling for age, these correlations indicate little evidence for a direct relationship between well-being (r = .180, p = .129) or psychological distress (r = -.009, p = .936) and number of years as a spiritualist; or between well-being (r = .076, p = .527) or psychological distress (r = .053, p =.660) and number of years practicing as a medium. Interestingly, when controlling for age, number of years as a spiritualist did not significantly correlate with psychological distress[a] (r = .472, p = .160) or well-being[a] (r = .225, p = .09) in the non-medium sample. However, the latter result suggests that the longer non-mediums are involved with spiritualism, the better well-being they have.

Significant differences between mediums and non-mediums were also found on Openness to Experience (t (157) = 3.21, p = .0016, two-tailed), Neuroticism (t (157) = 3.59, p = .00044, two-tailed) and Extraversion (t (157) = 2.01, p = .046, two-tailed), but not for Agreeableness (t (157) = .006, p = .99, two-tailed) or Conscientiousness (t (157) = .924, p = .36, two-tailed). When controlling for age,

TABLE 2
SUMMARY OF RESULTS FOR OTHER (MEDIUMSHIP RELATED) STUDIES USING SIMILAR MEASURES TO THE CURRENT SURVEY STUDY

Study	Participant type/ comparison	Measures/Variable	Results
Reinsel (2003)	Mediums (*N*=18) Sensitives (*N*=14) Controls (*N*=110	MHI-17 Total Score (mediums showed a trend towards better overall mental health)	p <.06
Hughes (1992)	Trance channels (*N*=10) DID (MPD) (*N*=20) Healthy group (*N*=34)	Trance channels scored significantly lower (DES median= 4.38; mean= 6.28) than DID comparison (DES median= 57.06; mean= 38.3) No differences between trance channels and healthy group comparison (DES median=4.38)	p =.01 *ns*
Krippner et al (1998)	"Ramtha" followers (*N*=7)	DES mean= 31.1 BQ mean= 343	High DES Thin boundaries
Seligman (2005)	Initiated mediums (*N*=11) Non-initiated mediums (*N* =10) Uninitiated religious frequenters (*N*=20) Controls/outside religion (*N*=20) Controls higher SES/ outside religion (*N*=10)	Mean DES scores for three religious comparison groups were significantly higher than two control groups. However, no association was found between mediumship and DES score.	p <.05 *ns*
Negro, Palladino-Negro & Louza (2002)	Kardecist Spiritism members (*N* =115)	Analysis identified 3 clusters: "Mainstream" DES mean=15.03 "High Dissociators" DES mean= 35.20 "Active Mediumship" DES mean = 20.14	
Laria (1998)	Individuals with mental health problems (*N* =51) Mediums (*N* =46) Controls (*N* =42)	DES mean score for individuals with mental health problems (33.45) was significantly higher than mediums (20.03) & controls (16.04) DES mean score did not differ between mediums and controls BQ-18 mean score for individuals with mental health problems (39.31) and mediums (37.23) was significantly "thinner" than controls(32.16)	p <.0001 *ns* p <.01
Carlson & Putman (1993) Bernstein & Putman (1986)	General population studies	Mean DES=3.7 (N=25) Mean DES=7.8 (N=415)	

Pearson correlations did not show any relationship between the significant variables and number of years as a spiritualist (Openness; r = -.076, p = .524; Neuroticism; r = .009, p = .935; Extraversion; r = -.056, p = .638) or number of years practicing (Openness; r = -.088, p = .461; Neuroticism; r = -.013, p = .912; Extraversion; r = .138, p = .250).

DISCUSSION

An exploration for differences between a sample of spiritualist mediums and non-medium spiritualists on a selection of psychological variables discovered that mediumship was associated with less psychological distress, better psychological well-being, greater extraversion, greater neuroticism, and greater openness to experience. Dissociative experiences, fantasy-proneness, boundary-thinness, agreeableness, and conscientiousness did not differ between the two groups.

Although the DES did not identify any significant differences between mediums and non-mediums, mean scores for both groups were higher than those in general population studies (Carlson & Putman, 1993). This interesting finding suggests that spiritualists may be more likely to have dissociative experiences, but levels to not reach those regarded as pathological. In contrast, the Ramtha follower participants described in Krippner et al.'s (1998) study experienced high dissociation. One explanation could be that they partake in breathing exercises and other processes designed to alter consciousness, which are claimed to be accompanied with biochemical changes in the body. In comparison, the mediums in the current study demonstrated their mediumship at spiritualist churches by giving messages, allegedly from deceased spirits, to audience members, and may have been less likely to alter consciousness. However, this would not account for the trance channelers presenting with dissociation scores more in line with those of the general population in the study by Hughes (1992). Worthy of further exploration, is the possibility that mediums (and non-mediums) in the current study scored higher than the general population as a result of a smaller subgroup that are more dissociation-prone, as discovered by Negro, Palladino-Negro and Louza (2002). They found a subgroup of "High Dissociators" (DES>30) with a distinct profile including poorer social adaptation.

Controversially, a significant difference (with a small to medium effect size) was found between mediums and non-mediums on the measure of mental health as mediums scored significantly higher on psychological well-being and lower on psychological distress. Furthermore, when controlling for age, correlations confirmed that number of years as a spiritualist did not identify a relationship with better mental health. It is speculated that mediums could have entered the profession with a predisposition for positive well-being and low psychological distress, and increased age and involvement with spiritualism had no impact on this. Alternatively, adoption of the mediumship role and associated status could have affected well-being in a positive way and remained a "buffer" throughout their career.

To some extent, these findings support the interpretation given by Seligman (2003) that distress is experienced by individuals prior to their involvement with Candomblé mediumship but is given a new positive meaning by their initiation into mediumship, together with the accompanied status, power and respect that is linked with the role. This model implies that the act of mediumship reframes experiences and that improvement of psychological well-being increases with time. The current research findings are not consistent with the latter part of this model. However, the first part of the model is supported as it is possible that the act of classifying oneself as a medium, regardless of spiritualist status, has a positive impact on mental health. In essence, Seligman suggests that the process of redefining one's identity and social support associated with the mediumship role may serve a therapeutic function. Implicit in this notion is the view that normalization of distressing or unusual experiences contributes to positive well-being or better ability to cope. This is something that has been identified by Western clinical psychology in relation to individuals who "hear voices", have "unusual beliefs" or experience "visual imagery". When their experiences are shared with others in a supportive, non-judgemental environment, they are more likely to cope with their experiences and avoid entering the mental health system (Romme & Escher, 2000).

It should be noted that mediums are probably aware that their experiences are considered unusual and therefore may feel it necessary to demonstrate good positive health, which could have impacted on completion of the mental health measure (MHI-17). Future research could explore the psychological health of mediums in training with a longitudinal study to examine in further detail whether the mediumship role contributes to well-being. Additionally, research could be conducted with individuals who define themselves as psychics or healers to establish if findings transfer to similar groups. It would also be useful to examine the comparison group in more detail and/or norms associated with the psychological measures as it may be that the non-medium spiritualists have lower well-being than the general population.

The finding that mediums scored higher on extraversion and neuroticism when compared with non-mediums presents as somewhat contradictory given the possible connection of mediumship with positive mental health. However, it could be that mediums are characterized by a dual facet personality: in one respect they are sociable and assertive, identified by their willingness to publicly demonstrate mediumship but, on the other hand, they also experience negative emotional states, are self-conscious and shy. A limitation of this study is that participants were mediums who demonstrate their mediumship at spiritualist churches, which may not be representative of the population of mediums as a whole. Thus, it would be interesting to explore whether mediums that only conduct private sittings score similarly.

Although no differences were found between mediums and non-mediums on the fantasy-proneness measure, mediums did score significantly higher on openness to experience, suggesting an active imagination, intellectual curiosity, and attentiveness to inner feelings. Intriguingly, openness to experience has been correlated with creativity (McCrae, 1987).

What has emerged from this study is that there are clear differences between spiritualist mediums and non-mediums that warrant further exploration. More advanced methods of analysis are planned to establish whether the significant variables predict membership for the medium group. Further analysis will also explore whether there is a clustering of features that leaves someone prone to mediumistic experiences. Moreover, the findings confirm previous research which demonstrated that mediums do not present with high levels of dissociation or pathology. It would also be useful to explore the phenomenology of mediumship and gain insight from mediums themselves on the process and nature of mediumship. This may shed light on the factors that contributed to individuals defining themselves as mediums, how they developed their claimed ability, and how they became involved with spiritualism. Therefore, these results will be considered alongside interviews with spiritualist mediums, which are to be analyzed using the Interpretative Phenomenological Approach (IPA: Smith, 1996).

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NEW INSIGHTS INTO THE LINKS BETWEEN ESP AND GEOMAGNETIC ACTIVITY

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ABSTRACT

A database of 343 free-response ESP trials conducted at centers in the U.K. was constructed in order to test the hypothesis that the relatively fast varying components of geomagnetic activity, geomagnetic pulsations, might be driving the reported associations between ESP, geomagnetic activity and local sidereal time. Local geomagnetic field-strength measurements taken at 1-second intervals during 99 trials, and at 5-second intervals during 244 trials, were converted by fast Fourier transform into power within five frequency bands. Two patterns were observed: ESP was found to succeed only during periods of enhanced pulsation activity within the 0.2-0.5 Hz band, but ESP effect was absent during the most disturbed periods of activity in the 0.025-0.1 Hz band. The pattern of ESP effect by local sidereal time was similar to that found by Spottiswoode (1997b), and this shape was found to be attributable to the pattern of ESP results by pulsation activity in the 0.2-0.5 Hz band. The observed patterns were demonstrated to have excellent explanatory power in terms of accounting for findings previously reported in the literature.

INTRODUCTION

The investigation of apparent associations between ESP (extrasensory perception), geomagnetic activity and local sidereal time (a time system based on the rotation of the Earth with respect to star positions) is one of the most promising areas of research in parapsychology. If the parameters of these associations could be reliably defined, this information would allow experiments to be timed to maximize effects, advance theory development, and might even lead to the development of technologies to enhance ESP. This paper presents the idea that a component of geomagnetic activity, geomagnetic pulsations, may be driving both the geomagnetic activity and local sidereal time associations that have been reported. This idea is then tested by comparing measurements of geomagnetic pulsations with the results of ESP experiments conducted at three centers within the U.K.: the University of Edinburgh, the University of Northampton and the Museum of Psychic Experience in York.

The Link between ESP and Geomagnetic Activity

Geomagnetic activity (GMA) is the aggregate of disturbances in the natural magnetic field surrounding the Earth caused by the interaction of that field with plasma (electrically charged gas) ejected from the Sun during solar storms. Researchers have often reported an association between the degree of GMA and the results of ESP experiments. These studies have generally used a crude global index of GMA, *ap*, which is derived from the difference between the lowest and highest field-strength measurements during a three-hour period from each of 13 observatories around the globe. This index therefore gives only very limited information about the degree and character of field disturbances at the location of the ESP experiment.

Most often, a negative correlation between ESP effect size and GMA is reported; that is to say, a stronger ESP effect is observed when the geomagnetic field is relatively undisturbed (Makarec & Persinger, 1987; Persinger & Krippner, 1989; Spottiswoode, 1990; Krippner & Persinger, 1996). In an analysis of two ganzfeld studies, however, Radin (1994) found opposing results: the first study showed no overall ESP effect, but a negative correlation with GMA, whereas the second found a significant ESP

effect and a positive correlation with GMA. In ESP experiments during which complex, fluctuating magnetic fields were generated near participants, both Persinger et al. (2002) and Booth et al. (2002) found a positive correlation between ESP and GMA.

Some large studies with strong evidence of ESP show no correlation with GMA. For instance, Nelson and Dunne (1986) examined 334 precognitive remote viewing sessions and Persinger (1989) reported on 139 ganzfeld sessions conducted by Charles Honorton; both found no relationship between ESP and GMA. In a meta-analysis of 51 studies comprising 2,879 free-response trials, Spottiswoode (1997b) found, overall, a slight negative correlation of ESP with GMA (r_s = -0.03). Many papers have also suggested a link between spontaneous ESP experiences and GMA (Persinger, 1989), but interpretation of these is difficult as many have used inappropriate statistical methods (Wilkinson & Gauld, 1993).

These inconsistent findings may indicate that there is a mid-range of GMA that has a positive or negative influence on ESP, or alternatively there might be a complex interaction involving several geomagnetic components, each acting upon ESP in a different way.

The Link between ESP and Local Sidereal Time

Local sidereal time (LST) is time measured relative to the stars. Therefore, a given star will always pass overhead at an observer's location at the same LST. As the Earth is in orbit around the Sun, the relationship between solar time and sidereal time cycles through the year. Spottiswoode (1997a, 1997b) checked for a relationship between ESP results and LST. He assembled 2,879 ESP trials into a database and graphed the ESP effect size by LST. Contrary to his expectation of a uniform distribution, he found that ESP effect size peaked at about 13:20 LST and fell close to zero at about 18:10 LST. One would reason that this could not be due to the influence of a factor that varies by time of day or time of year, because through the year, such a variation would be spread evenly across LST. However, as the large majority of ESP experiments in Spottiswoode's database were carried out in daylight hours, an influencing factor with seasonal variation would generate a systematic variation of ESP effect by LST. The trials in Spottiswoode's database do indeed exhibit a seasonal variation of ESP effect (Sturrock & Spottiswoode, 2007), so this will, at least partly, explain the shape of the LST graph.

Another class of influencing factor that would generate a non-uniform LST distribution is a factor that possesses a time of day variation which itself changes over the year, for example, a factor whose daily maximum shifts in local time through the year.

Geomagnetic pulsations meet these criteria. These regular fluctuations in the geomagnetic field are classified according to frequency (i.e., wavelength) and character (regular sinusoidal or irregular) (Jacobs, 1970; Campbell, 2003), and each type exhibits distinct seasonal and/or interacting seasonal/daily variation (Jacobs, 1970).

Spottiswoode (1997b) went on to report that the overall slightly negative correlation of ESP with the global index of GMA was much stronger in a 2-hour window centered at about 12:55 LST, close to the LST of maximum effect size. Therefore, we need to identify factors not only whose occurrence varies by season, or have time of day variation that varies by season, but that also are closely related to GMA. Clearly, geomagnetic pulsations also meet this second criterion; the occurrence profile of each pulsation type has a distinct relationship to the global index (Jacobs, 1970). These fluctuations are therefore an excellent candidate for explaining both the GMA and LST associations with ESP.

Adams (1986) first suggested that geomagnetic pulsations might be linked to ESP success, but at that time, the detailed field measurements that would have allowed the hypothesis to be tested were not available. Now that suitable measurements are available, this paper is able to address the question directly for the first time.

ESP TRIALS

A database of free-response ESP trials was constructed, comprising trials for which local, high time-resolution measurements of the geomagnetic field were available. To reduce noise in the analysis a further criterion was applied: considering each condition within each study, only conditions with an ESP effect size ($Z/\sqrt{N}$) greater than an arbitrary threshold of 0.15 were included. The included trials are listed in Table 1, which also shows the correlation between ESP effect size and the global 3-hourly GMA index, *ap*. None of these correlations is significant by a 2-tailed test.

TABLE 1
ESP Trials used in the Analysis

Type	Where Conducted	Study	Conditions	*N*	*es*	$r_s(ap, es)$
Ganzfeld	Edinburgh	Sender – No Sender (Morris, Dalton, Delanoy & Watt, 1995)	Sender present	64	0.17	-0.23
Ganzfeld	Edinburgh	Creativity (Dalton, 1997)	All	75	0.52	0.13
Ganzfeld	Edinburgh	Drumming (Symmons & Morris, 1997)	7 Hz drumming	25	0.54	0.03
Ganzfeld	Northampton	REG Receiver / Human Receiver (Roe, Holt & Simmonds, 2003)	Human receiver	40	0.28	-0.17
Ganzfeld	Edinburgh	Creativity (Morris, Summers & Yim, 2003)	All	40	0.19	0.08
Precognitive Remote Viewing	York	-	-	99	0.42	-0.12
		All Trials		343	0.37	-0.04

*Note: The effect size (*es*) was calculated as* $Z/\sqrt{N}$*, where Z was calculated using the sum-of-ranks method (Solfvin et al., 1978).* r_s*(*ap*,* es*) shows Spearman's rank correlation between the trials' effect sizes and the global 3-hourly GMA index* ap.

Ganzfeld Trials

The ganzfeld trials were conducted at the University of Edinburgh and the University of Northampton. In each trial, one participant acted as a sender who attempted to psychically transmit information about a film clip to a second participant, the receiver. The receiver sat in a separate room and, following a relaxation period, was immersed in white noise (played through headphones) and red light, typically for half an hour, during which time he would verbalize any impressions received. Following this visualization period, the receiver was played the target clip and three decoy clips in a random sequence, and rated each clip according to its similarity to his impressions. Each trial was then assigned a rank score from 1 (the best match) to 4.

Some aspects of the procedure were peculiar to the location or study. At the University of Edinburgh, the receiver's room was constructed from a Faraday cage. Several large holes had, however, been cut into this cage, severely reducing its effectiveness as an electromagnetic shield. In any case, a Faraday cage will not shield against the low-frequency magnetic fluctuations that are the subject of this investigation (Schmitt, 2002). In the 7 Hz drumming condition of the Drumming study (see Table 1), the receiver was played drumming at a frequency of 7 Hz during the visualization period.

Precognitive Remote Viewing Trials

The remote viewing trials, details of which have not hitherto been published, were conducted at the Museum of Psychic Experience in York. In each trial, between 2 and 14 visitors to the museum acted as "remote viewers". The viewers were guided through a relaxation exercise by a member of the museum staff and then, in the visualization period, they were asked to visualize a photograph that they would later be shown, and to draw their impressions. A separate member of the museum staff acted as a judge, who collected the drawings and then randomly selected one of 50 sets of four photographs. The judge compared each viewer's drawing to the four photographs and assigned a rank score of 1 to the most similar, 2 to the next most similar, and so on. The judge then randomly selected a target photograph from the set of four and placed this in a room where, within 2 hours, it would be presented to the viewers. An overall rank score for the trial was determined by comparing the mean rank assigned to the target photograph with the mean rank assigned to each of the three decoys. The series of 104 trials (99 of which are included in this analysis – five were excluded due to missing data) was highly successful, yielding a Z score of 4.34, $p = 0.0000071$.

Data Preparation

The score for each ESP trial was converted into an effect size using the formula: -

$$es = \frac{r_{MCE} - r_{OBS}}{\sqrt{(N^2 - 1)/12}} + adj$$

where r_{MCE} is the mean rank expected by chance, r_{OBS} is the observed rank, and *adj* is an adjustment such that the effect size for each condition matches the overall mean effect size of all included trials. The effect sizes were adjusted in this way to eliminate the possibility of artifacts arising in the analysis, for example due to the coincidence of a high-scoring ESP condition with a period of low or high geomagnetic activity.

The approximate local sidereal time of the start of each trial's visualization period was calculated using the formula: -

$$h_{LST} \equiv h_{UT} + 0.0657d - {}^{L}\!/_{15} - 17.4 \pmod{24}$$

where h_{LST} is hours LST, h_{UT} is hours Universal Time, d is the day of the year and L is degrees west longitude.

GEOMAGNETIC FIELD MEASUREMENTS

I used geomagnetic field-strength measurements from the SAMNET array of magnetometers in Northern Europe, which began operation on October 1, 1987. Figure 1 shows the locations of the magnetometers used. I selected measurements from the nearest operating magnetometer at the time of each ESP trial; the mean distance between magnetometer and ESP trial location was 126 km (minimum 2 km, maximum 261 km). For the first 8 years of operation, the magnetometers sampled the Earth's field strength every 5 seconds; then in mid-November 1995 the sampling interval increased to 1 second.

Each magnetometer recorded the field strength in two horizontal directions, magnetic north and magnetic east, and in some cases vertically downwards. As the record of vertical measurements is patchy, this study uses only horizontal measurements, as is consistent with the method used to derive the global GMA indices. The amplitude resolution of the measurements is 0.1 nT.

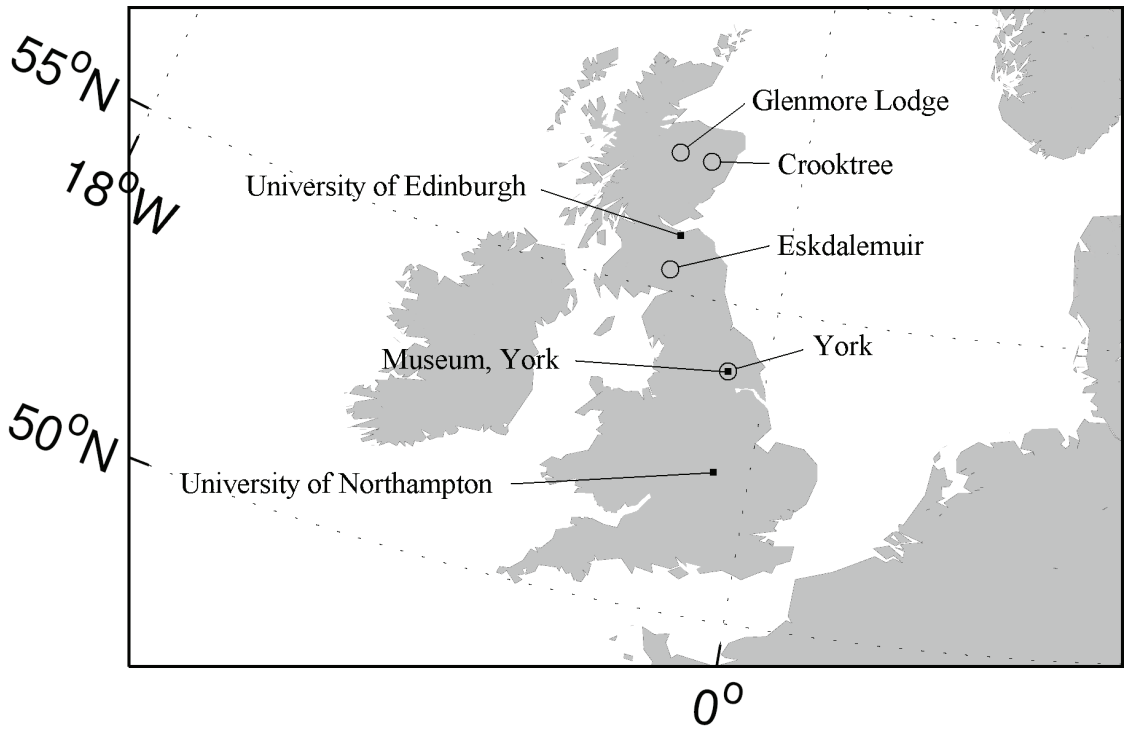

Fig. 1. Magnetometer locations (circles) and ESP trial locations (squares).

The Analysis Period

I chose a period of interest as a two-hour duration beginning half an hour before the visualization period of each ESP trial. This period covers the whole of the visualization and judging periods for almost all of the trials. The analysis period was then defined as starting 20 minutes before and ending 20 minutes after this period of interest. These extra 20-minute segments were added because the start and end of the extracted data would be tapered, as described later. The field measurements in each analysis period were manually inspected and the few periods containing bad data, for example due to interference from man-made sources, were discarded.

Data Transformation

The field-strength measurements in each analysis period were transformed into the frequency domain by applying a fast Fourier transform (FFT)[1]. To minimize the introduction of artifacts during this process, the data were de-trended and pre-processed with a Tukey (split cosine bell) window (Bloomfield, 1976) with 25% of the data tapered. Power was summed within each of five frequency bands, the boundary points of which were chosen to correspond closely to the standard geomagnetic pulsation categories, as shown in Table 2. Finally, for each band, the larger of the north and east power was selected (consistent with the method for deriving geomagnetic indices).

TABLE 2
Frequency Bands used in the Analysis

Band	Period (seconds)		Corresponding Standard Classification	
	From	To	Continuous (regular sinusoidal)	Irregular
1	2	5	Pc1 (0.2 – 5 s)	Pi1 (1 – 40 s)
2	5	10	Pc2 (5 – 10 s)	Pi1 (1 – 40 s)
3	10	40	Pc3 (10 – 45 s)	Pi1 (1 – 40 s)
4	40	150	Pc4 (45 – 150 s)	Pi2 (40 – 150 s)
5	150	600	Pc5 (150 – 600 s)	

Data Cleaning

In line with the general recommendation when analyzing time-series data (Chatfield, 2004), the record of geomagnetic field-strength measurements between the first and last ESP trial was examined for any trends or discontinuities that might be indicative of errors. This was achieved by extracting a 160-minute segment of measurements starting at 14:25 UT for each day within this period, transforming into the frequency domain (as described above), and then plotting the power in each of bands 1 to 5 over time. Several discontinuities were discovered, which upon investigation were found to coincide with upgrades to the magnetometers. The magnetometers had been calibrated, but their sensitivity to fine variations, as revealed in the frequency spectrum, varied between equipment. In these cases the data were corrected using measurements taken at York from Jan 1, 2000 as a baseline. Where a correction was not possible, for example where no suitable alternative magnetometer was available for comparison, the data were discarded.

Geographic Extent of Geomagnetic Features

Table 3 shows Spearman's rank order correlations of power in each band (north direction only), firstly between York and Glenmore Lodge (a distance of 394 km), and secondly between York and Eskdalemuir (distance 206 km). In both cases the correlations for bands 3, 4 and 5 are large, but the correlations for bands 1 and 2 are small, demonstrating that band 1 and 2 disturbances are highly localized. The band 1 and 2 data were therefore discarded for all but the 99 remote viewing trials conducted at the Museum of Psychic Experience in York, for which the magnetometer was also located in York.

TABLE 3
Spearman's Rank Order Correlations of Power in Bands 1-5, between: (1) York and Glenmore Lodge; and (2) York and Eskdalemuir

Band	Spearman's Rank Order Correlation	
	York and Glenmore Lodge Distance 394 km December 1, 1996 – November 30, 1997 *N* = 162	York and Eskdalemuir Distance 206 km October 1, 2002 - November 20, 2002 *N* = 49
1	0.29	0.37
2	0.25	0.04
3	0.79	0.97
4	0.96	0.99
5	0.98	0.99

ANALYSIS

Analysis by Power in Band

(i) Bands 1 and 2

Figures 2 and 3 show bar charts of ESP effect size (with one standard error bars) by decile of power in bands 1 and 2. So for example, in Figure 2, the leftmost bar shows the ESP effect size for the 10% of trials with the least disturbance in the band 1 frequency range, whereas the rightmost bar shows the effect size for the 10% of trials with the most pulsation activity in this band.

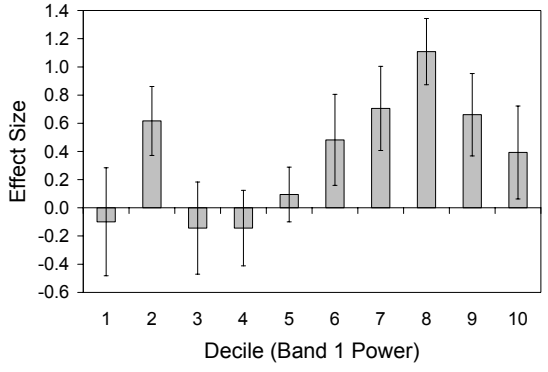

Fig. 2. ESP effect size by decile of band 1 power.

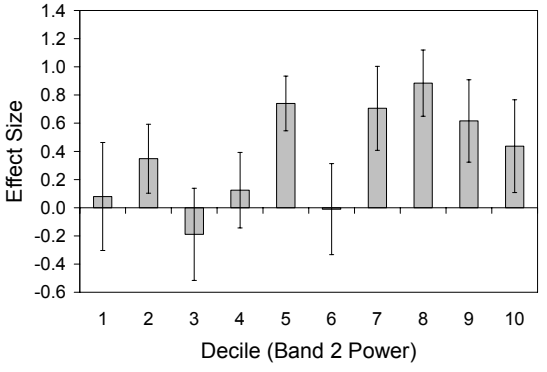

Fig. 3. ESP effect size by decile of band 2 power.

Figure 2 reveals a striking pattern: virtually all of the ESP effect is attributable to trials conducted during the top half of band 1 power. This pattern is also present to a lesser degree for band 2, but note that these patterns are not independent, because the power within each band is correlated with that of neighboring bands (see Table 4). Spearman's rank order correlation between ESP effect size and band 1

power is 0.28 ($p = 0.0059$, 2-tailed). However, as I will present an effect size bar chart for each of the five bands, in order to accurately gauge the true significance it is necessary to correct for these multiple analyses. To this end, I performed a Monte Carlo simulation, wherein for each of 10,000 runs, the ESP trial results were randomly redistributed and the correlation between ESP effect size and power in bands 1-5 recalculated. 250 runs resulted in a positive or negative rank order correlation for one or more of the bands that was more unlikely (assuming the null hypothesis) than the actual band 1 finding, thereby yielding a significance estimate of $p = 0.025$.

TABLE 4
Spearman's Rank Order Correlation Matrix for Power in Bands 1 to 5

Band	Band				
	1	2	3	4	5
1	1.00	0.89[1]	0.26[1]	0.18[1]	0.05[1]
2		1.00	0.25[1]	0.18[1]	0.15[1]
3			1.00	0.68[2]	0.50[2]
4				1.00	0.69[2]
5					1.00

[1] $N = 99$ [2] $N = 343$

Figure 4 shows that the average level of band 1 activity trends upwards over the period of the 99 trials that make up the band 1 bar chart, and that the ESP effect size also increases over this period. The former is probably due to progression of the 11-year solar cycle, and the latter could perhaps be due to the museum staff becoming increasingly skilled at running the experiment. The shape of the chart in Figure 2 could therefore be an artifact arising from the coincidence of these two upward trends. To discriminate between the two possibilities, I re-plotted Figure 2, this time using de-trended ESP data (see Figure 5). If the pattern in Figure 2 was due entirely to the trends in the data, the pattern should disappear in Figure 5, but this is not the case: the same pattern is present, albeit to a lesser degree (the rank-order correlation of ESP scores with band 1 activity is now non-significant at 0.13). The artifact hypothesis would require both that the coincidence of trends in ESP scores and band 1 activity was due to chance, and that also the residual pattern in the de-trended data was due to chance. The alternative possibility is that the residual pattern is not due to chance, and that the trend of increasing ESP scores is due to the rising band 1 activity through the period of the experiment. The issue is not clear-cut, but it seems reasonable to provisionally reject the artifact hypothesis.

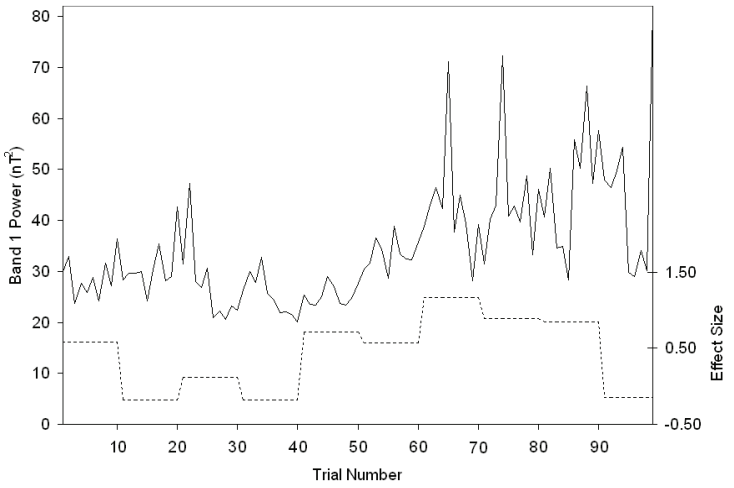

Fig. 4. Band 1 power (solid line, left axis) and ESP effect size in groups of ten trials (dashed line, right axis).

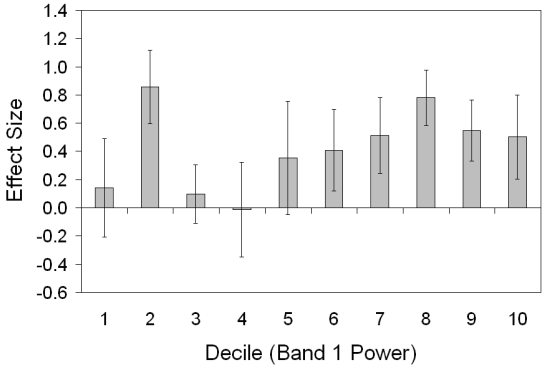

Fig. 5. ESP effect size by decile of band 1 power (ESP data de-trended).

It is worth noting that although band 1 measurements were only available for 99 trials, these trials were from the Museum of Psychic Experience's remote viewing experiment, which had an element of redundancy in that between 2 and 14 (average 9) viewers contributed to each trial and yet each trial's result was condensed into a single rank-score from 1 to 4. One would therefore expect results from this study to give a clearer representation of the relationship between environmental conditions and ESP effect.

(ii) Band 3

Figure 6 shows ESP effect size by decile of power in band 3. The chart shows that at the top decile of band 3 power, ESP effect size drops to zero. Note that due to the skewed distribution of band 3 power, the power for trials during this top decile is much greater than that for trials in lower deciles (Figure 7). Comparing ESP results of trials conducted during this top decile with those conducted during lower deciles confirms a significant difference (t = -2.52, p = 0.012, 2-tailed). Assessment of the true significance, however, is problematic. If we limit the set of analyses that we may have performed to simple tests of correlation and then correct for multiple analysis, the result would clearly not be significant. On the other hand the pattern is remarkably homogeneous – the effect size for trials conducted during the top decile of band 3 activity is lower than the average effect size for trials conducted during less disturbed periods in all six studies (Figure 8).

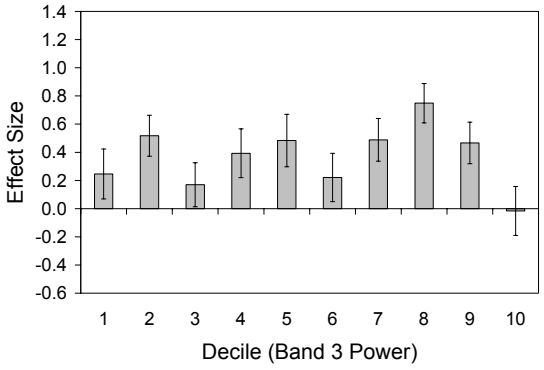

Fig. 6. ESP effect size by decile of band 3 power.

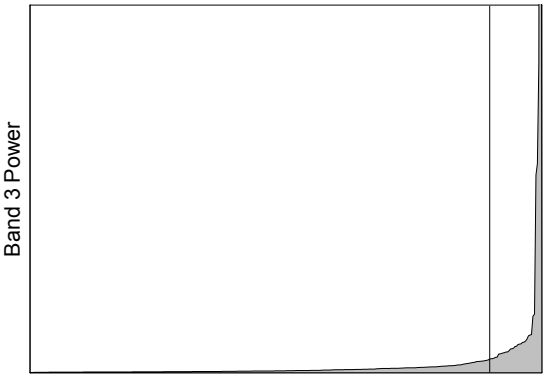

Fig. 7. Distribution curve for band 3 power. A vertical line delineates the top decile.

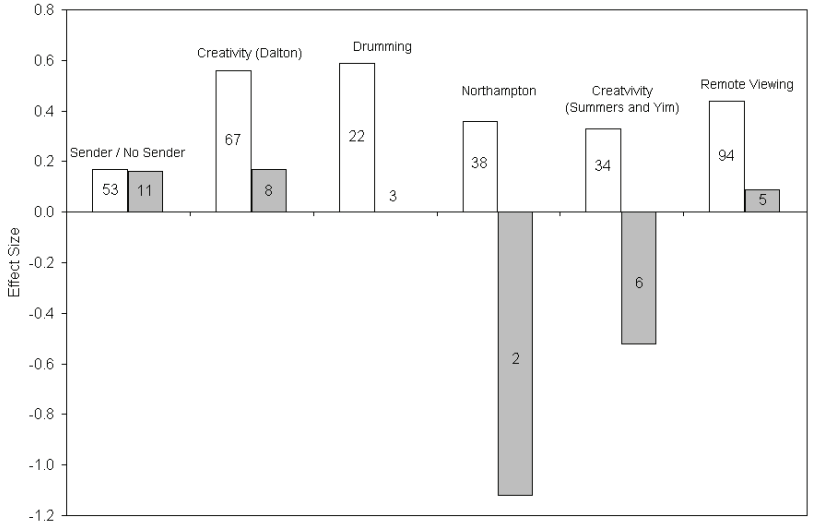

Fig. 8. ESP effect size for trials conducted during the top decile of band 3 activity (shaded bars) and during less disturbed periods (unshaded bars), for each study. The number of trials represented by each bar is shown.

(iii) Bands 4 and 5

Figures 9 and 10 show ESP effect size by decile of power in bands 4 and 5. These charts show that the relationship between ESP effect size and band 4 and 5 power forms an inverted-U shape pattern. Figures 11 and 12 show the same charts, but this time with trials conducted during the top decile of band 3 power excluded. These figures demonstrate that the drop-off of ESP effect size towards the top of band 4 and 5 power is attributable to the pattern of ESP results by band 3 power.

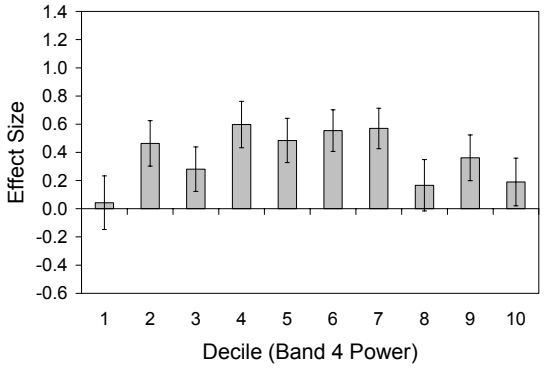

Fig. 9. ESP effect size by decile of band 4 power.

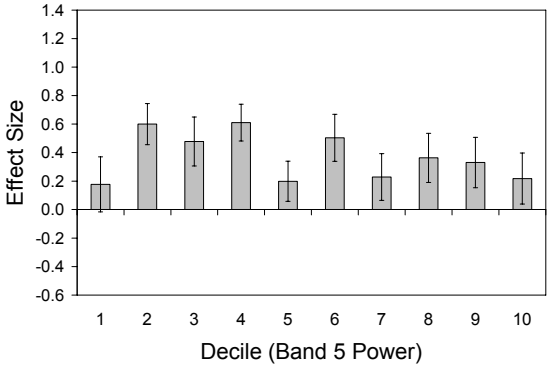

Fig. 10. ESP effect size by decile of band 5 power.

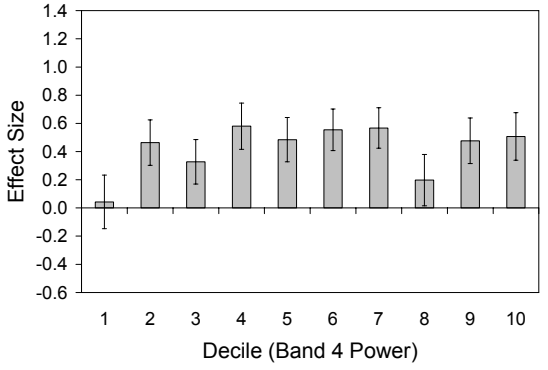

Fig. 11. ESP effect size by decile of band 4 power, excluding trials conducted during the top decile of band 3 power.

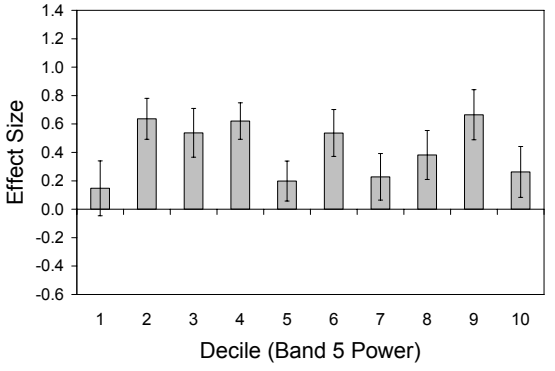

Fig. 12. ESP effect size by decile of band 5 power, excluding trials conducted during the top decile of band 3 power.

In a similar way, it can be shown that the low ESP effect size for trials conducted during the bottom decile of band 4 power (Figure 9) is probably attributable to the pattern of ESP results by band 1 power. Figure 13 shows ESP effect size by decile of power in band 4, for the 99 trials for which band 1 data is available. The effect size for the bottom decile of band 4 power is 0.15 – the equal lowest along with decile 7, so to some extent the pattern in Figure 9 is also present within this subset. Figures 14 and 15 show the same chart as Figure 13, but this time split between trials conducted during the bottom and top halves of band 1 power. If the reduction of ESP effect size in the lowest band 4 decile was an independent pattern, we would expect this pattern to be present in these figures. This is not the case, suggesting that the low ESP effect size for the left-most bar in Figure 9 is attributable to pattern of ESP results by band 1 power.

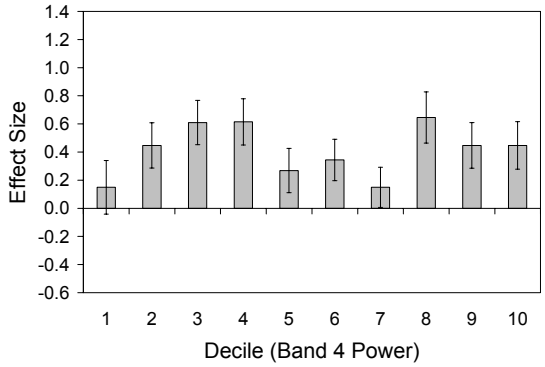

Fig. 13. ESP effect size by decile of band 4 power, for the 99 trials where band 1 data was available.

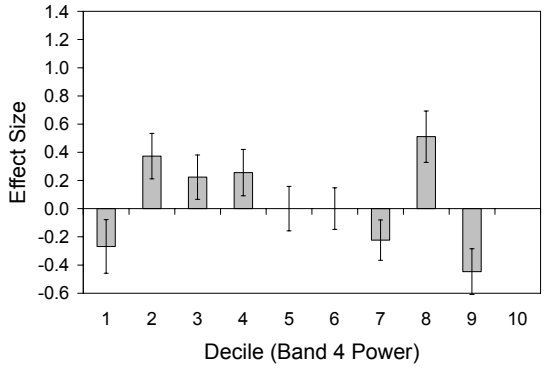

Fig. 14. ESP effect size by decile of band 4 power for trials conducted during the bottom half of band 1 power.

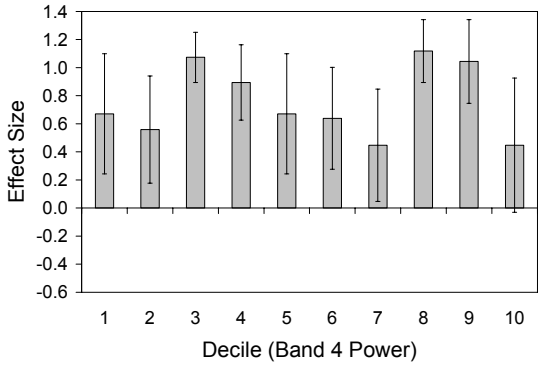

Fig. 15. ESP effect size by decile of band 4 power, for trials conducted during the top half of band 1 power.

(iv) Summary

In summary, ESP effect is present only for trials conducted during the top half of band 1 power, but absent for trials during the top decile of band 3 power. Figure 16 presents ESP effect size as a function of band 1 and 3 power, in order to illustrate the interaction of these two patterns. The diagram suggests that the reduction of ESP effect size during the most disturbed periods of band 3 activity takes precedence over the pattern of increased effect size with enhanced band 1 activity.

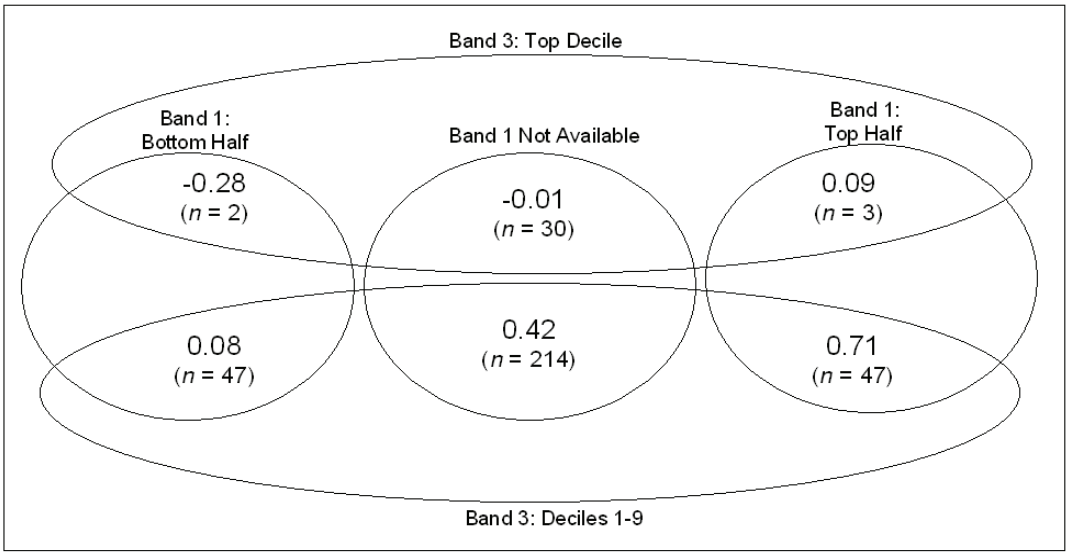

Fig. 16. Venn diagram illustrating ESP effect size as a function of power in bands 1 and 3.

Analysis by Pulsation Character: Continuous / Irregular

The standard classification system (Jacobs, 1970) categorizes geomagnetic pulsations as either continuous (regular, sinusoidal pattern) or irregular. In accordance with this system, I visually examined the field-strength measurements in each analysis period and recorded the proportion of the period that contained continuous pulsation activity. Spearman's rank order correlation between these proportions and the trials' effect sizes was 0.01 (n.s.). I also analyzed the data by comparing trials conducted during periods containing any pulsation activity (51 trials) with trials conducted during periods containing none (292 trials); a *t*-test of the trial effect sizes yielded $t = -0.31$ (n.s.). Therefore the character of the fluctuations does not appear to be related to ESP success.

LOCAL SIDEREAL TIME

The question remains as to whether the pattern of ESP effect size by LST revealed in Spottiswoode's dataset (Spottiswoode, 1997b) appears in the present data. Two studies (Sender – No Sender, Creativity – Dalton) are in fact represented in both datasets, so the subsequent analysis is confined to new trials ($N = 204$). After Spottiswoode (1997b), I calculated the ESP effect size for a 2-hour window advanced in 0.1-hour increments through the LST day. The results are plotted as a solid line against the left axis in Figure 17, and the dashed line plotted against the right axis shows the equivalent effect sizes for Spottiswoode's database of 2,879 trials. The difference in average effect size is due to the different inclusion criteria for trials in each dataset. Calculation of Pearson's correlation between the points of the two graphs confirms what is clearly apparent: the graphs are well correlated ($r = 0.59$). Calculation of a *p*-value is not possible in this situation (at least not by customary methods) due to auto-correlations in both datasets arising from the windowing method. Note that most of the trials were conducted before 8:00 LST (Figure 18). There are many fewer trials at the times of the interesting features in Figure 17, i.e., the maximum of effect size around 14:00 and the minimum around 20:00; indeed the peak at 14:00 comprises just one data point. An alternative approach that gives equal weight to each trial is to calculate the correlation between each trial's effect size and the effect size on Spottiswoode's graph at that trial's LST. Using this method the correlation is significant: $r = 0.17$, $p = 0.007$, one-tailed. These results support Spottiswoode's finding, and also provide the opportunity to examine whether the

observed relationships between pulsation activity and ESP results can account for the pattern of ESP results by LST.

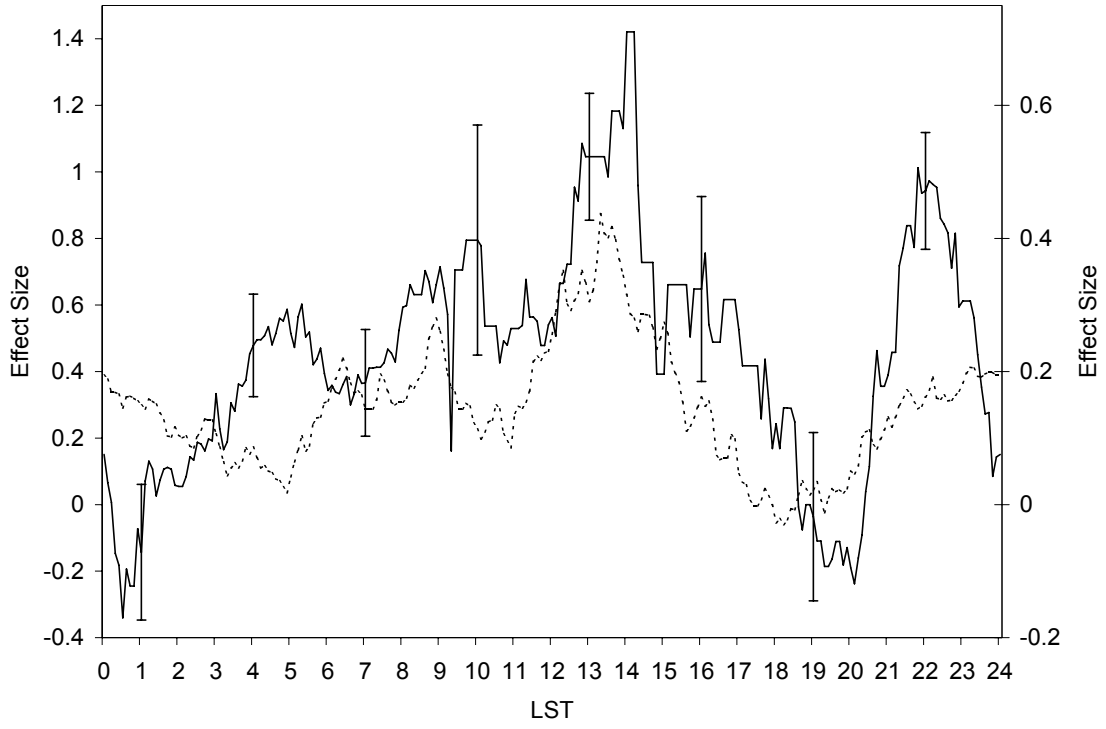

Fig. 17. ESP effect size as a function of LST, for 204 trials in the present study (solid line, left axis) and trials in Spottiswoode's dataset (dashed line, right axis), with one standard error bars.

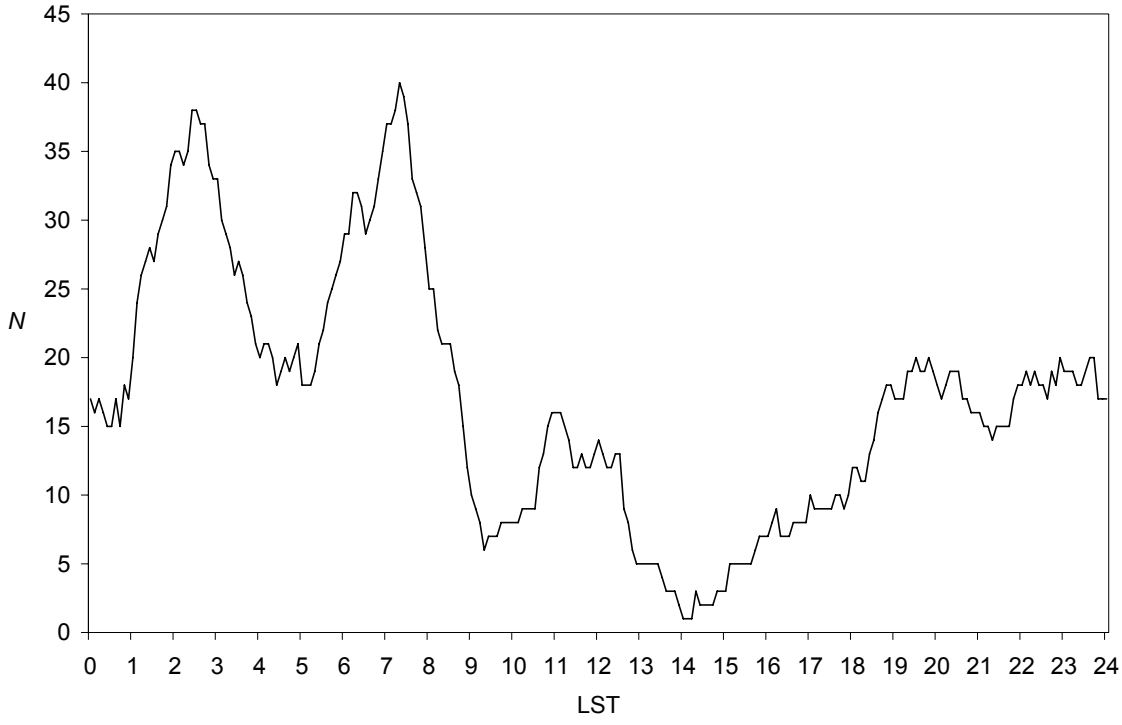

Fig. 18. Distribution of trials by LST. *N* is the number of trials in each 2-hour LST window.

So the following analysis assesses whether pulsation activity can explain the distribution of ESP effect across LST. Contrary to what one would expect, the LST graph for those trials that are part of Spottiswoode's database is not correlated with Spottiswoode's graph ($r = -0.19$), therefore this analysis also uses only new trials ($N = 204$). For this analysis, I constructed a model to show what the result of each trial would have been if band 1 and 3 activity had been the only influencing factors. In this model, the effect size for each trial was replaced with the effect size from the appropriate region in the Venn diagram illustrated in Figure 19, then the trial effect sizes predicted by the model and the effect sizes on Spottiswoode's graph at each trial's LST were compared. The correlation was significant ($r = 0.18$, $p = 0.0049$), and the graph of the model's results by LST is a similar shape to Spottiswoode's graph (Figure 20), thus confirming that the similarity of the graph of ESP results by LST with Spottiswoode's graph is, at least in part, attributable to the pattern of ESP results by pulsation activity.

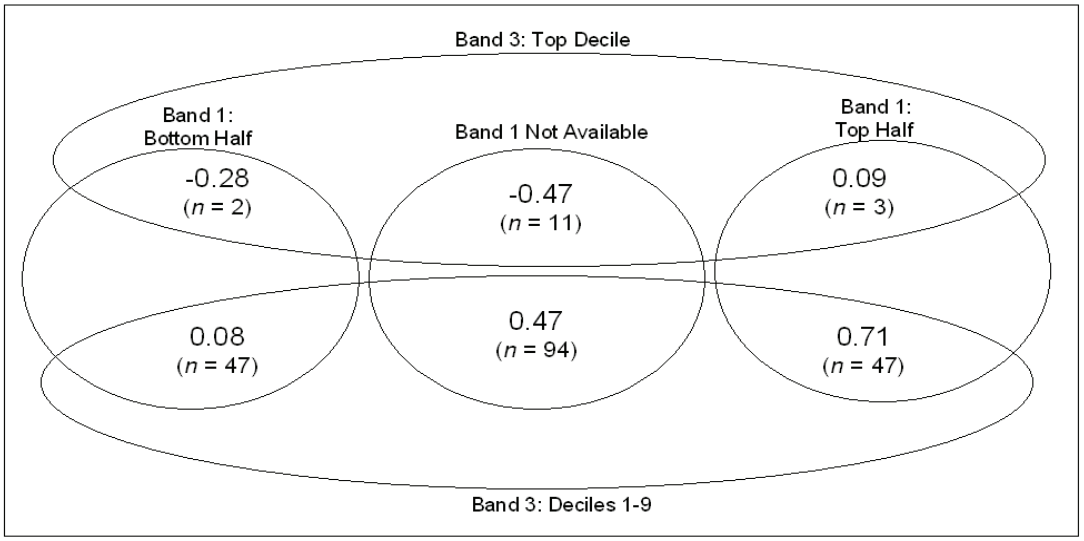

Fig. 19. Venn diagram illustrating ESP effect size as a function of power in bands 1 and 3, for 204 trials not included in Spottiswoode's dataset.

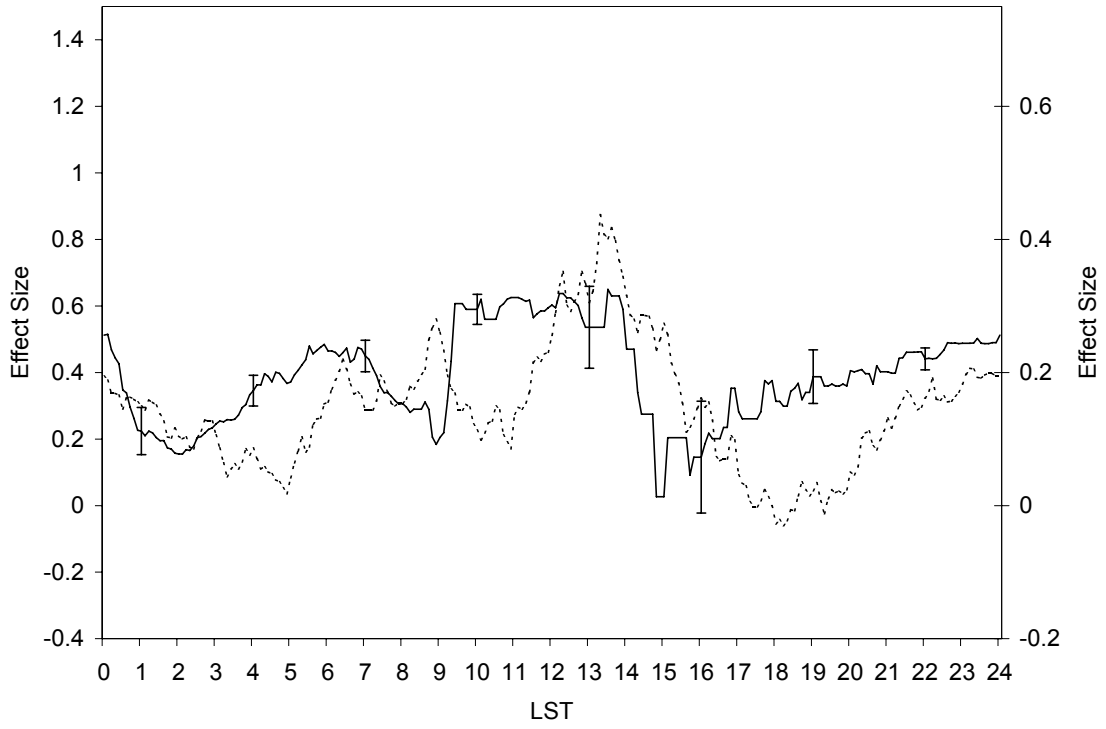

Fig. 20. Effect size by LST, for model of ESP based on band 1 & 3 activity (solid line, left axis) and trials in Spottiswoode's dataset (dashed line, right axis), with one standard error bars.

The relative contribution of each band in this explanation was assessed by creating two further, similar, models, the first of which represents only the observed band 1 pattern and the second, only the observed band 3 pattern. To allow a valid comparison these models were constructed from the 99 trials

for which data were available for both bands 1 and 3 (the LST graph for this subset of trials was also correlated with Spottiswoode's: $r = 0.57$; and by the trial-by-trial method, $r = 0.20$, $p = 0.023$). The results for the models representing the band 1 pattern only, and the band 3 pattern only, were respectively $r = 0.28$, $p = 0.0028$ and $r = 0.02$, n.s., suggesting that the correlation of the original model's results with the effect sizes on Spottiswoode's graph is due entirely to the pattern of ESP results by band 1 activity.

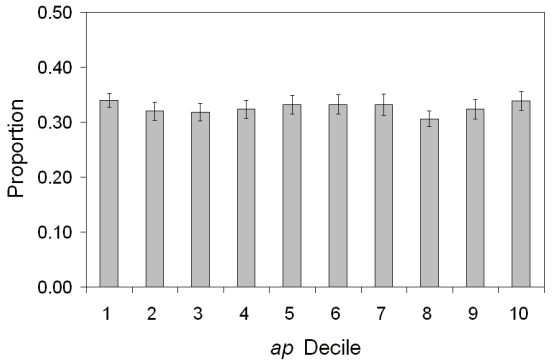

Fig. 21. Proportion of periods with enhanced (top-half) band 1 activity, by *ap* decile, for 160-minute periods commencing 9:10 UT, 12:10 UT and 15:10 UT each day between Nov 4,1996 and Mar 19, 2005, with one standard error bars.

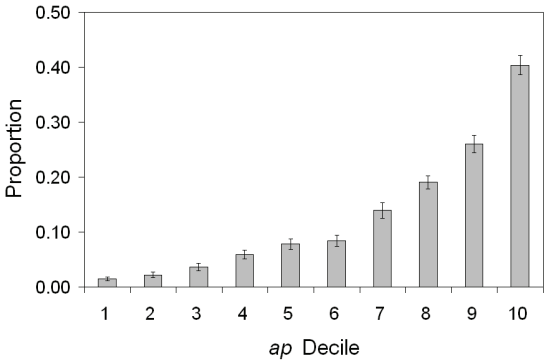

Fig. 22. Proportion of periods with enhanced (top-decile) band 3 activity, by *ap* decile, for 160-minute periods commencing 9:10 UT, 12:10 UT and 15:10 UT each day between Nov 4,1996 and Mar 19, 2005, with one standard error bars.

PIECING TOGETHER THE JIGSAW

If the patterns revealed by the foregoing analyses represent real underlying relationships, then we may be in possession of two more pieces of the jigsaw puzzle: ESP is present only during periods of enhanced band 1 pulsation activity; and ESP is absent during periods with strong band 3 pulsations. The predominant pattern is the positive correlation of band 1 activity with ESP effect – but this would appear to contradict the literature, which suggests, generally, an inverse relationship between ESP and GMA. The problem is resolved by examination of the relationship between band 1 and 3 activity and the global GMA index *ap* (Figures 21 and 22): there is a clear correlation between band 3 activity and *ap*, but the same is not true for band 1. So let us consider the findings of previous studies and assess the fit with the band 1 and 3 patterns: -

1) The correlation of ap with ESP effect size is, overall, slightly negative. When individual studies find a stronger correlation, it is most often negative, but occasionally positive.

The predominant pattern of ESP success during periods of enhanced band 1 activity would not result in a correlation between *ap* and ESP effect size; but one would expect, overall, a small negative correlation due to the reduction in ESP effect at the top end of band 3 activity. A larger negative correlation would be expected for studies conducted during periods of enhanced GMA (e.g., at equinoxes, or at peak periods of GMA during the 11-year solar cycle), as large band 3 pulsations would be more prevalent at these times. Occasionally band 1 activity is correlated with *ap*, which may explain the occasional positive correlations between *ap* and ESP effect size. For example, at York, during 160-minute periods commencing 9:10 UT, 12:10 UT and 15:10 UT each day throughout the geomagnetically disturbed year 2003, band 1 pulsation activity was significantly correlated with *ap* ($r_s = 0.14$, $p = 0.000006$, 2-tailed).

2) There is a peak of ESP effect at 13:20 LST and a minimum of effect at 18:20 LST.

We have seen that the pattern of ESP results by LST for the present study is similar to the pattern of results in Spottiswoode's graph, and that for the present study this pattern is, at least in part, attributable to band 1 pulsation activity.

3) ESP effect size and ap are strongly and negatively correlated at 12:55 LST, close to the point of maximum ESP effect size.

At times of day / times of year when band 1 pulsations are prevalent (and thus ESP effect size is high), one would expect a larger difference between effect sizes for periods with and without large band 3 pulsations, and for this to be reflected in a larger negative correlation between *ap* and effect size. The Venn diagram (Figure 16) illustrates: during periods of high band 1 activity, the effect size when band 3 is low is 0.71, whereas when band 3 is high the effect size is 0.09.

The findings of the present study, therefore, fit excellently with the patterns previously reported.

DISCUSSION

The analyses presented here utilize, for the first time, local 1-second geomagnetic field measurements to test for a link between pulsation activity and the results of ESP experiments. In the studies examined, two patterns were observed: ESP was found to be present only during periods of enhanced band 1 activity, and not present at all during the most disturbed periods of band 3 activity. The band 1 analysis was, however, handicapped by the small number of trials for which pulsation activity data was available, and interpretation was made more difficult by trends present in both ESP and geomagnetic data; therefore these observations should be treated with caution. Nevertheless, in the trials examined the pattern of ESP effect by LST was similar to that found by Spottiswoode, and this pattern was found to be attributable to the pattern of ESP results by band 1 activity. The observed patterns were also demonstrated to have excellent explanatory power in terms of accounting for findings previously reported in the literature.

How can these findings be confirmed? Firstly, let's consider the band 3 pattern. As band 3 disturbances cover a relatively wide geographical area, it may be possible to identify further trials that can be checked. The present analysis most probably covers all of the good quality trials (i.e., those from a study-condition with an effect size > 0.15) from the U.K., but there may be suitable trials from other countries that are within the vicinity of a sufficiently sensitive magnetometer. Alternatively, one could examine study-conditions that were omitted from this analysis because their effect size fell below the inclusion threshold. In this case, a positive result would support the hypothesis, but a negative result would be ambiguous – it could indicate either that the hypothesized pattern is not present, or that there is no ESP effect within the dataset. The remaining possibility is to wait until new trials are available from U.K. universities.

This study was fortunate to have data available from the long and highly successful series of remote viewing trials conducted at the Museum of Psychic Experience in York, for which the nearest magnetometer was also located in York. This enabled the relationship between the higher-frequency disturbances (bands 1 and 2) and ESP to be studied. Unfortunately, both the Museum of Psychic Experience and the SAMNET observatory at York have now closed, so there is no opportunity to verify these findings using the same data sources. The way forward, therefore, would be to have measuring equipment of sufficient sensitivity and sampling interval installed at a university that is studying ESP.

It should be noted that in the present study, the top end of the geomagnetic frequency range could not be studied at all due to limitations in both the temporal and amplitude resolution of the measuring equipment. Almost certainly, geomagnetic pulsations near the upper bound of measured frequencies (0.5 Hz) will be correlated with activity immediately above this range; so there is the possibility that the band 1 pattern is in fact due to this higher frequency activity.

One must also consider the possibility that geomagnetic activity is an indirect variable, which is correlated with another environmental factor that is actually responsible for the effect. For example ELF spherics (the standing waves surrounding the Earth, continuously powered by lightning strikes) in

the 5-50 Hz frequency range, are known to be disrupted by GMA. However, the size of the observed correlations and the specificity of frequencies argue against an indirect effect.

Theoretical Implications

Figure 23 is presented in order to move from the somewhat abstract terms "band 1" and "band 3" to a more concrete, visual representation of these disturbances. The figure shows how a typical band 1 and band 3 disturbance would look on the scope of a magnetometer. The *y*-axis shows the deviation of geomagnetic field-strength from an arbitrary baseline, in nT. 1 nT is about 1/60,000th of the total strength of the Earth's field, so these fluctuations are really quite small. The *x*-axis shows time, and one can see that the pulsations are very slow: the period between peaks of a band 3 pulsation ranges between 10 and 40 seconds.

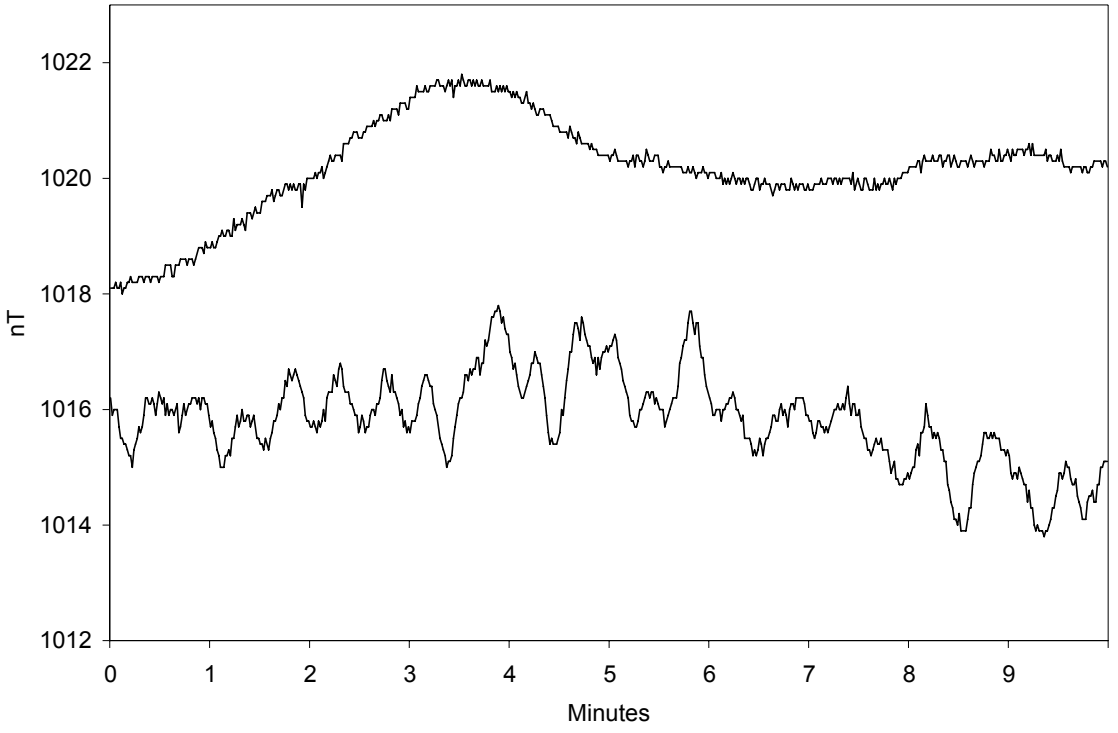

Fig. 23. Typical band 1 (top) and band 3 (bottom) pulsation activity associated with ESP success and failure respectively. The *y*-axis shows the deviation of geomagnetic field-strength from an arbitrary baseline.

Looking back at Figure 2 we can see that the ESP effect is as good as absent in the least disturbed half of band 1 activity. This suggests that this frequency of pulsation may be a necessary condition for ESP. Assuming that geomagnetic pulsations are acting directly on the ESP system, the question arises: by what mechanism?

One possibility is that the pulsations act directly on the brain, perhaps by stimulating areas associated with the perception of extrasensory information, so that perception is "switched-on" when band 1 pulsations are present, but "overloaded" during periods of intense band 3 pulsations. An objection is often raised that fluctuations in the geomagnetic field are too small for the brain to detect, and that these would be swamped by much stronger man-made signals. The brain does, however, contain magnetically sensitive material (Kirschvink et al., 1992), and it is conceivable that the brain has evolved sensitivity to the particular frequencies of natural disturbances. There is also some laboratory evidence, albeit scant (e.g., Subrahmanyam et al., 1985), that geomagnetic pulsations can affect brain function.

Recall that the trials from which Figure 2 is constructed are precognitive trials, that is, they represent information passing from a future event backwards in time to the present. Of course, real-time ESP can usually also be accounted for by the flow of information backwards in time, that is, from the future event where the participant views the target, back to the time of the trial. The laws of physics do permit the passage of information backwards in time, via the mechanism of closed timelike curves in spacetime (Earman & Wüthrich, 2006), and indeed in the Gödel spacetime model (Radu et al., 2002), a closed timelike curve passes through every point within the universe. So perhaps the band 1 and 3 magnetic fluctuations act to modify the shape of these structures, thus modulating the flow of information. Alternatively, perhaps the fluctuations modulate the interface between the information flows and consciousness, akin to a "focussing" effect.

Practical Implications

In the presence of band 1 and the absence of band 3 pulsations, the remote viewing study achieved an effect size of 0.75 (unadjusted), close to the effect size of 0.71 that Spottiswoode (1997b) reports for optimum LST and GMA conditions. This suggests the possibility that, subject to confirmation of the patterns, the reliability of these types of experiments could be significantly increased either by conducting trials during optimum conditions, or, if this is not practicable, pre-arranging to disqualify trials that are subsequently found to have been conducted during sub-optimal conditions. Looked at another way, we could say that if it is true that band 1 pulsations are a necessary condition for ESP, then, according to Figure 21, only approximately 1 in 3 ESP trials conducted between November 1996 and March 2005 would have had any chance of success – and this is without accounting for the band 3 pattern.

The final practical consequence of this work is that it may allow for the construction of a device that synthesizes the optimum conditions for ESP. The only "leap" required would be to suppose that a locally created fluctuating magnetic field would have the same effect as the large-scale magnetic disturbances of the natural environment.

To generate a uniform, fluctuating, magnetic field that envelopes a participant would require the construction of a "Helmholtz chamber". Such chambers comprise two or three large wire coils that surround the participant. These chambers are often used to study the effects of magnetic fields upon humans, and indeed Spottiswoode (Spottiswoode, 1993) has already attempted to use such a device to influence ESP performance, but of course at the time he did not have detailed information about the specific frequencies that might be effective. Researchers should note that the orientation of the participant in the field may be important (Subrahmanyam et al., 1985).

Perhaps an irregularly shaped fluctuating field would suffice, in which case, a set of smaller coils situated around the participant's head may be adequate. Such a device would be similar to the helmet used at Persinger's laboratory to induce in participants the sensed presence of a sentient being (St.-Pierre & Persinger, 2006).

Conclusion

The analysis of geomagnetic pulsation activity in relation to ESP success was initially conceived as a first step in a process of elimination in the search for an explanation for the reported associations between GMA and LST with ESP. Rather than eliminating the possibility, this factor emerges as a leading candidate for a solution to the problem.

ACKNOWLEDGEMENTS

The author extends thanks to the University of Edinburgh, the University of Northampton and the Museum of Psychic Experience for kindly supplying data from ESP experiments and to SAMNET for

supplying magnetometer data. SAMNET is a PPARC National Facility operated by Lancaster University. Thanks also to Mr. James Spottiswoode, Mr. Alex Sabell, Dr. Ciarán O'Keeffe and Dr. Alex Hallums for their valuable comments on the drafts.

NOTES

[1] The FFT transformation was performed with a version (v1.9.5.1) of Sigview32 specially customized for this study to support the Tukey window pre-process. The transformation process was controlled using Macro Scheduler v7.4.009. All data transformation and data cleaning steps were performed blind of the ESP trial results. All transformation, data cleaning and analysis steps were performed twice, in order to verify that no errors were introduced during the process.

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EXPERIMENTER EFFECTS IN THE GANZFELD[1]

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ABSTRACT

The replicability of ganzfeld-ESP findings continues to be debated by parapsychologists and their critics. Similarly, the 'experimenter effect' (where some experimenters are consistently more successful than others in obtaining evidence for psi) continues to be a major challenge facing experimental parapsychology. This study addressed both of these concerns. Sixteen experimenters conducted a total of 114 trials using a digital autoganzfeld system. Experimenter expectancy regarding the likely success of the experiment was manipulated so that half the experimenters were given a positive expectancy of success and half are given a negative expectancy of success. Experimenters' attitudes towards psi were also measured and classified as either 'high' or 'low'. The effects of these independent variables upon participants' confidence of success and actual performance on a ganzfeld-ESP task were assessed. No previous research has used this approach with the ganzfeld paradigm, nor has any previous research discriminated between the experimenter's a priori attitudes towards psi and his or her more specific expectations about the outcome of the experiment. The overall hit-rate was 34.2% (39/114 trials) and was statistically significant (p=0.02). No significant main effects of experimenter expectancy or experimenter attitudes towards psi upon psi scores were found. Nor was there a significant interaction. Experimenter expectancy was found to have an effect upon the confidence of success on the ESP task for participants acting as 'senders' but not for those acting 'receivers'. Possible interpretations of these findings are discussed.

INTRODUCTION

The utility of the ganzfeld paradigm in providing replicable empirical support for the existence of an anomalous process of information transfer ('psi') continues to be debated in both the parapsychological literature as well as more 'mainstream' psychological literature. In such studies, one individual (the 'receiver') is typically isolated from another individual (the 'sender') by being placed in two separate rooms. A randomly selected target (such as a short video-clip) is then presented to the sender whose task it is to try and psychically 'send' the contents of the target to the receiver. In an attempt to induce a psi-conducive altered state of consciousness in the receiver, he or she is placed in a mild form of sensory deprivation (the 'ganzfeld') in which the eyes are covered with halved ping-pong balls and bathed in red light, and white noise is played through headphones. Whilst in this state, the receiver is asked to relate to an experimenter the imagery that comes to mind. At the end of this sending-receiving period, the receiver is presented with a target judging set (containing four stimuli, of which one is the actual target stimulus), and must select the one that most closely matches their imagery. Over many trials, a 'hit-rate' of 25% would be expected by chance (i.e., if psi were not operating, the receiver could be expected to guess the correct target about 25% of the time). Although a number of studies have reported hit-rates ranging between 33% and 75% (suggesting that psi is operating by helping receivers to accurately select the correct target more often than chance would predict), there is still much debate over the extent to which ganzfeld findings are replicable (e.g., Bem & Honorton, 1994; Bem, Palmer & Broughton, 2001; Milton, 1999; Milton & Wiseman, 1999; Milton & Wiseman, 2001; Schmeidler & Edge, 1999; Storm, 2000; Storm & Ertel, 2001). Researchers on both sides of this debate point to the need for further

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attempts to replicate and extend ganzfeld-ESP findings across a wider range of laboratories and researchers.

The replicability of ganzfeld-ESP findings continues to be the subject of debate amongst parapsychologists and critics of parapsychology. This debate reflects the wider issue of replication of parapsychological findings in general. Reviews of the literature examining the role of the experimenter in parapsychological research reveal that an experimenter's attitudes towards psi and his or her expectations about the outcome of their studies appear to be important factors in obtaining evidence for psi (Smith, 2003). However, there is a lack of research aimed towards identifying which of these variables is likely to be most influential in predicting experimental success.

Although there has been much debate over the replicability of ganzfeld-ESP findings, there has been hardly any research directly examining the role of experimenter effects in ganzfeld research (an exception being Sherwood, Roe, Holt & Wilson, 2005). This is unfortunate as experimenter variables may play a central role in explaining the replicability of ganzfeld-ESP findings. This is likely to be especially true if experimenter effects are explained, at least in part, in terms of how the experimenter interacts with his or her participants[2] because participants in ganzfeld experiments are tested individually (as opposed to being group tested) and there is sustained experimenter-participant interaction (each testing session typically lasts more than an hour).

The present study aims to experimentally assess the relative effects of experimenters' attitudes towards psi and expectations of success upon ESP performance by conducting a ganzfeld study with multiple experimenters. Sixteen students were recruited as experimenters and were classified as either 'high' or 'low' in terms of their attitudes towards psi. Experimenter expectancy regarding the likely success of the experiment was manipulated so that half the experimenters were given a positive expectancy of success and half were given a negative expectancy of success. The effects of these independent variables upon participants' (both senders and receivers) confidence of success and actual performance on a ganzfeld-ESP task were assessed. This general approach has been used to good effect to examine experimenter expectancy in psychological research (e.g., Rosenthal, 1976) and has been used successfully in some previous research on experimenter effects in parapsychology (e.g., Parker, 1975; Taddonio, 1976; Watt, 2002). However, no previous research has used this approach with the ganzfeld paradigm, nor has any previous research discriminated between a priori attitudes towards psi and more specific expectations about the outcome of the experiment.

The study employed *DigiGanz*, a digital autoganzfeld system developed at Liverpool Hope University (Fox, Smith & Williams, 2002). As this system is designed to be relatively easy to use, it was possible to train undergraduate and postgraduate students to use the system fairly quickly. This means that more time and effort could be devoted to training experimenters in other skills deemed to be important in ganzfeld research. These include those social skills associated with creating a warm and friendly atmosphere, such as putting participants at ease, explaining what the experiment involves, and responding to participants' questions.

The primary hypotheses were that there would be main effects of experimenters' attitudes towards psi and experimenters' expectancies of success in the experiment upon ganzfeld-ESP scoring and participants' confidence of success. It was predicted that participants tested by experimenters with more positive attitudes towards psi would perform better on the ESP task and would have greater confidence of success. Similarly, it was predicted that participants tested by experimenters in the positive expectancy condition would score better and be more confident of success than participants in the negative expectancy condition.

In addition to the primary hypotheses, secondary analyses examined the relationship between psi scores and participants' attitudes towards psi, previous psi experience, and whether or not they practised a mental discipline. The impact of the sender-receiver relationship upon psi scores was also examined.

[2] Another explanation of experimenter effects proposes that the experimenter's own psi influences the outcome of a study.

METHODS

Design

A 2 x 2 between groups ANOVA design was employed in which one independent variable was experimenter attitudes towards psi ('high' scores versus 'low' scores) and the other was experimenter expectancy ('positive' versus 'negative' expectancy). The dependent variables will be (a) ganzfeld-ESP performance where performance is measured by way of transforming target ratings for each trial into Z-scores and (b) participants' confidence of success in the ESP task. Additional data such as participants' attitudes towards psi, practice of a mental discipline, and the sender-receiver relationship were also recorded for exploratory analysis.

Experimenters

Sixteen individuals (13 female, 3 male) were recruited to act as experimenters. Seven of these were undergraduate psychology students at Liverpool Hope University, seven were postgraduate students on the MSc Applied Psychology programme at Liverpool Hope, one was a postgraduate student on the MA Business Studies at Liverpool Hope, and one was an undergraduate psychology student at Liverpool John Moores University. Each experimenter was trained to use the *DigiGanz* system and required to conduct 8 ganzfeld trials as part of the study. Experimenters were generally responsible for scheduling their own trials. On completion of all 8 trials they were would receive a payment of £200. (Three experimenters did not complete all 8 of their trials and did not therefore receive any payment.)

Participants

A total of 228 participants took part in 114 trials (each trial involved two participants; one to act as a 'receiver' and one as a 'sender'). In general, sender-receiver pairs were friends or relatives as volunteers were requested to bring someone to act as their co-participant. However, in some trials participants were paired up with a co-participant by the experimenter. Participants were recruited from friends and acquaintances of experimenters, the student population at Liverpool Hope, via web-based advertisements, and via articles in local newspapers, the *Liverpool Echo* and the *Daily Post*. Interested parties were asked to contact the research team either in person, by phone, or by email. The majority of participants were from Liverpool and the surrounding area, although there were a number of participants who travelled from other parts of the UK to take part in the study. Particpants did not receive any reimbursement for taking part in the study.

Apparatus/Materials

Digital autoganzfeld system. This system comprised a software application, *DigiGanz*, installed on to the hard drives of two Apple iMac computers linked via an Ethernet connection. These two computers were housed in two rooms in separate buildings. The Receiver's Room (figure 1) was on the ground floor of one building, whilst the Sender's Room (figure 2) was on the first floor of another building approximately 30 metres away. *DigiGanz* allowed the two computers to communicate with each other; one acting as the sender's machine, the other as the receiver's machine. The software co-ordinated the ganzfeld testing procedure by, for example: prompting the experimenter to enter session details; leading both sender and receiver through a relaxation exercise; using a random function to select the target (from a pool of digital movies stored on the computers' hard drives); displaying the target to the sender; guiding the experimenter and receiver through the judging procedure; and storing the data securely. The software also plays white noise to the receiver and records the receiver's mentation. A more detailed description of the *DigiGanz* software can be found in Fox, Smith & Williams (2002).

Fig. 1 Receiver's room

Fig. 2 Sender's room

Target pool. The target pool comprised 96 short digital movie clips (each lasting 60 seconds) taken from feature films and television documentaries. They were stored on the computers' hard drives as QuickTime™ movies. This target pool has been used in previous successful ganzfeld studies (e.g., Dalton, 1997) and was kindly made available by Kathy Dalton.

Participant/Experimenter information forms. A participant/experimenter information form was used to collect background information from participants and experimenters. This form included the Keirsey Temperament Sorter (a 70-item self-report personality measure), along with questions about personal psi experiences, whether they practise any form of mental discipline and their attitudes towards psi phenomena.

Experimenter and participant attitudes towards psi were measured using four items. These items asked respondents to indicate their agreement on a 7-point scale (where 1 = "strongly disagree" and 7 = "strongly agree") to the statements: "Extra-sensory perception (ESP) is possible", "I have some ESP

ability", "It is possible to demonstrate ESP ability in an experimental study", and "I am confident I will do well in the ESP task". The maximum score possible was therefore 28 (indicating strong agreement with all four statements) whilst the minimum score possible was 4 (indicating strong disagreement with all four statements). A median split meant that the eight experimenters with highest scores were classified as having 'high' attitudes towards psi, and the eight lowest scores were classified as having 'low' attitudes towards psi. Experimenters completed this form before receiving training and prior to the expectancy manipulation (see below). Participants were asked to complete this form in their own time and bring it along to their ganzfeld testing session.

A second short questionnaire was completed by all participants during their ganzfeld testing session. This asked about their relationship with their co-participant (i.e., how long they had known each other and how emotionally close they were) and asked participants to indicate their level of confidence of success in the ESP task.

Video recording apparatus. A sub-sample of testing sessions were video recorded using a digital video camera mounted on the back of the door of the Receiver's room. This was to allow for exploratory analyses of experimenter-participant interaction across experimenters. These analyses will be reported in a separate paper.

Procedure

Experimenter training and expectancy manipulation. Experimenters were trained in pairs by the first author. Training consisted of a minimum of four training sessions for each trainee experimenter pair. The first two sessions each consisted of running a ganzfeld trial with the two trainee experimenters acting as participants, once as a receiver and once as a sender. These trials allowed each experimenter to experience what it was like to take the sender and receiver roles in a ganzfeld trial, and so be in a better position to explain these roles to their participants. The outcomes of these training trials did not form part of the database for formal analysis. In the third and fourth training sessions, each trainee experimenter got the chance to act as experimenter for a trial in which the trainer acted as receiver and the fellow trainee acted as sender (third session) followed by the trainer acting as sender and the fellow trainee acting as receiver (fourth session). As part of the third and fourth training sessions, trainees were instructed on how to use the *DigiGanz* software and were also given written guides for reference. Experimenters were also given guidance in those social skills deemed to be important in ganzfeld research (such as creating a warm and friendly atmosphere, putting participants at ease, explaining what the experiment involves, and responding to participants' questions). In addition to the four basic training sessions, trainee experimenters were encouraged to run one or two practice trials before conducting their 8 trials as part of the formal study.

All experimenters were given a briefing regarding the background to the study and the success of previous ganzfeld research as part of their first training session. The expectancy manipulation was included in this briefing and was video recorded. Experimenters were randomly allocated to either a 'positive' expectancy or 'negative' expectancy condition in such a way that half the experimenters with 'high' scores on the attitudes towards psi questionnaire and half the experimenters with 'low' scores on this questionnaire were allocated to each condition. For experimenters in the 'positive' expectancy, the success of previous research was emphasised. Thus, they were told that previous research using the ganzfeld procedure had generally been very successful in obtaining evidence in favour of ESP with many studies obtaining hit-rates from 30% to 50% (where 25% would be expected by chance). More specifically, they were told that previous research using the *DigiGanz* system developed at Liverpool Hope had similarly been very successful in replicating these findings and that we expected this trend to continue in the present study. In contrast, experimenters in the 'negative' expectancy condition were told that, although some previous research using the ganzfeld procedure had obtained hit-rates above chance, these findings had been difficult to replicate. More specifically, they were told that previous research at Liverpool Hope, using the *DigiGanz* system, had yielded chance results, and we expected this trend to continue in the present study. In short, in the positive expectancy condition, experimenters

were led to expect to obtain more hits than expected by chance whilst experimenters in the negative expectancy condition were led to expect no more hits than chance would predict. The manipulation was re-iterated after they completed their final training session. Prior to experimenters beginning their first trial, each completed an additional questionnaire asking about their thoughts and expectations about the study to assess whether the expectancy manipulation had influenced such expectations.

Ganzfeld testing sessions. The ganzfeld testing procedure was broadly similar to that employed in previously successful studies using this procedure (e.g., Dalton, 1997; Honorton et al., 1990).[3] Each trial involved two participants; one to act as 'sender' and one as 'receiver'. On arrival, participants were greeted by their allocated experimenter and taken into the Receiver's room. The experimenter outlined what would happen during the session and show participants a short film about what to expect during the trial that complemented and reinforced the experimenter's instructions regarding the procedure. The experimenter collected completed participant information forms and responded to participants' comments and questions about either the forms or the session itself. Participants were at this stage asked to indicate who would act as the sender for the trial and who would act as receiver. Both participants then completed a short questionnaire asking about their relationship with their co-participant (i.e., how long they had known each other and how emotionally close they were) and asking to indicate their level of confidence of success in the ESP task.

Both participants were then taken to the Sender's room, where the person acting as sender would be left and remain on their own until the judging stage of the session was complete. It was felt important to show the receiver the room where the sender would be for the duration of the session. The receiver was encouraged to wish the sender good luck before the experimenter and receiver returned to the Receiver's room. Upon returning to the Receiver's room, the experimenter reminded both participants of their respective tasks (*DigiGanz* enables the sender to hear through headphones what's being said in the receiver's room, although, of course, the receiver cannot hear noises made by the sender). Halved ping-pong balls were placed over the receiver's eyes and bathed in red light. Both participants were then guided through a ten-minute pre-recorded progressive relaxation exercise. As this ended, the receiver was played white noise through the headphones for a further 30 minutes and was reminded to relate to the experimenter all the imagery and sensations that came to mind. This 'mentation' was transcribed by the experimenter and recorded on to the computer's hard drive. Meanwhile, the sender was shown a randomly chosen target from the target pool that they were to attempt to psychically 'send' to the receiver. The same target clip (lasting 60 seconds) was shown repeatedly to the sender once every five minutes for the next 30 minutes (the sender was therefore shown the target clip six times). At the end of this sending-receiving period, the experimenter roused the receiver from their relaxed state before going through the receiver's mentation with them, allowing the receiver to clarify or elaborate where appropriate. Once the receiver was ready, he or she was shown a target judging set containing four clips from the target pool, of which one was the actual target. The receiver was required to rate each of these four clips (on a scale from 0-100) in terms of how closely they match his or her mentation. *DigiGanz* guided the receiver through this judging stage by first playing each of the clips in a randomly selected order before allowing the receiver to give ratings. After all four clips had been played once, the receiver was allowed to choose to play all, any or none of the clips again whilst deciding on ratings. Once ratings were decided, *DigiGanz* stored the data to a computer file. At this stage, the experimenter retrieved the sender from the Sender's room before asking *DigiGanz* to reveal the identity of the target. The experimenter then brought the session to a close by allowing participants to review the session and responded to any final questions. Experimenters were also encouraged to explain the difficulties from drawing too many conclusions from just one trial (e.g., that there was 25% chance of giving the highest rating to the target, so a 'hit' did not necessarily indicate ESP).

It should be noted that the procedure as outlined above was the procedure that all experimenters were asked to adopt, and that individual experimenters may have deviated from this in minor ways. However,

[3] One main difference in the procedure was that the experimenter was located in the receiver's room rather than in a separate room.

the *DigiGanz* system ensured that all important procedural elements (such as randomization of target materials, recording and storage of ratings during the judging procedure, etc.) were carried out rigorously and in the correct order.

Each experimenter was required to conduct 8 ganzfeld trials each, however three experimenters did not complete all 8 of their trials. Experimenters who completed all 8 of their trials were debriefed after completing their trials. No experimenters indicated that they were aware or suspicious of the expectancy manipulation. A total of 114 trials were completed.

RESULTS

The overall hit-rate for the study was 34.2% (39 hits from 114 trials) where 25% would be expected by chance. This means that in 34.2% of trials the receiver gave the highest rating to the target video-clip for that session (compared to three decoy clips). A post hoc analysis by way of a binomial test revealed this to statistically significant (p=0.02). However, as 128 trials were originally planned, it is important to note that there is a risk of optional stopping in this study, as three experimenters did not complete all 8 of their trials (one completed 2 trials, the other two completed 4 trials each). All three of these experimenters were classified as having 'low' attitudes towards psi. The experimenter who completed just 2 trials was in the 'negative' expectancy condition whilst the two experimenters who each completed 4 trials were in the 'positive' expectancy condition. They did not complete all 8 trials due to difficulty with scheduling trials. If the data from these three experimenters are removed the hit-rate is 33% (34 hits from 103 trials) and becomes marginally non-significant (p=0.06). The analyses reported below include all 16 experimenters' data from 114 trials (it should be noted that the overall patterns in the data remain the same when only the 13 experimenters who completed their 8 trials are included in the analyses).

Experimenter variables and psi scores

The first planned analysis examined the effects of experimenter expectancy and experimenter attitudes towards psi upon ganzfeld-ESP performance. Experimenter expectancy was determined as either 'positive' or 'negative' according to which condition they had been assigned. As mentioned above, experimenter attitudes towards psi were classified as either 'high' or 'low' according to their level of agreement to four statements regarding the possibility of ESP. Scores on this measure could theoretically range from 4 to 28, with higher scores indicating a more positive attitude to the possibility of ESP. A median split meant that the eight experimenters with highest scores were classified as having 'high' attitudes towards psi, and the eight lowest scores were classified as having 'low' attitudes towards psi.

ESP performance was measured by transforming target ratings for each trial into Z-scores. Table 1 shows the mean Z-scores for all trials split by experimenter attitudes towards psi ('high' or 'low') and experimenter expectancy ('positive' or 'negative').

A 2 x 2 between groups ANOVA revealed that there was no significant main effect of experimenter attitudes towards psi upon Z-scores, $F(1, 113)=0.32$, $p=0.58$. Nor was there a significant main effect of experimenter expectancy, $F(1,113)=2.35$, $p=0.13$. Finally, no significant interaction was found between experimenter attitudes towards psi and experimenter expectancy, $F(1,113)=0.08$, $p=0.78$.

Table 1: Hit-rate, mean Z-scores (and standard deviations) for 'high' and 'low' experimenter attitudes towards psi and 'positive' and 'negative' experimenter expectancy.

			Experimenter expectancy	
			Positive	Negative
Experimenter attitudes towards psi	High			
		hit-rate	37.5%	30%
		Mean Z-score	0.29	-0.05
		SD	0.91	1.00
		n	24	40
	Low			
		hit-rate	37.5%	33%
		Mean Z-score	0.13	-0.11
		SD	0.95	0.93
		n	32	18

Experimenter variables and participants' confidence of success

The second planned analysis examined the effects of experimenter expectancy and experimenter attitudes towards psi upon participants' confidence of success in the ESP task. As above, experimenter expectancy was either 'positive' or 'negative' and experimenter attitudes towards psi were classified as either 'high' or 'low'. Participants' confidence of success in the ESP task was measured by their level of agreement with the statement "I am confident I will do well in the ESP task" on a 7-point scale from 1="strongly disagree" to 7="strongly agree" immediately prior to their ganzfeld trial. This was included on a questionnaire administered by experimenters after they had explained the nature of the ESP task, and had explained a little about the background of the research, and once participants had decided whether they were going to act as 'sender' or 'receiver'.

Table 2 shows the mean confidence scores for all participants (senders and receivers) split by experimenter attitudes towards psi ('high' or 'low') and experimenter expectancy ('positive' or 'negative').

A 2 x 2 between groups ANOVA revealed that there was no significant main effect of experimenter attitudes towards psi upon Receivers' confidence scores, $F(1, 105)=1.64$, $p=0.20$, or Senders' confidence scores, $F(1, 103)=3.09$, $p=0.08$, although it was approaching significance for Senders' confidence. Whilst there was also no significant main effect of experimenter expectancy upon Receivers' confidence, $F(1,105)=0.23$, $p=0.64$, there was a significant effect of experimenter expectancy upon Senders' confidence, $F(1, 103)=7.06$, $p=0.009$. Finally, no significant interaction was found between experimenter attitudes towards psi and experimenter expectancy for either Receivers' confidence, $F(1,105)=0.91$, $p=0.34$, or Senders' confidence, $F(1, 103)=0.89$, $p=0.35$.

Table 2: Mean sender and receiver confidence scores for 'high' and 'low' experimenter attitudes towards psi and 'positive' and 'negative' experimenter expectancy.

		Experimenter expectancy	
		Positive	Negative
Experimenter attitudes towards psi	High		
	Senders' confidence (and SD)	4.04 (1.22)	3.62 (1.18)
	n	23	39
	Receivers' confidence (and SD)	3.50 (1.53)	3.63 (1.13)
	n	24	38
	Low		
	Senders' confidence (and SD)	3.84 (0.94)	2.94 (1.60)
	n	25	17
	Receivers' confidence (and SD)	4.12 (1.24)	3.72 (1.74)
	n	26	18

Participants were also asked to indicate their perceptions of their experimenter's expectations of success in the ESP experiment. They were asked to rate their agreement with the statement "The experimenter believes that ESP will be demonstrated in the ESP task" on a 7-point scale from 1="strongly disagree" to 7="strongly agree". 2 x 2 ANOVAs revealed a significant main effect of experimenter attitudes towards psi upon Sender's ratings, $F(1, 103)=6.73$, $p=0.01$, and a near-significant effect upon Receivers' ratings, $F(1, 105)=3.12$, $p=0.08$. All other effects were non-significant.

Participants' attitudes towards psi and previous psi experience

The possible relationship between participants' attitudes towards psi (especially ESP) and performance on the ESP task was examined as previous research has indicated that people's beliefs about the possibility of ESP can predict ESP performance. Participants were asked to indicate their level of agreement with the statements "Extra-sensory perception (ESP) is possible", "I have some ESP ability", and "It is possible to demonstrate ESP ability in an experimental study" on a 7-point scale from 1="strongly disagree" to 7="strongly agree". No significant correlations were found between ESP scores (Z-scores) and agreement ratings to any of these three statements (all correlations $< \pm 0.1$).

Previous research has suggested that people who have had ostensibly psychic experiences may perform better on psi tasks than those people who have not had such experiences. 43 Receivers and 32 Senders indicated that they had had previous 'psychic' experience. An independent t-test comparing Z-scores from those trials involving Receivers who had had a psychic experience (Mean Z-score=0.20) with Receivers who had not had such an experience (Mean Z-score=-0.03) did not reveal that this had an impact upon performance on the ESP task, $t(96)=1.19$, $p=0.24$. A similar analysis for Senders also revealed no significant difference, Experiencers' Mean Z=0.17 vs. Non-experiencers Mean Z=0.03, $t(94)=0.70$, $p=0.50$.

Mental discipline

In order to assess the possible impact of the practise of a mental discipline (such as meditation or yoga) upon ESP performance, participants were asked to indicate whether or not they practised such a discipline. 97 Receivers and 96 Senders indicated whether or not they practised a mental discipline, of whom 41 Receivers and 33 Senders indicated they had practised such a discipline. An independent t-test comparing Z-scores from those trials involving Receivers practising a mental discipline (Mean Z-score=-0.05) with Receivers who had not done so (Mean Z-score=0.16) did not reveal that this had an impact upon performance on the ESP task, $t(95)=-1.09$, $p=0.28$. A similar analysis for Senders also revealed no significant difference, Practitioners Mean $Z=0.12$ vs. Non-practitionaers Mean $Z=0.05$, $t(94)=0.35$, $p=0.73$.

Sender-receiver relationship

Previous research has indicated that certain sender-receiver pairings may perform better on ESP tasks. In this study, participants were asked to indicate how long they had known their co-participant, how emotionally close they were to each other (using a 7-point scale), and whether they had ever shared an experience that could be described as telepathic. No relationship was found between either the length of time co-participants had known each other (Pearson's $r=0.05$, $p=0.63$), or ratings of emotional closeness (Pearson's $r=-0.11$, $p=0.27$) and ESP scores.

107 pairs of participants indicated whether or not they had shared an ostensibly telepathic experience, of whom 28 pairs indicated they had shared such an experience. An independent t-test comparing Z-scores from those trials involving those sharing an experience (Mean Z-score=-0.08) with those who had not shared an experience (Mean Z-score=0.11) did not reveal that this had an impact upon performance on the ESP task, $t(105)=-0.90$, $p=0.37$.

DISCUSSION

Across all 114 trials a hit-rate of 34.2% was obtained. This is in line with the hit-rate reported in previous successful ganzfeld studies (Bem & Honorton, 1994), and is statistically significant (binomial $p=0.02$). This suggests that, overall, there was a tendency for receivers to give highest ratings to the target clip when it was presented alongside three decoy film clips. However, it is important to note that this hit-rate may be a consequence of the possibility of optional stopping as three experimenters did not complete all 8 of their trials. A hit-rate of 33% (binomial $p=0.06$) was observed when these three experimenters' data were removed. The main aim of this study, however, was to examine the effects of experimenter expectancy and experimenters' attitudes towards psi upon ganzfeld-ESP performance. In order to do this, target ratings for each trial were converted into Z-scores to allow for analysis of variance. Both main effects were found to be nonsignificant. However, it should be noted that the data suggest that experimenter expectancy, as manipulated by the experimental design, appears to have more influence, if any, on psi scores than experimenter attitudes towards psi. Hit-rates in the positive and negative expectancy conditions were 37.5% and 31% respectively, whilst hit-rates obtained by experimenters with 'high' and 'low' attitudes towards psi were 32.8% and 36% respectively. Thus, there is a slight tendency for hit-rates to be highest among experimenters given a more positive expectancy regarding the outcome of the study, irrespective of their own attitudes towards psi. However, as the ANOVA showed the main effect of experimenter expectancy as not being significant we should be extremely cautious of over-interpreting this tendency.

We also sought to examine the effects of experimenter expectancy and experimenter attitudes towards psi upon participants' confidence of success on the ESP task. Senders' confidence was more likely to be influenced by the experimenter's expectancy than was receivers' confidence. There was also suggestive evidence that experimenters' attitudes towards psi had some impact upon sender's confidence of success, with senders tested by experimenters with 'high' attitudes towards psi displaying

greater confidence of success on the ESP task than those tested by experimenters with 'low' attitudes towards psi (although the main effect did not reach significance). Receivers' confidence did not appear to be affected by experimenter expectancy or attitudes towards psi. When participants were asked to indicate whether they thought their experimenter believed that ESP would be demonstrated in the ESP task, again it was senders who seemed to be more likely to be sensitive to this. A significant main effect of experimenter attitudes towards psi was found for senders' ratings on this variable, and it approached significance for receivers' ratings.

Although the pattern of findings is not the same across these dependent variables, there is some consistency in that it is typically the senders who appear to be more influenced by the experimenters' attitudes towards psi or their expectancy than the receivers. It seems that individuals who opt for the sender role are more open to being led or influenced by the way in which the experimenter portrays the likelihood of success in the ganzfeld than those who take the receiver role. Possible explanations for why this might be the case may vary depending on whether participants have already decided on their respective roles before arriving for their testing session, or whether they decide on their roles after listening to the experimenter's description of the procedure. For example, participants who already know something about the ganzfeld procedure may have already decided on their respective roles before arriving. If so, it may be that one participant is more interested in taking part than the other and that it is this person who wants to act as the receiver as the receiver role might be regarded as the more interesting of the two roles. The person acting as the sender may therefore have less interest in ESP and, consequently, less fixed a priori attitudes regarding the possibility of ESP. They might therefore be more malleable in terms of their expectations of success in the ESP task. This explanation is perhaps less likely to be the case for trials where participants do not decide on their respective roles until after hearing the experimenter's description of the procedure, although it is still possible that one participant has more interest than the other and it is they who opt for the receiver role.

In order to explore more fully the possible effects of the experimenters' attitudes towards psi and expectancy upon the experimenter-participant interaction, it is intended that the video recordings made of the subsample of trials will be analysed. This will allow us to, for example, examine whether there is a tendency for experimenters in the different conditions to interact with participants in observably different ways. For example, do experimenters given a 'positive' expectancy tend to display more enthusiasm than experimenters given a 'negative' expectancy? Are experimenters' expectations and attitudes towards psi communicated towards participants explicitly or implicitly? Analysing the experimenter-participant interactions in this way will also allow us to explore any differences between 'successful' trials (i.e., trials in which the target was given the highest rating) and 'unsuccessful' trials. It is anticipated that analysing individual trials in this way may shed more light on the role that the experimenter plays in parapsychological experiments.

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THE EXPERIENCE AND MANAGEMENT OF ANOMALOUS EXPERIENCE: AN EXAMINATION OF THE OUT-OF-BODY EXPERIENCE USING INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

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ABSTRACT

A variety of anomalous experiences have been reported in the research literature as enhancing, rather than indicating poor mental health. The out-of-body experience (OBE), where the person's self and body are phenomenologically separate, is a relatively common anomalous experience. The aim of this study was to investigate the experience of an OBE and its resultant after-effects. Three participants took part in recorded face-to-face, semi-structured interviews. Interpretative Phenomenological Analysis found experients perceived their OBEs as occurring at times of personal significance. They were inextricably linked with participants' lives beyond their point of occurrence and played an adaptive role in response to difficult life events. The process of integration was helped or hindered by the varying reactions from others to the disclosure of the OBE. The idiographic nature of this study was instrumental in highlighting the subtle personal and social factors that influenced how the OBE was managed and integrated.

INTRODUCTION

The Out-of-Body Experience (OBE), whereby *"the centre of consciousness appears to the experient to occupy temporarily a position which is spatially remote from his/her body"* (Irwin, 1985, p.5) has been a topic of research in the psychological sciences for over 100 years (Alvarado, 1992). Whilst the experience incorporates a variety of features, those most commonly reported are: a floating sensation, seeing the physical body from a remote point in space, and the impression of travelling to distant locations (Alvarado, 2000). Prevalence in the general population is widely considered to be between 10-12% (Alvarado, *ibid*), rising to about 25% in student populations (Gow, Lang & Chant, 2004), and 82% in those with a strong interest in the paranormal (Alvarado & Zingrone, 1999).

Previous research has aimed to 'profile' people who have OBEs; in order to describe their personality, or to predict what kind of personality would be most likely to have an OBE. People who have had out-of body experiences (OBErs) do score higher on measures of dissociation, especially somatoform dissociation (Irwin, 2000, Murray & Fox, 2005), fantasy proneness (Gow et al., 2004), paranormal belief (Tobacyk & Mitchell, 1987), and display a propensity to become more psychologically absorbed (Myers, Austrin, Grisso & Nickeson, 1983) than their non-OBE counterparts.

A considerable body of psychological research has been conducted with the theoretical assumption that the OBE is some form of hallucination (Blackmore, 1984) and that it may be linked to mental health disorders, such as depersonalization (Whitlock, 1978) or schizophrenia (Rawcliffe, 1959). However, there appears to be no evidence linking OBEs to psychosis (McCreery & Claridge, 1995) depersonalization (Twemlow, 1989) or schizophrenic body boundary disturbances (Blackmore, 1986a).

One personality variable that has received considerable research attention is that of schizotypy, in particular the fully dimensional model proposed by Claridge (1997). This model portrays schizotypy as

a psychological concept which encompasses a range of personality traits related to psychosis and schizophrenia, varying over a normally distributed continuum from psychological good health to psychological ill health (Goulding, 2004). This is distinctly different to the categorical view of the same illnesses, where someone either has the illness, or does not. Schizophrenia and psychosis, on the other hand, are considered to be breaks in normal psychological functioning, which make up a second continuum, with schizotypal personality disorder at one end and full-blown schizophrenic psychosis at the other (Claridge, 1997). Claridge's model effectively decouples the concept of schizotypy from that of mental illness whilst still allowing for certain aspects of schizotypy, particularly at the higher end of the spectrum, to be causally linked to such illnesses (McCreery & Claridge, 1995).

The Claridge model comprises four factors, 1) aberrant perceptions and beliefs (sub-clinical forms of positive symptomatology), 2) cognitive disorganisation with anxiety (sub-clinical forms of thought blocking and high social anxiety), 3) introvertive anhedonia (sub-clinical forms of the negative symptomatology of schizophrenia), and 4) asocial behaviour, such as social non-conformity, impulsiveness and disinhibition of mood.

Evidence from research into this model suggests that schizotypy, although associated with psychopathology, may also have an adaptive value, particularly where paranormal experiences are concerned (McCreery & Claridge, 2002). For instance, McCreery and Claridge (1995) found that OBErs scored higher on the positive factor of aberrant perceptions and beliefs than non-OBErs, moderately on neuroticism, and low on physical anhedonia and social anxiety. In another study (McCreery & Claridge, 2002) the same authors found that the only discriminating factor between OBErs and non-OBErs was the aberrant perceptions and beliefs factor. More recently, Goulding (2004) has noted that OBErs often score lower than non-OBErs on the third factor in Claridge's model, introvertive anhedonia. Anhedonia is the inability to experience pleasure from normally pleasurable life events, thus, by scoring low on these scales it could be possible that OBErs may be deriving pleasure from their anomalous experiences.

Research on schizotypy has been extended to other anomalous experiences, some of which have been linked with OBEs. In a review of the literature, Goulding (2005) listed 18 studies conducted over a 25 year period that showed people who were believers in, or who claimed to have experienced, paranormal phenomena also scored high on measures of schizotypy. Goulding's research has added support to McCreery and Claridge's (2002) view of the healthy schizotypes, which they define as people who are fully functional in everyday *life "in spite of, and even in part because of, their anomalous perceptual and other experiences"* (p.141).

A criticism of much of the previous work on the OBE is that it takes a largely 'top-down' approach rather than first eliciting such experiences in detail before forming testable hypotheses which would provide the best psychological insight into the phenomenon (Alvarado, 1997). In particular, Alvarado and Zingrone (2003) have been critical of the lack of systematic work conducted to elicit the impact the OBE has on the experient. In so doing, research in this area has tended to overlook the concerns, relevance or the significance of the experience for the person having it.

While this previous work has added substantially to our understanding of the OBE, there is a need for an examination of the longitudinal after-effects experienced by people who have them, the nature of those after-effects, the pathways people take whilst attempting to integrate their experience(s), and the temporal, social and psychological factors that may impinge on the integration process. The present research aimed to address these issues. To date there has been no in-depth examination of the lived experience of having an OBE and what meaning OBErs attribute to that experience. Such work would be expected to contribute to an understanding of how anomalous experience (or aberrant perceptions) may contribute to, or impact upon the mental well-being of such persons.

METHOD

Study Design

A qualitative, phenomenological approach, that of Interpretative Phenomenological Analysis (IPA) Smith (1996), was adopted which enabled an in-depth analysis of, and engagement with, individual accounts of OBEs. This was achieved through the use of face-to-face, semi-structured interviews. The use of IPA to study the OBE here is focussed upon the interpretation and meaning of such experiences, drawing out the implications for mental health issues. It makes no claim, nor do we have an interest here, with regards to whether these experiences are of 'real' veridical events.

Sample

Sampling in IPA research is purposive; that is, it seeks the experiences and opinions of the most appropriate persons for the particular research issue being addressed. Although, there are various factors that may influence the sample size of a study, Smith and Osborn (2008) point out that there is no objectively finite sample size for an IPA study. The intense analysis of individual accounts and the examination of shared meaning, along with any nuances in these meanings, are reflective of the idiographic characteristic of IPA which is generally characterized by small and homogeneous samples (Smith, Jarman, & Osborn, 1999). To meet these requirements three participants (two males and one female) were recruited; one participant was recruited at a local paranormal annual conference day. The remaining two participants were recruited from a database of respondents who had taken part in previous research studies and who had given their contact details with the wish to take part in future research.

Mark (age 30) estimated he had had between 20 and 50 OBEs. These had begun in childhood. A typical OBE for Mark began when he experienced a variety of physical sensations usually beginning with a buzzing or vibration that ran up and down his body; a stage of sleep paralysis followed and a feeling of pressure on his chest area. This was followed by a period of light-headedness before finally he exited his physical body into the OB environment. His adult OBEs started shortly after the death of his brother and the most significant content of his OBEs are his communications with his deceased brother.

Cindy (age 45) reported 2 prior OBEs. She described having floating, out-of-body sensations when she was a teenager whilst listening to music. She had her first full OBE while going to sleep when she was 20 years old and 4-5 weeks post-child birth. Cindy described the exit from her body as very quick and recalled suddenly finding herself looking down on her body as she lay in bed. She described the OB environment as similar to the physical room she was lying in, except that the walls and ceilings were transparent. She then heard a voice telling her to go back as it was not her time yet. She returned to her body quickly and hard. Before waking up she then heard her step-grandfather's voice telling her not to worry and that the baby was not well. At that point she woke up feeling very frightened. The next day she took her baby to the local doctor's surgery and then later to the local hospital, where upon the baby was diagnosed with bronchial pneumonia.

John (age 28) reported 2 prior OBEs. He had been diagnosed with nocturnal epilepsy at the age of 10 and received medication to control it. His first OBE happened when he was 17 years old and asleep in his room. He experienced sleep paralysis, which he describes as *"terrifying"*. After the paralysis, John went back to sleep, then next remembers being out of his body, sitting on top of the bookcase in the corner of his room, looking down on himself as he lay in bed. As he looked back at his physical body the whole room seemed to come towards him and he found himself back in his body and awake again.

Interview Procedure

A pre-prepared interview schedule contained a list of main topics to be covered, including biographical details, background to the and full details of the OBE, what happened immediately after, and questions about the person's life since and any other experiences they may have had. All questions

were open-ended. An example of one question, would be, *"Can you please tell me about your experience in as much detail as you can remember?"* Interviews were conducted by the first author (DW) and lasted approximately one hour and were audio recorded and fully transcribed. Semi-structured interviews in IPA ideally should be participant led, with the researcher facilitating the interview in a non-directive manner. The attitude of the researcher should be one of empathic attentiveness; the interviewer should try establishing a rapport with the participant, ideally based on non-judgemental acceptance and openness (Smith & Eatough, 2006). Alongside empathic attentiveness, the researcher should also try to retain a critical distance such that they can remain aware of interesting and unusual instances in accounts as they happen 'live' and can be subsequently followed up. It was in accordance with these principles that each interview was conducted.[1]

Data Analysis

IPA was used to analyze the data. IPA has its roots in phenomenological psychology, hermeneutics and symbolic interactionism (Smith et al., 1999). IPA is phenomenological in that it seeks to obtain and honour a person's experiences, understandings, perceptions and accounts (Reid, Flowers, & Larkin, 2005). There is no attempt to construct an objective truth about an experience; rather IPA is more concerned with the subjective account and meaning of the experience (Brocki & Wearden, 2006). However, one criticism that is often levelled at phenomenology's descriptive stance is that, in order to reach a deeper understanding of ourselves and our world, it is necessary to consider how the human being interprets their world, from both individual and social psychological perspectives. IPA acknowledges that, in attempting to gain access to another's world that *"access depends on and is complicated by the researcher's own conceptions...required in order to make sense of that other personal world through a process of interpretative activity"* (Smith, Jarman, & Osborn, 1999, pp. 218-219). Inherent in the above is the idea that people are social beings and engage in meaning making in social contexts and interactions. IPA thus draws upon a symbolic interactionist perspective to emphasize that the meanings that individual's attribute to experiences, events or objects are primarily the result of the process of sense-making between actors in a social world. In acknowledging this social interaction in the formation of meaning, IPA also recognizes that a participant's interpretation of an experience is not always idiosyncratic but grounded, at least in part, in a shared psycho-social space between social actors.

IPA deals exclusively with text, so the starting point for an IPA analyst is with the production of a full verbatim transcript of each interview, complete with participants' answers and interviewer's questions (Smith & Osborn, 2008). As IPA is essentially a semantic level analysis, it is not necessary or usual to transcribe the more prosodic features of talk.

Smith and Osborn (*ibid*) stipulate that IPA takes a 'non-prescriptive' approach to data treatment and encourage researchers to remain creative wherever possible when engaging with data. Nevertheless, there are numerous, detailed worked examples of IPA (e.g. Smith & Eatough, 2006) that guide the researcher through four distinct stages in the analysis process (Willig, 2001).

The first stage involves the researcher immersing themselves with the data and will be familiar to most qualitative researchers, but from a more phenomenological point of view, the researcher is actively encouraged to try and 'walk in the shoes' of the participant as much as possible in order to get a rich flavour of what their world is like. The researcher makes notes about what they perceive the participant

[1] One possible critique of qualitative research is the effect of the researcher on collected data, in particular, the interactional process occurring during the interviews, which may have unduly shaped and given rise to particular responses given by participants. Wooffitt and Widdicombe (2006) highlight IPA as a particular approach which does not fully consider the manner in which the utterances of the interviewer give rise to particular responses from participants. The manner by which a person's utterances can be shaped by the design of another person's preceding utterance has been a particular focus of another qualitative approach, conversation analysis (Hutchby & Wooffitt, 1998), which shows that turns at talk are invariably connected in significant ways to prior turns, with turns in interaction being designed with respect to the activities performed by prior turns. However, in accordance with the theoretical interest of IPA, which builds up a phenomenological understanding of participants' experiences, analysis emerges as a consequence of data provided in depth over the course of interviews, and the research presented here has therefore focused on the interactional turns of the interviewee.

is trying to do to make sense of their world, while at the same time noting the course of their own sense-making. Traditionally in IPA, these notes are usually a mix of the researcher's own words and phrases culled verbatim from the transcript text, which serves to keep the analysis grounded in the data.

The second stage involves taking the researcher's preliminary notes and transforming them into specific themes, usually in terms of psychological language and terminology.

In stage three, the researcher looks for common *"reference points"* (Willig, *ibid*) between the themes and a process of clustering the themes begins.

In the fourth and final stage, a summary table of clusters and themes is produced, which should provide a clear overview of how the clusters and themes fit together as a coherent analysis. This table is usually augmented with keywords (Willig, *ibid*) and a line/page number reference and textual extract to support each theme and to ensure that an 'audit trail' can be traced back to the raw data (Smith & Osborn, 2008).

Once this process has been exhausted on the first case, the procedure is repeated for all other cases in the sample. When all cases have been analysed, cross case comparisons can then be made (Smith & Osborn, *ibid*).

Reliability and Validity

Given the different epistemological basis, aims and objectives of quantitative and qualitative research paradigms, achieving adequate reliability and validity in research for each are judged in different ways (Smith, 1996). Here, a number of appropriate procedures were adopted. First, the authors met frequently to compare their independent analyses of the transcripts. These analytical comparisons enabled a check on the validity of the primary researcher's analysis and interpretation of participants' accounts. However, the aim of this process is to ensure the credibility of the analysis rather than to produce an analysis which is objectively 'true' (Yardley, 2008). Two further criteria to assess the internal validity and reliability of qualitative research are whether the argument presented within a study is internally consistent and supported by the data, and there being sufficient data from participants discourse within a report to enable readers to evaluate the interpretation (Smith, 1996). Therefore, the emergent themes presented here are appropriately supported by participants' actual discourse.

FINDINGS

Three interconnected themes emerged when considering participants' OBEs: Barriers and facilitators to sharing the experience: negative and supportive reactions; Recovery, rescue and consequence: the positive effects of OBEs; and the OBE within a biographical context: an adjunct to personal growth and understanding.

Each theme will be discussed in turn and illustrated by direct quotations from the transcripts. Ellipsis points denote a short pause in the flow of a participant's speech.

Barriers and facilitators to sharing the experience: negative and supportive reactions

Both Mark and Cindy had a strong desire to share their OBEs with others as part of an attempt to better understand what they were and what they could mean. Both had encountered mixed reactions from within and outside of their family circle. In contrast, John had not tried to talk in detail about the OB aspect of his experiences as he was concerned that this might provoke derision from others. Instead he had preferred to talk about the sleep paralysis aspect of the experience which frightened and confused him, particularly because of his earlier episodes of epilepsy; he thought that this could be signs of that illness returning, despite taking medication to control it. Mark describes his parents' initial reaction to hearing what he had to tell them about his first frightening OBE.

> *I just explained to her* [his mother] *what I'd seen and me parents…they just listened to what I had to say and then they just…parents tend to dismiss things, and…they just put it down to dreams- a dream experience, so, you've had a bad dream or nightmare, erm, and then when you're that age as well you tend to accept that.*

The early dismissiveness Mark experienced from his parents as a reaction to his frightening childhood experience helped to galvanize a long-term personal inhibition about talking to others about any kind of experience which might be perceived as out of the ordinary. This inhibition could have potentially led to reduced social skills and strategies in later life in intuitively knowing when and how and with whom to broach these topics, which Mark describes as 'clumsy'. This lack of being heard left him with long-term feelings of being undervalued, powerlessness, frustration and isolation and these feelings had been compounded by the negative reactions he had received when trying to discuss his experiences within a workplace setting.

> *I've found that, I think I made a mistake sometime by discussin' it in, perhaps in the workplace…People just tend to dismiss it an' go, "what are y'on about, y'know, but I'm not bec-, its probably because the' don't really, the' not really interested, y'see, some people. Erm, so they just tend to sort of dismiss it y'see. But like I say, I don't think it's, the workplace is the right place to discuss it, erm, so I think that's, it's quite, er, a clumsy thing to do really.*

In contrast, John had never really spoken in depth to anyone else about the OB aspect of his experience, although he felt that he wanted to. There was a yearning to talk about what he had experienced but, like Mark, he felt inhibited. However, John's inhibition was made in anticipation of negative reactions from others.

> *It's the sort of thing I would want to share, but I'd only tell select people that, y'know, that I could trust, they wouldn't laugh at me and that sort of thing.*

All three participants had enjoyed support from a variety of sources since having their first OBEs, which had been crucial in helping them to integrate the experience. The mothers of the two men played important roles in this sense. Mark's relationship with his mother had gotten closer still since the death of his brother, and the sharing of his OBEs in which he was visited by his deceased brother was a source of comfort and healing for them and their family.

> *It has a kind of positive uplifting effect on me mum and I feel a lot happier, in life…it's just a, an inner sense of peace within myself that I know me brother's spoken to me an' I've seen him and I feel real happy about that. So, I think that's the best part of it for me and I think been able to share that with me mum as well, erm, is, is really good, an' other members of me family.*

Outside of the family, Mark had found support and acceptance for his experiences and beliefs at a local paranormal investigation group, which he joined shortly after the death of his brother.

> *I don't expect the group to just believe what I say and, erm, well they're entitled to not believe me and, and I don't enforce me beliefs on anybody else erm, it's entirely up to anybody else whether they believe me or not…It's just that I feel that I want to share the experiences with other people an' see what their views and opinions are.*

The sharing and accepting process within his family and with his peers at the paranormal group had helped reduce the early apprehension he had felt about his OBEs. Beyond being a source of comfort for

himself and his mother, there was a wider social implication in that he felt more confident and independent and enjoyed being a part of something to which he had something to contribute. This had raised his self-esteem, provided him with a wider social network and given him a definite sense of being more in control of his life.

Cindy had also found some sources of support in her life surrounding her OBEs. The day after she had her first OBE, her step-grandfather's son took her to hospital with her baby. During the journey, she recounted her story to him about her experience. Being interested in spiritualism he wanted to hear what she had to say about her OBE and of hearing her step-grandfather's voice during the experience. Although feeling as sure as Mark and John regarding the veridicality of her OBE, Cindy differed from them in that she felt less inhibited about talking about her experiences and less concerned about potential negative reactions to her story. She attributed this confidence and certainty to the experience itself as it in some way it gave her access to 'the other side' or a glimpse of life after death.

> *It's convinced me so much, no one will tell me anything different that the-, as far as I'm concerned there's another side and that is it. Y'know, nothing will, I'm a hundred percent about that.*

Recovery, rescue and consequence: the positive effects of OBEs

Each participant had a unique story to tell regarding their OBEs, yet all were linked by their resolute affirmation for the positive effects the experience brought to their lives. For Mark, this was a story of recovery and healing after tragedy. The sudden tragic death of his brother in a car accident had a very deep upsetting effect upon him and his family. Shortly after his brother's death Mark began having his first adult OBEs and they had had a profound effect upon his emotional healing process. Communication with his deceased brother within the OB environment had given him proof that his brother was happy, having 'crossed over'. Communicating this to his mother and other family members had in turn aided his family's healing.

Recounting his OBEs and that of his meeting with his brother allowed Mark to relate to his family in a way he would not have thought possible beforehand. An initially frightening experience had been transformed and imbued with positive meaning and purpose.

Mark felt that, notwithstanding the relatively recent loss of his brother, life had become better, and this he partly attributed to the after effects of having his OBEs. He considered himself to be happier now and felt he had benefited from the experiences.

Cindy's story was also one of recovery and healing for her and of rescue for her newly born baby. From a very early age Cindy was extremely afraid of death, in particular she feared her grandparents dying as she was very close to them. This fear was characterized in later life by refusing to attend her grandfather's funeral.

> *I don't think I fear death…like, erm, when you are* [a] *young child and you hear the word death it sort of fills you with absolute dread. Erm, since these experiences, erm, and some things like when my dad died, me step dad, I was actually there, and as I say, y'know, when my granddad died, y'know, I was pregnant at the time, I didn't, y'know, want to go and visit him because I didn't want to see someone on their death bed and them was seeing him in the coffin and things like that because I was so scared of death, so, but I've, obviously because of these things that have happened I'm the complete opposite end now.*

Cindy also firmly believed that there was an immediate positive outcome to the OBE she had as it saved her baby's life.

I just understood that this presence was there and it was there to sort of look after, like me and the baby…I think it was a positive experience for me. Without that the chances are, y'know, my son might've died.

John was somewhat different in that the OB aspect had had a milder positive effect than it did for Mark and Cindy. Rather, it was his fear of an aspect of his OBE – the paralysis preceding the OBE – and its immediate association with a potential return of his epilepsy that caused him most concern. The sleep paralysis aspect had been his main focus of research and conversation over the years concerning that experience. Having now come to terms with this fearful aspect of the experience, John was convinced that as whole it was a positive one, which he would like to repeat.

If I had the chance to do it again, I would, knowing that it was safe, y'know, if you could get it controlled or whatever, it doesn't scare me, the paralysis thing scared me…so, hey, I'd love to able to just turn it on, on and off, it would be great.

The OBE within a biographical context: an adjunct to personal growth and understanding

John felt there had been little in the way of great changes in his life since his first experience. When he had his first OBE he was particularly scared that the physical sensations of paralysis might be the beginning of the return of his epilepsy, and it is this aspect of the whole experience that captured his attentions since it happened. The initial shock of the sleep paralysis preceding his OBE seemed to have overshadowed the OB aspect itself, which appeared to have been more quietly integrated and John made his own suggestions as to why this might be the case.

I think maybe that's why I'm not, it's not made such a big impact 'cos I know other people that's been sleepy, y'know, there is a buzz word to describe sleep paralysis… so I think, maybe if it was, if someone had said sleep paralysis is a paranormal event that happens because of this, that and the other, then it would have had more of a, an impact, but because it is a, just a, y'know, a sleep related thing, erm, it's not been, y'know, too big a deal.

The OBE is often viewed as a paranormal event by many lay people and some professionals. This is partly because of the implication within its name that something detaches itself (e.g. the mind, or consciousness) and travels beyond the confines of the physical body. In this study, both John and Mark shared the same view about the 'paranormality' of their OBEs. Both had prior knowledge of the paranormal and of OBEs, yet both suggested that, having experienced them, they saw them as naturally occurring events in their lives, something which they both viewed as positive life-affirming experiences. In this extract, Mark not only highlights the normality of the experience, but also minimizes the difference between himself as an OBEr and other people who may not have had OBEs:

To me, it feels like it's a naturally occurring experiences that are a part of life, and personally I believe that they've always been there, an, and I don't believe that I'm special in the way that it only happens to me, I just, I genuinely believe that this is the case for all human beings…I don't think I'm unique in the experiences that personally think it applies to everyone.

Since his experiences, Mark had developed an open-minded view towards anomalous experiences and paranormal phenomena. He placed faith in scientific research to find out the answers to the questions he had about his own, and other experiences. His experiences had been catalytic in fuelling his desire to find out more about what his experiences are and how they come about. Since the death of his

brother and the onset of his OBEs, he had begun a distance learning course about how to scientifically research the paranormal, including OBEs. An important consideration for Mark when he was seeking a course of study was that the course should not be purely academic, but also incorporate the personal experiences of the student, thus allowing him freedom of expression and a chance to evaluate his experiences alongside known scientific data about OBEs.

> *Well, the course is based on twenty modules, it's, like I say, it's a scientific based organization, which personally I think is really important because you share a lot of common ground with other people then, and you, you kind of rule things out…and then in some of the answers you can interpret your own belief system as well, y'know you can mix some of your experiences in with scientific knowledge.*

Mark's overall feeling about his OBEs was that they had been mostly very positive and uplifting experiences. The paralysis, electrical buzzing and vibrations that preceded his OBEs were still unwanted, but the content of the experiences, especially those in which he communicates with his deceased brother, made him happy and were a source of great comfort for him. Despite the negative reactions from outside of the family, he seemed to have become resolute in his belief that his OBEs were indeed as they appeared to be. Beyond being a source of comfort for himself, his mother and family, there was a wider social implication in that he felt more confident and independent and enjoyed being a part of something, and in which he is able to contribute to. His OBEs had been instrumental in forging a 'new' Mark, someone who has left behind old ways of inhibition, doubt and self-consciousness, and had raised his self-esteem, provided him with lead-in to a wider social network and afforded him a sense of being more in control of his life. The negative response he had had to his experiences had encouraged him to be more accepting of other's views, particularly of those who don't believe in the veridicality of his OBEs.

> *I'd say it's been a very uplifting experience, erm, and a very positive experience…I would say since the experiences I'm getting more, I'm more conscientious about life and I've found that I want to learn more…Well, I say I feel more in control of me own life and I don't worry about what other people think as much, y'know, if there's somethin' I want to do in life I do it, I'll go out there an' do it, I don't need anybody t'hold me hand.*

Cindy's OBE seemed to have played a dual role in her life. As mentioned earlier, she felt it was instrumental in warning her of her baby's impending illness and in reducing her fear of death and dying. She had an unwavering attitude towards most reactions to her story and attributed this to feeling so convinced that her OBE was completely veridical; that in some way it gave her access to 'the other side' or a glimpse of life after death. She attributed her reduced fear of death to her OBEs, as well as an increased sensitivity to death and accidents, and felt this was a sign of having attained a spiritual connection with the world.

> *When I got, when my dad died, y'know, I was, y'know, I wouldn't leave the room, I knew and the funny thing is I knew he was going to die. No one in my family, didn't even know he was ill and I just…I can sense things now really sense things, and I feel a bit like, y'know, in sensing things it's like, erm, I dunno, if there's a bit of a connection somewhere in whatever it is spiritual, I feel like I've got a bit of a connection now.*

Like Mark, Cindy's OBE was a catalyst for her starting to search for answers to explain what had happened to her. She had become more spiritually inclined and had learned to meditate. She felt she had a stronger connection or 'oneness' with the universe and existence and had taken up reading as much as she could about spiritual issues. Her early attempts to seek out explanations and answers to her experience led her to attend a spiritualist church in the hope of contacting a spirit guide or guardian

angel. She began to avidly study areas of the paranormal and spirituality and continues her studies today.

DISCUSSION

The above analysis has revealed that the OBE is both socially and affectively complex; the successful integration of which may add positively to a person's mental well-being. In this section of the paper we will discuss these findings within a theoretical context.

As discussed earlier, OBEs have sometimes been researched in the past in connection with mental illnesses. Mental disorders themselves have attracted stigma throughout history, often in the form of direct discrimination (personally, institutionally or structurally) or through social psychological processes which engage the perceptions of the person being stigmatized, for example, psychosis (MacDonald, Sauer, Howie, & Albiston, 2005), schizophrenia (Dinos, Stevens, Serfaty, Weich, & King, 2004), and bipolar disorder (Perlick et al., 2001).

Whilst it can not be said that any of the participants in this study *directly* experienced stigma and discrimination, some of the views expressed did suggest that, certainly in the minds of some other people, a person who has OBEs is perceived also as having something else 'wrong' with them. Those negative perceptions alone can have debilitating effects on a person's sense of identity and self-esteem. Poor experiences of disclosure can also have negative long-term consequences in terms of how the experience may be integrated.

To begin the process of successful integration, open and honest disclosure must be met with acceptance, empathy and understanding, particularly if it is from those perceived by the experient as a caring and trusted role model. In this study, participants did find those sources of support, though not always where they might have initially expected and not always upon first disclosure.

The positive effects of successful sharing and disclosure of experiences such as OBEs have been noted by Palmer and Braud (2002), who found that scores on measures of disclosure of 'Exceptional Human Experiences' (EHEs) positively correlated with measures of personal and existential meaning in life and psychological well-being. There was also a negative correlation with stress related physical and psychological illnesses.

All participants in the present study emphasized positive aspects of their OBEs, such as finding greater meaning and a sense of purpose in life, compassion, happiness and a reduced fear of death. Similarly, in a questionnaire survey comparing OBErs and non-OBErs, Osis (1979) found that 88% of OBErs reported having beneficial changes post-experience, such as, a deeper philosophical consideration of life and death, and a reduced fear of dying. The positive moods reported post-OBE by participants echoes findings from McCreery and Claridge (1995) in their work on schizotypy, where they found that OBErs scored higher on a measure of hypomania, which they found consistent with their model of schizotypy in that, to a certain degree, the hypomania measure was tapping into a person's tendency towards positive mood states.

Two of the participants in this study reported communication with deceased relatives, which, upon reflection was seen as beneficial to them, helping them to cope with emotionally difficult situations that had happened in their lives. McCreery and Claridge (2002) have suggested that there may be an adaptive value underlying some kinds of anomalous experiences, citing an example of someone who is experiencing post-operative pain before an OBE, who once having an OBE, then report less pain. Green and McCreery (1975) have also described what they called 'reassuring apparitions', forms of hallucination in which human figures appear which have the subsequent effect of calming a person who is experiencing a stressful life event. This finding is in part supported by the work of Palmer and Braud (2002) who found that there was a needs related aspect to the occurrence of the EHEs that their participants were reporting. In many instances, their participants would recall how these experiences would happen as *"helper experiences just when they needed the help"* (p.35).

All three of the participant's in this study had prior knowledge of OBEs before they happened and had strong beliefs themselves about the nature and veridicality of the experience. The role of an experient's belief system, particularly their belief in the paranormal, has also received research attention in relation to the 'healthy schizotype' personality and the adaptive value of anomalous experiences. For instance, Williams and Irwin (1991) suggested that having a belief in the paranormal may provide individuals with a mechanism by which to accept and explain their paranormal experiences. This was supported by Schofield and Claridge (2007) who found that participants who had a framework by which to support their belief in the paranormal were less cognitively disorganised and recounted their paranormal experiences as more pleasant, which also may have a bearing on the experient's psychological well-being. The authors also suggest that persons with a weak belief framework may find the same experience alarming and unwanted. This scenario fits well with the experiences of all participants in the present study, who, despite some previous knowledge of OBEs and the paranormal before their OBEs, found their initial experiences disturbing. However, upon subsequent reflection and with at least one additional OBE a stronger belief has been forged that their experiences are veridical OBEs.

It must be noted, however, that there are limitations to this study. The three participants in this study are not entirely representative of the broader population of OB experients on two counts. Firstly, all three participants' OBEs were sleep related and two of the three participants had there OBEs in conjunction with episodes of sleep paralysis. Paralysis is a not an uncommon onset feature of OBEs, for instance, in a study looking at how the two phenomena might be related, Blackmore (1999) examined 201 reports of people who had experienced sleep paralysis and found that 21% of them had also had OBEs. When comparing these to letters originally sent to the 'X Factor' magazine and letters from her own collection, she found incidence rates of 12% and 19% respectively. Secondly, one participant, John, did have a history of epilepsy for which he was taking meditation. It has been noted by some authors (e.g. Palmer & Neppe, 2003) that OBEs and other anomalous experiences have been linked with temporal lobe symptomatology although John did describe himself as *"fit free for ten years now"* and never reported having had an OBE during a seizure episode.

Some readers may be concerned about the small sample size and the potential generalizability of the results to the wider OBE population. Smith and Eatough (2006) point out that IPA is an idiographic approach to data collection and analysis and this is mainly considerate of honouring the richness of the individual's account. Smith and Osborn (2008) have argued that IPA is not opposed to more general claims for larger populations, but is *"committed to the painstaking analysis of cases rather than jumping to generalizations"* (p.54). They further argue that while generalizable claims regarding a sample in a single IPA study would not be made, as more studies with other samples are carried out with similar findings, more general claims would become possible. However, they refer to this as 'theoretical generalizability', rather than 'empirical generalizability'. With regards to the data presented in this study, the authors wish to make it clear that the focus of interest was on the detailed experience and meaning of the OBE for the individual participants, without claiming that these experiences are universal to all OBEs or OBErs.

CONCLUSIONS

The qualitative findings presented here adds to existing knowledge of OBEs in showing that participants tended to follow a certain pattern of healthy adaptation following their OBE(s) which was characterized by adaptive tasking (i.e. dealing with the implications of the experience and sustaining everyday relationships) and the employment of active, constructive coping strategies.

Experients first cognitively appraised and then redefined their OBEs, which involved moving from a period of initial confusion as to the causality of their experience to later framing it as a positive life-affirming occurrence. Experients then engaged in more specific problem-focused behaviours in which

they actively sought out information and support, and then, in some instances, acted upon that information, in order to further understand and bring meaning to their OBEs.

The idiographic, phenomenological approach taken in this research has been instrumental in highlighting the subtle personal and social factors that influenced how the OBE was managed and integrated during the maturation process. The present work, then, provides an in-depth account as to how the mental well-being of people may be improved as a consequence of such anomalous experiences.

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NEUROPSYCHOLOGICAL CORRELATES OF PSI PHENOMENA

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ABSTRACT

We review five areas of research that have been central to the search for the possible neuropsychological correlates of psi: 1.) ESP and brain waves, 2.) EEG and functional imaging correlates of precognition and presentiment, 3.) cerebral lateralization and ESP, 4.) ESP and the temporal lobes, and 5.) brain correlates of PK. The review indicates that ESP may be linked with brain wave activity within the alpha range, that the brain exhibits certain neuroelectrical correlates that may serve as unconscious indicators of precognition, that ESP and PK both appear to be associated with the right brain hemisphere, and that survey measures of temporal lobe lability are correlated with subjective reports of ESP experiences among the general population.

1. INTRODUCTION

This paper is part of our attempt to bridge parapsychology and mainstream science. The principal issue that has stood in the way of achieving this aim has been the inability of parapsychologists to explain how things can be correlated across distances of space or time, when electromagnetism and other known factors are apparently excluded. For instance, when a subject perceives a distant scene in remote viewing, no physical stimuli are transmitted from the scene to the subject.

The picture changed when Josephson and Pallikari-Viras (1991) proposed that psi phenomena illustrate the principle of quantum entanglement. This principle in turn is illustrated by the thought experiment of Einstein, Podolsky, and Rosen (EPR) (1935). Briefly stated, EPR says that when a fundamental particle is split into X and Y, the two parts will remain correlated regardless of how far they are from each other. If part X is sent to detector 1 and part Y is sent to detector 2, which is in another direction and not connected to detector 1 in any way, detector 2 will of necessity register Y for the other part because the parts originated from the same source and are thereby entangled. Conversely, if Y is registered by detector 1, detector 2 will show X.

In the case of a fundamental particle, X and Y represent opposite spins, but the same principle applies to any conjugate pair, as in telepathy, the direct influence of one mind on another mind, and in psychokinesis, the direct influence of mind on matter (Josephson & Pallikari-Viras, 1991, p. 199). We explore the implications of EPR for different types of psi in another paper (Roll & Williams, 2008).

Can EPR be applied to neuroscience? The "hard problem" of consciousness (Chalmers, 1995), that is, the issue regarding the correlation between brain processes with consciousness, has been explored primarily from the neurocomputational perspective (e.g., Churchland & Sejnowski, 1992; Crick & Koch, 1990; Dennett, 1991; Eliasmith & Anderson, 2003; Thagard, 2005). Crick (1994), co-discoverer of the structure of DNA, did away with the problem by simply stating that consciousness is "nothing but a pack of neurons" (p. 3), a common opinion if not so extreme.

In contrast, quantum physicist Niels Bohr (1961), regards the mental and material aspects of existence as complementary and not merely contradictory. He writes, "the nature of our consciousness brings about a complementary relationship between...the psychical and physical aspects of existence...which it is not possible to thoroughly understand by one-sided application either of physical or of psychological laws" (p. 20, 24). The principle of complementarity, as Bohr's position is known, encourages the development of mental and material science and of their relation without one overshadowing the other.[1]

Throughout most of the history of parapsychology, research has focused on the psychological aspects of psi, but over the last 30 years, experiments have increasingly turned to the methods of neuroscience for an understanding of psi. We review this work in the present paper.

2. BRAIN WAVES AND ESP

There are five brain waves of increasing frequency (cycles per second, or Hertz): delta (1 – 3.5 Hz), theta (3.5 – 7.5 Hz), alpha (8 – 12 Hz), beta (13 – 29 Hz), and gamma (30 – 80 Hz). Delta and theta are associated with sleep and unconsciousness, alpha with relaxed awareness, beta with attention and cognitive activity, and gamma with advanced cognitive activity. The normal brain undergoes all four stages during the 24 hours of the day, and at the end of days also 0 Hz, the sign of death.

Because a state of relaxed awareness may be ESP-conducive, and because the alpha brain wave has been associated with such a state (Carlson, 1992, p. 242; Kolb & Whishaw, 1990, p. 53), several experiments have looked for correlations between ESP performance and three types of alpha activity: 1) alpha abundance, 2) changes in alpha wave frequency and amplitude, and 3) effects of alpha feedback training.

2.1. Alpha Abundance

Studies examining the correlation between ESP and alpha abundance have generally measured the latter in terms of the percent amount of alpha rhythm present in the EEG record during a given trial or run (percent-time alpha). During a card-calling telepathy test, Wallwork (1952) collected EEG data from the fronto-parietal and occipito-temporal regions of the percipient's brain. ESP scores were at chance, and no correlation between the scores and the amount of alpha was found. Cadoret (1964) recorded the EEGs of seven subjects while they were engaged in clairvoyance card guessing. More ESP hits were recorded during slow wave EEG activity (predominantly alpha) than during fast EEG activity ($p = .025$). Honorton (1969), who tested ten high school students selected because of previous high ESP scores, found that their ESP scores were positively correlated with alpha abundance ($p < .05$). Stanford and Lovin (1970) gave 30 male college students two precognition runs of card tests while their EEG from the right occipital region was recorded. Contrary to Honorton's (1969) finding, their results showed negative correlations between alpha amount and test scores on the two runs that were significant when combined ($p < .04$). In a replication of this study (Stanford, 1971), a slightly positive but insignificant correlation was found. McDonough et al. (1996) collected bilateral, broad-spectrum EEG data from McDonough himself during two of seven tests in which he made forced-choice ESP calls on Honorton's computer-based ESPerciser™ program. Analysis revealed that at posterior temporal electrode sites, more alpha was found for hits than for misses ($p < .05$), but at anterior temporal sites, less alpha was seen for hits than for misses ($p < .03$). The significance of this effect, if any, is unclear, although the authors note that the electrode sites at the posterior temporal lobes are closer to the occipital region, where alpha is frequently measured.

ESP correlations with alpha abundance have also been explored in two free-response studies. Stanford and Stevenson (1972) reported a telepathy test in which right occipital EEG data was collected from Stanford while he served as the percipient. They found that percent-time alpha during the times that Stanford attempted to clear his mind and produce an image of the pictorial target were positively

but insignificantly correlated with his resulting ESP scores. In a clairvoyance study, Stanford and Palmer (1975) had 32 college students attempt to describe a hidden pictorial target while their right occipital EEG was monitored. Subjects whose ESP scores were above mean chance expectation showed significantly higher alpha densities than subjects who scored below expectation ($p = .021$).

In summary, except for the Honorton (1969) and Stanford and Palmer (1975) studies, the ESP-EEG tests with unselected subjects have shown insignificant or inconsistent relations between ESP and alpha abundance.

Tests of the psychic, Sean Harribance, have been more promising. In the first of four studies, Morris et al. (1972) examined Harribance's bilateral alpha activity in the occipital lobe while he was engaged in two clairvoyance tasks. In the first task, where he guessed the gender of people shown in hidden photographs, higher percent-time alpha was found during high scoring runs as compared to chance runs ($p < .05$). A similar result was seen in the second task, where he guessed ESP cards ($p < .005$). In the second study, Kelly and Lenz (1976) recorded bilateral EEG data at the parietal regions (electrode sites C3 & C4)[2] while Harribance was engaged in a two-choice clairvoyance task controlled by an REG. While the results of the ESP test were insignificant, a multivariate analysis of variance (MANOVA) showed that, prior to his ESP responses, Harribance's EEG appeared to discriminate between hits and misses to a significant degree.[3] An excess of high-frequency alpha waves (12 to 13 Hz; i.e., borderline with beta) on psi-missing trials appeared to have contributed to this finding. In the third study, Alexander et al. (1998) measured Harribance's brain wave activity using computer-based quantitative EEG (QEEG) while he performed five clairvoyance tasks (two photo-based psychic readings, two ESP card tests, and a remote viewing trial). Assessment of the QEEG data revealed bilateral alpha in Harribance's paraoccipital region during the tasks, with maximal alpha activity in his right parietal lobe (at electrode site P4). In the fourth study, Roll and Persinger (1998) recorded Harribance's occipital EEG while he performed psychic readings of photographs of people in opaque envelopes. Reading statements judged as moderately to very accurate for the people in the photos were found to be associated with more alpha than statements judged to be inaccurate ($p < .0001$).

2.2. Changes in Alpha Frequency and Amplitude

Stanford and colleagues conducted five studies with unselected subjects to determine if changes in EEG alpha frequency (an increase or decrease in Hz) were correlated with ESP scoring. In the initial study, Stanford and Stanford (1969) recorded the left occipital EEG in 11 subjects of various ages while they participated in a clairvoyance card test. They found post hoc that large increases in alpha from one half of a test run to the other half were correlated with increased variance in the run scores to a marginally significant degree ($p < .05$). In a formal examination of the question, Stanford and Lovin (1970) gave a precognition card test to 30 male college students. Changes in alpha frequency from a pre-test relaxation period to the precognitive test period were positively and significantly correlated with the resulting precognition scores ($p < .01$). An attempt by Stanford (1971) to replicate this finding gave a significant correlation ($p < .01$). In the free-response telepathy study where Stanford was the percipient, Stanford and Stevenson (1972) found that an increase in alpha frequency from the time Stanford attempted to clear his mind to the time he developed a mental image of the target picture had correlated positively with his ESP score ($p < .03$).

Using three experienced remote viewers, May (2001) explored whether changes in the amplitude of alpha waves (known as alpha desynchronization) were correlated with ESP scoring. Based on findings that suggest alpha desynchronization often occurs in relation to motor planning, higher cognitive processing, and sensory stimulation, May predicted that desynchronization should also occur in relation to successful ESP processing. To test this hypothesis, occipital and parietal EEG data were collected from the remote viewers while they attempted to view target images shown on a monitor at random times in an adjacent room. The results of the 70 test trials produced evidence for ESP ($p = .006$), but not for the predicted effect.

2.3. Effects of Alpha Feedback Training

As with some processes of the autonomic nervous system (e.g., breathing and heart rate), studies suggest it is possible to learn a degree of voluntary control of alpha activity by way of biofeedback training (Brown, 1970; Kamiya, 1969; Nowlis & Kamiya, 1970). In such a study, the subject's EEG is continually monitored by an electronic frequency discriminator that triggers a stimulus, such as a light or sound, when it detects the presence of alpha. The goal of the subject is to learn to produce or suppress alpha through feedback guidance from the stimulus, either keeping it on (production) or off (suppression) for as long as possible.

In the first ESP study of this type, Honorton and Carbone (1971) gave their subjects 10 feedback training sessions on alpha production in which the subjects participated in four ESP card test runs with a clairvoyance design. Alpha feedback was given to the subjects in two of the runs, and no feedback in the other two runs. The ESP scores for the feedback condition were insignificant, while the scores of the no feedback condition showed a significant ($p < .05$) negative correlation with alpha percentage.

Honorton, Davidson, and Bindler (1971) had 23 subjects go through a series of feedback training sessions on both alpha production and suppression the day before they did a clairvoyance card test. During the training sessions, the subjects were asked at various times to rate their mental state as a way to assess any changes in consciousness (ranging from normal alert consciousness to a deeply altered state) that may be associated with alpha production or suppression, and with ESP. They found that positive clairvoyance scores were associated with high levels of alpha, along with reports by the subjects of experiencing a deep altered state. The production of alpha was significantly higher than alpha suppression during both the feedback sessions ($p < .01$) and the ESP tests ($p < .001$), indicating that the subjects benefited from the training. While ESP scores for the alpha production condition were higher than for the alpha suppression condition, the difference was insignificant.

Prior to a clairvoyance test with a four-choice REG, Lewis and Schmeidler (1971) had their 14 subjects receive two sessions of alpha feedback training. During the training, the subjects attempted to learn to predict moments they were producing alpha by pressing a key. Unknown to the subjects, the key press also served as a covert ESP response on the REG. There was a positive relation between alpha amount and the covert ESP scores during the training ($p = .003$), whereas a negative relation was observed during the actual clairvoyance test ($p = .03$).

Two free-response ESP studies included alpha feedback training sessions. In a study by Rao and Feola (1973), a male psychic who was adept at meditation and had received alpha feedback training was more successful at describing hidden pictorial targets when asked to produce alpha than when asked to suppress it. Venturino (1978) had 20 college students receive a single feedback training session before participating in a clairvoyance test in which they attempted to describe target images in another room. The students' ESP scores were collectively at chance, and no significant correlations were found between their scores and measures of alpha abundance and frequency change in the occipital and parietal regions.

2.4. Other Brain Waves

Four studies have looked at ESP performance in relation to brain waves outside of the alpha band, mostly by broad-spectrum EEG. McDonough et al. (1994) recorded the EEGs of 20 professional artists while they served as percipients in a ganzfeld study. They found that percipients who hit the target showed more alpha and beta activity than percipients who missed it, and that missers showed more delta and theta activity than hitters. While testing a female psychic for remote viewing, Alexander (2000) recorded beta activity in her left frontal region (at electrode site F7) that was not present during baseline periods. In a computer-based precognition test disguised as a card game, McDonough et al. (2000) found that 20 gamblers showed a preponderance of 40 Hz waves in relation to target cards ($p < .05$) but not to non-target cards. The 40 Hz wave is within the 30 – 80 Hz gamma band, which is thought to

reflect the neural integration of cognitive processes, and the temporal binding of sensory stimuli in perception (Desmedt & Tomberg, 1994; Joliot, Ribary, & Llinás, 1994).

2.5. Summary

Studies examining the possible correlations between ESP performance and three types of alpha activity gave mixed results. Studies which have found a positive correlation between ESP scoring and alpha abundance have mostly been telepathy or clairvoyance designs (Cadoret, 1964; Honorton, 1969; Morris et al., 1972; Stanford & Palmer, 1975; Roll & Persinger, 1998), whereas the studies that found a negative correlation tend to be precognition designs (Stanford, 1971; Stanford & Lovin, 1970). The studies that found no correlation between alpha and ESP have tended to be ones in which no evidence for ESP was found, either (American Society for Psychical Research, 1959; Morris & Cohen, 1969; Venturino, 1978; Wallwork, 1959).

The studies by Stanford and colleagues suggest that ESP performance is positively correlated with changes (primarily increases) in alpha wave frequency. The study by Venturino (1978) failed to show this correlation, although its inclusion of alpha feedback training make it methodologically different from, and thus not directly comparable to, the studies by Stanford et al. It should be recognized that the ESP-alpha frequency change correlation is limited primarily to the work of Stanford et al., suggesting that this finding could be an experimenter effect. Further independent replication is needed in order to confirm this finding.

Studies that have explored the effect of alpha feedback training on ESP performance suggest that subjects can learn to gain some control over their alpha, but it does not always follow that ESP scoring will be improved, as evidenced by the feedback training studies that found negative relationships between ESP and alpha (Honorton & Carbone, 1971; Lewis & Schmeidler, 1971).

It is important to note in the ESP-alpha correlation studies that interpretation may be hampered by artifacts. First, alpha activity can be produced simply by opening and shutting one's eyes in a lighted room. While most studies have taken steps to reduce this possibility by having the subjects keep their eyes closed and using darkened rooms, the procedure has not been invariable. Second, it is known that EEG data may display temporal autocorrelation (usually on the order of seconds to fractions of a second) that may inflate the significance of correlation coefficient values if not taken into account (Chari, 1970; Kennedy, 1976; May et al., 2001). Ways to overcome these shortcomings include 1) formulating standard guidelines for the production and measurement of alpha that can be applied across future studies, and 2) using Monte Carlo methods such as those developed by May et al. (2001) to obtain valid estimates of statistical significance.

The few studies that have looked at brain wave activity other than alpha indicate that other wave frequencies, such as beta and gamma, may be involved in the ESP response, but the answer as to which ones and to what degree requires additional studies with broad-spectrum EEG.

3. THE BRAIN, PRECOGNITION, AND PRESENTIMENT

The term "precognition" implies mental images or other impressions in awareness about future events, which often occur in spontaneous cases, but rarely if ever in experimental studies, which may therefore better be called "presentiment," a term introduced by Radin (1997) for autonomic responses to future events. Experimental studies have explored three possible brain correlates of precognition and presentiment: 1) event-related and slow cortical potentials, 2) other pre-stimulus EEG signatures, and 3) functional imaging correlates.

3.1. Event-Related & Slow Cortical Potentials

Event-related potentials (ERPs) are minute neuroelectric changes in voltage recorded on the surface of the scalp via EEG, which are usually generated in response to sensory stimulation (Kolb & Whishaw,

1990, p. 372). A series of four studies by Don, McDonough, and Warren showed that ERPs may possibly serve as unconscious indicators of precognition. In the first two studies, Warren et al. (1992, 1996) recorded the EEG of the psychic Malcolm Bessent while he was tested on Honorton's ESPerciser™. The program had been modified so that each of the four images in the target pool was presented one at a time on the monitor screen, allowing individual ERPs to be recorded for each image. Although the ESP results were insignificant, the ERP voltage for targets and non-targets differed significantly, with the ERPs for targets showing more negative voltage than the ERPs for non-targets (p = .044). The differing ERPs for targets may indicate precognition because they occurred prior to Bessent's guesses of the target, and prior to the REG's choice of targets. In their third study (Don et al., 1998), the EEGs of 22 regular gamblers were recorded as they were tested on the ESPerciser™, which had been modified to resemble a gambling task with playing card images as stimuli. These subjects had also shown significant ERP differences between targets and non-targets (p = .007). In the fourth study (McDonough et al., 2002), 20 other gamblers again showed ERP differences between targets and non-targets ($p \leq .05$). In view of the apparent similarity between the ESP-associated ERPs and the ERPs associated with sensory and cognitive processing, speculation has been offered that the two may share similar properties (Don et al., 1998, pp. 140 – 141; McDonough et al., 2002, pp. 199 – 201).4

In a presentiment study that measured multiple physiological variables, McCraty et al. (2004) examined the ERPs evoked in the EEGs of their 26 subjects prior to their randomly viewing pictures of emotional (violent & erotic) and neutral (landscapes & fruit) scenes. A significant difference ($p < .05$) was observed between the ERPs for emotional images and the ERPs for neutral images. A particularly strong negative-value ERP was seen in the data of their 15 female subjects in the four seconds prior to their viewing the emotional images ($p < .05$). Electrode sites at the frontal-polar regions (FP1 & FP2), the left rear temporal region (T5), and the left occipital region (O1) were most active in female subjects. Electrode sites at the left frontal-polar (FP1), left rear temporal (T5), left rear parietal (P3), and both occipital regions (O1 & O2) were most active in male subjects.

A few researchers have examined the possibility that a slow cortical potential recorded from the frontal lobe, known as the contingent negative variation (CNV), may serve as an unconscious precognitive indicator. This is based on early EEG findings that suggest CNV, marked by its sharply negative voltage, may be a neural indicator of mental anticipation, expectation, and motor response priming (Walter et al., 1964). The first study to look at CNV in relation to precognition was conducted by Levin and Kennedy (1975), who had five subjects participate in a precognition task based on their motor response time. Light displays of red or green were randomly shown based on the output of an REG, and the subjects were asked to press a key as quickly as possible whenever they saw the green light come on. Overall, the subjects correctly predicted the green light flash 53.7% of the time (p = .05), and their EEGs showed a larger CNV voltage immediately before correct key presses as compared to the CNV prior to no key press. Hartwell (1978) attempted to explore CNV in a similar study, but his results failed to reach significance.

3.2. Other Pre-stimulus EEG Signatures

Bierman and van Ditzhuijzen (2006) measured their subjects' EEGs while they participated in a computer-based slot machine task. Three types of reel spins on the slot machine were possible: three different fruits (XYZ), two same fruits and one different (XXY), and three same fruits (XXX). The last of the three was a winning outcome with a 12.5% chance of occurring. Combining the EEG data from the frontal and midline electrode sites (Fz, Pz, & Cz), they found a significant difference (p = .026) in voltage between a future winning situation (XXX) and a future losing situation (XXY) during the one second before the outcome of the last spinning reel was determined. There were visual indications on the EEG record that this voltage difference began to develop even before the middle spinning reel had stopped.

Hinterberger et al. (2006) searched for possible presentiment signatures in the EEG activity of their 20 subjects during an experiment that was part of a larger study on brain correlations between spatially

separate individuals. During two test runs, their subjects viewed randomly timed emotional and neutral pictures on a monitor, and during a third run, they viewed randomly flashing checkerboard patterns. The three test runs were then compared to three control runs in which the monitor images were obscured by an opaque screen. Although no presentiment signature could be seen on the graph of the subjects' averaged test data, statistical analysis detected an increase in EEG activity during the second preceding the presentation of pictures ($p = .044$), with the increase being most notable for the emotional pictures ($p = .021$). No change in EEG activity was seen in the control data. In addition, a significant decrease in delta rhythm was found for picture stimulation ($p = .006$). Since the presentiment effect was indicated statistically but not graphically, Hinterberger et al. suggested that the effect might not be time-locked to the presentation of the stimulus, and may vary across individuals. Given that their study was not a direct replication of the original presentiment study design, this might have contributed some variation to their results.

In a study with 20 subjects, Radin and Lobach (2006) looked for a possible presentiment response to an impending light flash. EEG activity was recorded from the occipital region of each subject as they were visually and randomly stimulated by way of a pair of opaque glasses fitted with light-emitting diodes (LEDs). It was found that in the one second prior to stimulation, female subjects showed higher EEG voltage during trials when the LEDs flashed, as compared to trials when the LEDs were off and did not flash ($p = .007$). Male subjects had shown the opposite effect, but to an insignificant degree; the difference between males and females was significant ($p = .002$).

3.3. Functional Imaging Correlates

Two studies have attempted to explore the functional brain correlates of precognition and presentiment using functional magnetic resonance imaging (fMRI). Bierman and Scholte (2002) obtained brain scans with BOLD contrast from each of their ten subjects while they randomly viewed emotional (violent & erotic) and neutral pictures. The combined scan results of the subjects indicated increased functional activation of the entire visual cortex. For female subjects, significantly higher activation ($p < .05$) was observed in the four seconds *before* violent and erotic pictures were shown, as compared to neutral pictures. For male subjects, significantly higher activation ($p < .05$) was observed prior to viewing erotic pictures only. When Bierman himself participated as a subject, his fMRI scan also showed significant higher activation ($p < .01$) in his visual cortex in the three seconds prior to viewing the erotic pictures.

Inspired by the design of the ERP studies (Section 3.1), Moulton and Kosslyn (2008) used fMRI to examine the possibility of using event-related functional brain changes as a proof-oriented test for ESP. Using 19 emotionally connected agent-percipient pairs, they explored whether or not differential activation occurred in the percipient's brain in relation to targets as compared to non-targets, akin to the ERP differences observed by Warren et al. (1992).[5] Overall performance by their subject pairs on a two-choice ESP task was exactly at chance, however, and only one of the pairs had shown an interesting fMRI result (a difference in bilateral activation at the superior temporal gyrus), which they explained away as a likely artifact.

3.4. Summary

Unlike non-experimental reports of precognition, which usually consist of mental images about the future, experimental studies show that precognition also occurs on an unconscious level. In these studies, the precognitive response manifests as subtle changes in brain activity prior to the onset of an emotional stimulus. In the ERP studies, the changes consist of voltage changes across the cortex, while in the fMRI studies, they may reflect changes in blood oxygenation in the areas involved in the processing of the associated sensory stimulus. The indication from the presentiment studies that emotion is a determining factor for unconscious response is consistent with the finding from the spontaneous

case literature that precognition often occurs in relation to emotional events (Feather & Schmicker, 2005, Ch. 7 & 8; Persinger, 1974, Pt. 1; Stevenson, 1970).

4. THE CEREBRAL HEMISPHERES

Like the Roman god Janus, the brain has two parts that face in different directions. The first evidence of the dual nature of the brain comes from the work of Sperry (1968) with epileptic patients whose corpus callosum had been surgically severed in order to reduce their seizuring. In addition to relieving the severity of epilepsy, Sperry discovered that he had created a dual personality of sorts for his patients. A patient, for example, might hold a pencil in their left hand, which is controlled by the right hemisphere, and be able to distinguish it from other objects by touch. But if asked to name the pencil, the patient would be unable to do so because they have no access to the language functions of the left hemisphere.

4.1. Functions of the Left Hemisphere

As initially indicated by the work of Broca in 1861, and Wernicke in 1876, the left hemisphere is the seat of language production and comprehension (Geschwind, 1990; Kolb & Whishaw, 1990, Ch. 22; Schneider & Tarshis, 1995, pp. 636 – 639). Similarly, the left brain supports the memory of words (Funnell et al., 2001), and the visual identification and processing of words (McAuliffe & Knowlton, 2001). A study by Corina et al. (1992) further suggests that the left brain is not limited to speech, but may also support sign language, an ability that may tie it to motor control (Kimura & Archibald, 1974), another left brain function.

While not definitive, evidence points to left hemispheric dominance in motor control because damage or lesions to the left frontal and parietal lobes are associated with oral and limb apraxias (Carlson, 1992, pp. 227 – 229). In addition, Dawson et al. (1985) found significantly less alpha activity (suggesting increased cortical activation) in the left hemispheres of their subjects as they went through a series of verbal and motor imitation tasks. Kim et al. (1993) found preliminary fMRI evidence to suggest that the left motor cortex is equally active in both left and right hand finger touching. However, Borowsky et al. (2001) found contradictory evidence in an attempted replication. A study by Schluter et al. (2001) using positron emission tomography (PET) found that the left prefrontal, premotor, and parietal regions were all active during the selection of finger movements by either hand. Rogers et al. (2004) further found fMRI indications that the left supplementary motor area is active during finger movement.

4.2. Functions of the Right Hemisphere

The left hemisphere is said to be dominant because of its role in waking perception and behavior, while the right hemisphere is comparatively minor for these behaviors. The right brain is also comparatively mute, but we have now heard a great deal from it, in the first place through Roger Sperry. Sperry (1982) notes that the right brain is adept at nonverbal, nonanalytical, and nonsequential tasks, such as "...the reading of faces, copying of designs...the discrimination and recall of nondescript factual and visual shapes, spatial transpositions and transformations...and perceiving whole forms from a collection of parts" (pp. 57 – 58).

Since the initial proposal by Hughlings-Jackson in 1874, the right hemisphere has been thought to be specialized for visuospatial processing (Kolb & Whishaw, 1990, Ch. 24; Schneider & Tarshis, 1995, pp. 639 – 643). A recent meta-analysis by Vogel et al. (2003) of 4,278 cerebral lateralization studies relating to spatial ability does indeed provide strong statistical evidence ($p = .00028$) for this.

There is evidence to suggest that the right brain plays a role in object identification. In testing a split-brain patient, Funnell et al. (2001) found that the right side was functionally superior to the left in memory of objects. Examining this ability in healthy subjects, McAuliffe and Knowlton (2001) found

that pictures of objects shown to the left visual field, which is controlled by the right hemisphere, produced a quicker response than the right visual field. Similarly, Laeng et al. (2007) found that pictures initially shown to the left field were better recognized from memory several days afterward than pictures shown to the right field. In addition, Husain and Nachev (2006) note that lesions to the right parietal lobe often lead to hemispatial neglect, where people are unaware of objects in their left visual field. Some studies of depth perception (Durnford & Kimura, 1971; Kimura, 1973) further suggest that the right hemisphere is superior to the left in analyzing information about the location of objects in space.

There is evidence to the effect that the right hemisphere is involved in the mental tracking of time. Harrington et al. (1998) found that patients with right prefrontal and right inferior parietal cortex lesions frequently showed deficits in their ability to time events. Similarly, Morin et al. (2005) found that patients with right hemispheric stroke damage made significant errors in estimating the current clock time. Lewis and Miall (2006) found that the right dorsolateral prefrontal cortex is activated more often during the cognitively controlled timing of events. In addition, Battelli et al. (2007) found evidence that the area which supports the cognitive analysis of the temporal sequence of events is focused around the right parietal lobe, hinting that it may be a part of the "when" pathway in tracking event occurrence.

4.3. Summary

In addition to be the seat of language, the left hemisphere has been posited by some (Kolb & Whishaw, 1990, p. 373; Schneider & Tarshis, 1995, p. 659) to be the area associated with logic and analytical thinking. As discussed in Section 5.1, these are processes that may be psi-inhibitive. The suggestion that the left hemisphere is involved in motor control further suggests that this region of the brain may be more specialized toward handling and perceiving objects that are within the proximity of the body's sensory-motor system (i.e., local objects).

Psi phenomena suggest an ability of the mind to perceive and interact with objects that are located at spatial and temporal distances beyond that of the body's sensory-motor system (i.e., nonlocal objects). We predict that the left hemisphere's opposite facing partner, the right hemisphere, may be the region of the brain that is more specialized in dealing with nonlocal objects. We base this prediction on the following: 1) There is some evidence to suggest that the right hemisphere is more specialized in visuospatial processing and object identification (including the location of objects in space), and in the mental tracking of time. This indirectly implies that the right hemisphere may focus more on spatial and temporal factors than the left. 2) There is some evidence to suggest that psi is more closely associated with the right hemisphere (Sections 5 & 7).

5. CEREBRAL LATERALIZATION AND ESP

It has been thought that if ESP is in any way similar to other known cognitive and perceptual processes, then it too could be a lateralized ability. Broughton (1975) has pointed out that the first suggestion of ESP being lateralized was made over a century ago by F. W. H. Myers (1885) in his observation of the automatic writing of trance mediums. Myers noticed that their scrawled responses bore a close resemblance to communication efforts made by patients suffering from aphasia, a loss of language ability due to left hemispheric damage. Based on the idea that the right hemispheres of aphasic patients attempt to compensate for the loss, Myers suggested that the right hemisphere may control the writing of mediums.

Ehrenwald (1977) made a similar observation when comparing the drawings of telepathic receivers to the drawings of patients who suffered from agnosia (an inability to attach meaning to sensory impressions) as a result of damage to the left parieto-occipital region. He suggested that:

> "...the telepathic subject, like the patient suffering from optic agnosia, uses his *right*, rather than the dominant *left*, hemisphere for the central processing and organization of his impressions. The brain-injured patient has to fall back on the groping attempts of the "other side" of his brain to make up for the existing deficit on the left side. In turn, the telepathic percipient's productions carry all the hallmarks of the same difficulty in the organization and comprehension of his target material. That is, his responses likewise point to the part played in their origin by the right hemisphere (p. 725, italics in original).

Broughton (1975) has pointed to the work of Trevarthen, who argued that the differences between the two hemispheres may in part be reflected by different, though complementary strategies to acquire information. According to Trevarthen, the right brain takes a wide-angled view of the environment through the peripheral visual field to establish intelligent priorities and presumably to draw one's attention to relevant external stimuli. In contrast, the left brain selectively focuses on stimuli already in the central visual field, matching them against expectations. Broughton has argued that psi is more consistent with the wide-angle scanning view of the right brain than the focal approach of the left brain.

To further explore the hypothesis that ESP is lateralized, and that it is more particularly associated with the right hemisphere, psi researchers have examined ESP performance in relation to two areas: 1) cognitive abilities often associated with a given cerebral hemisphere, and 2) brain wave measurement and imaging of the cerebral hemispheres.

5.1. ESP and Hemispheric Cognitive Abilities

Braud (1975) has drawn attention to a cognitive difference between left hemispheric functioning and right hemispheric functioning, and regards the latter as part of a "psi-conducive syndrome" (pp. 147 – 149). Left hemispheric functioning is most often characterized by linguistic, sequential, analytical, logical, and rational thought processes; while right hemispheric functioning is characterized by nonverbal, visuospatial, simultaneous, gestalt, non-analytical, and intuitive processes (Schneider & Tarshis, 1995, p. 659). To see how each hemispheric type may affect ESP, Braud and Braud (1975) had one half of their subjects listen to an audio tape supporting left hemispheric mentation, and the other half listen to a tape supporting right hemispheric mentation. The two groups of subjects then attempted to describe a picture viewed by an agent in another room. A marginally significant difference between the two groups was noted ($p < .05$), as well as significant psi-missing displayed by the left hemispheric group ($p = .011$).

Another indication that left hemispheric mentation may be negatively related to ESP performance comes from an observation of remote viewing techniques. Targ (1994, p. 273; 2004, p. 59) and Targ and Harary (1985, pp. 51 – 52) noticed that a tendency shown by some remote viewers to analyze or draw detailed conclusions about the distant target they are trying to view often produces mental noise that can potentially diminish the quality of the viewing. Schwartz (2007), who explored the ability of two of his remote viewers, fiction author Michael Crichton and intuitive psychiatrist Judith Orloff, noticed that they seemed to use the free-flowing mentation of the right brain while gathering impressions about the distant target, and then switched to the analytical mentation of the left brain when attempting to interpret their impressions afterward (pp. 337 – 338).

If the left hemisphere holds ESP captive, as it were, perhaps it will loosen its grip if distracted; this was Broughton's (1976) thinking when he had subjects perform tasks regarded as conducive to left brain engagement (counting mentally or reading aloud from legal reports) while they simultaneously made non-verbal ESP responses. Two of his three experiments produced evidence indicating that the subjects did well when making forced-choice responses with their left hand (controlled by the right hemisphere) while their left hemisphere was occupied with the behavioral tasks ($p = .03$ and $p = .025$). In a later study of psi-influenced reaction time to an impending audio tone, Broughton (1977) obtained similar results, in that the responses with the left hand were quicker when the left hemisphere was distracted by reading ($p = .035$). However, Maher and Schmeidler (1978) objected to the procedure in Broughton's (1976) initial study, noting that the wooden geometric shapes handled by the subjects in making their

ESP responses could have engaged the right hemisphere because of its specialization in object identification and discrimination (Section 4).

Maher and Schmeidler (1977) attempted to maximize ESP sensitivity by engaging the functional preferences of the two hemispheres. During trials designed to test the ESP capabilities of the left hemisphere, the subjects tried to pick out one of five clear plastic cubes containing a slip of paper with the word "clover" from an opaque cloth bag, and avoid picking any of the 20 cubes with slips that said "wrong." While they did so, the subjects used their free hand to trace the edges of a visual pattern, a task that presumably engages the visuospatial processes of the right brain and keeps it from attending to the ESP responses being made by the left brain. During trials designed to test the right brain, the target cubes contained clover leaves, and the non-target cubes held bits of clear plastic. For these trials, the analytical processes of the left brain were engaged by having the subject solve syllogistic problems. The subjects succeeded in picking the correct cubes with their right hand while distracting the right brain with the pattern tracing ($p < .007$). However, a follow-up study by Maher et al. (1979) failed to replicate this result. Broughton (1978) pointed out that the pattern-tracing task used by Maher and Schmeidler may have also engaged the left hemisphere because of the motor skills required in the manual tracing (Section 4). The behavioral tasks utilized by Broughton (1976) and by Maher and Schmeidler (1977) are highly complex, and it is not clear whether they actually engaged the hemisphere that they were intended to affect.

Alexander and Broughton (2001) assessed the left and right hemispheric tendencies of their 50 subjects by first having them take a battery of neuropsychological tests designed to measure cognitive functions associated with each hemisphere. Each subject then acted as the percipient in a ganzfeld session. The results indicated that right hemisphere dominant percipients scored fewer direct hits than left hemisphere dominant percipients, although the difference in scoring rate between the two groups was insignificant.

An indirect suggestion that ESP may be associated with the right hemisphere comes from studies of cerebral lateralization in relation to beliefs in ESP and the paranormal. In surveying 108 college students, Roig and Neaman (1992) found that students displaying a preference for right hemispheric mentation also showed more belief in ESP. In a test with 30 students, Brugger et al. (1993) found that students who believed in ESP displayed more right hemispheric involvement in a lateralized tachistoscopic lexical-decision task than did skeptical students. Pizzagalli et al. (2000) recorded the resting EEGs of female subjects who strongly believed or disbelieved in the paranormal. Believers showed more activity in the beta-2 band (18.5 – 21 Hz) than disbelievers, which was localized to right brain electrode sites.

5.2. Brain Wave Measurement and Imaging of the Hemispheres During ESP

Maher (1986) conducted an EEG study that focused on the supposed tendency for the right hemisphere to process stimuli with emotion-inducing properties. She showed two artistic films to her subjects while monitoring their temporal and parietal EEG activity; one film showed interviews with people about their attitudes toward love designed to elicit strong emotion, while the other film showed architectural views that presumably generated little emotion. It was found that male subjects showed more right hemispheric involvement as compared to left while viewing the love film, whereas female subjects showed more right involvement while viewing the architectural film ($p < .05$). In addition, Maher found that the subjects' lateralized alpha wave activity under both regular viewing and ESP conditions was significantly correlated ($p < .04$). In other words, the subjects seemed to process the films in the same way during ESP conditions as they did while viewing them directly, whether by the right or the left brain as determined by the nature of the films.

Don et al. (1990) found that the broad-spectrum EEG of a psychic, Mel Doerr, displayed significantly more right hemispheric activity across all of the frequency bands they measured (delta, theta, alpha, & beta) for hits in a psychometry task ($.0001 \leq p \leq .004$), and more left hemispheric activity for misses. McDonough et al. (1996) later collected broad-spectrum EEG data from

McDonough during two studies that tested him on Honorton's ESPerciser™. For hit trials, alpha activity at posterior electrode sites was greater in the left hemisphere than in the right (p = .02). McDonough et al. (1996) note that the posterior sites showing this effect were situated close to the occipital region, where alpha is commonly recorded.

In their EEG study of the psychic Sean Harribance, Alexander et al. (1998) found the greatest amount of alpha activity in the right parietal region (P4) of Harribance's brain while he was engaged in five ESP tasks. Brain scans obtained through single-photon emission computerized tomography (SPECT) indicated increased functional activity in the medial parietal (aka. paracentral) lobule and superior parietal lobule of his right hemisphere during the ESP tasks (Alexander et al., 1998; Roll et al., 2002). In addition, Roll and Persinger (1998) found that when Harribance's right brain was stimulated with weak, complex magnetic fields, he reported that the subjective experiences evoked by the stimulation were akin to those that he often associates with ESP. Evidence from neuropsychological tests further indicated possible structural changes in Harribance's left prefrontal region, left superior temporal gyrus, and right occipito-parietal region (Roll & Persinger, 1998; Roll et al., 2002). Structural changes in the left prefrontal lobe and superior temporal gyrus of Harribance's brain would be consistent with his language acquisition difficulties as a child (which delayed his public schooling), and with the fact that Harribance is currently able to read and speak English at a level exceeding his education (an ability that would likely be lacking in the case of dysfunction).

During an EEG study of the psychic Ingo Swann, Persinger et al. (2002) found an unusual 7-Hz spike pattern and slow wave activity in Swann's occipital lobe while he was viewing remote objects. Although the unusual activity occurred across both sides of Swann's occipital lobe, close inspection of the EEG records suggests that it initially emerged over his right hemisphere. Brain scans later obtained with fMRI while Swann was at rest indicated possible anomalies in the area around his right occipital-parietal region, suggesting altered structural and functional organization in that area. In addition, Swann's neuropsychological test results produced below-average scores for some abilities that are associated with the right medial parietal lobule, the right superior parietal lobule, and the right prefrontal cortex.

In a preliminary study using functional near-infrared spectroscopy, Kokubo et al. (2005) observed cerebral blood flow changes occurring spontaneously in the right temporal lobes of their subjects as they made forced-choice clairvoyance calls. They noted that there was a significant tendency for the changes to be associated with strong impressions of the target ($p < .001$).

5.3. Summary

Although the evidence is not definitive, the results of most of the studies point to the right hemisphere as the side of the brain that is most associated with ESP, as first suggested by Myers (1885), Broughton (1975), and Ehrenwald (1977). Nine of the 13 ESP experiments reviewed here were tests for clairvoyance (Alexander et al., 1998; Broughton, 1976; Don et al., 1990; Kokubo et al., 2005; Maher & Schmeidler, 1977; Maher et al., 1979; McDonough et al., 1996; Persinger et al., 2002; Roll & Persinger, 1998), suggesting that the association is most likely to be with this form of ESP.

The studies examining ESP performance in relation to the cognitive abilities associated with a given hemisphere give mixed results. In the case of telepathy, the results of the first study by Braud and Braud (1975) provide weak evidence at best to support the right hemisphere hypothesis, while Alexander and Broughton (2001) obtained a result, albeit insignificant, supporting the left hemisphere hypothesis. The studies by Broughton (1976, 1977) and Maher et al. (1977, 1979) found opposite results for clairvoyance, but their results are confounded by the uncertainty in knowing if the behavioral tasks in question actually engaged the hemisphere that they were intended to affect. Three studies (Brugger et al., 1993; Pizzagalli et al., 2000; Roig & Neaman, 1992) found evidence suggesting that subjects who believe in ESP and the paranormal show a tendency towards right hemispheric mentation, although this should be considered indirect evidence only.

The alpha EEG results of Maher (1986) and McDonough et al. (1996) suggest that ESP may be processed by either the left or both hemispheres, while the EEG and imaging studies with psychics suggest right hemispheric processing (Alexander et al., 1998; Don et al., 1990; Persinger et al. 2002; Roll & Persinger, 1998).

Two findings emerged from the studies of the psychics, Sean Harribance and Ingo Swann. First, their neuropsychological tests indicated structural and functional changes in the right medial and superior parietal lobules. The medial parietal lobule is thought to be involved in creating meaningful associations from sensory stimuli (Roll et al., 2002, pp. 214 – 215), while the superior parietal lobule (Brodmann's Areas 5 & 7) may be involved in the visuospatial processing of objects in the left visual field, as suggested by imaging studies (Sack et al., 2002) and lesion studies (Kolb & Whishaw, 1990, pp. 423 – 432). Minor cortical restructuring in these regions might allow access to latent neural pathways that expand the psychics' visuospatial abilities beyond those of non-psychics.

Second, evidence was obtained in the study of both psychics suggesting that the occipital-parietal region of their right hemispheres is a possible region of interest (ROI) for the functioning of their ESP. Quantitative EEG data revealed this region to be active while Harribance was engaged in ESP tasks (Alexander et al., 1998). Resting fMRI scans of Swann's brain revealed a cluster of anomalous signals localized around this region (Persinger et al., 2002). With its close proximity to the occipital lobe, where alpha activity is often recorded, we speculate that this ROI may be significant for the ESP-alpha correlations (Section 2). In this connection, it is relevant that Harribance has shown increased alpha activity in relation to his ESP (Alexander et al., 1998; Morris et al., 1972; Roll & Persinger, 1998). On a different note, 7 Hz spike activity was observed in the occipital region of Swann's brain during successful remote viewing (Persinger et al., 2002).

Because the occipital lobe is known to be involved in vision, and the right parietal lobe is involved in visuospatial processing, we speculate that these same regions perform similar functions for the ESP of Harribance and Swann. Additional brain wave measurement and imaging studies need to be done with other psychics to determine if, and to what degree, the findings may be generalized.

6. THE TEMPORAL LOBES, THE LIMBIC SYSTEM, AND ESP

The history of the organism is encompassed by four-dimensional space-time, the brain's interpretation of reality, which is accessed by long-term memory. Penfield (1959) discovered that memories of past events could be elicited in neurosurgical patients by electrically stimulating their exposed temporal lobes, an area he called "the interpretive cortex." Based on a survey of ESP studies, Roll (1966) concluded that the ESP response is composed of long-term memories that match the ESP target in the same way that long-term memories are a part of sensory perception, a finding that is consistent with Penfield's work and is known as the memory theory of ESP.

Studies by Broughton (2006), Palmer (2006), and Stanford (2006) seem to support this theory. Broughton (2006) further suggests that emotion may operate in association with memory to select the memories that will compose the ESP response, similar to the way emotion seems to modulate response behaviors such as attention in visual search, conditioned fear, and decision-making (Dolan, 2002; LeDoux, 1998). Assuming that long-term memory and emotion are incorporated in the ESP response, it is to be expected that the structures in the medial temporal lobe which are most closely associated with memory and emotion, namely the hippocampus and the amygdala, will be active in ESP.

A survey study by Neppe (1983) of members of a South African psychical research organization found that members who reported more psi experiences showed more apparent symptoms of temporal lobe dysfunction than members who reported few or no psi experiences. Persinger (1984), Persinger and Valliant (1985), and Persinger and Makarec (1987) independently found a positive correlation between temporal signs in the temporal regions and the number of psi experiences reported among three groups of normal college students ($p < .001$). In an examination of a neuropsychiatric population, Palmer and Neppe (2003) found that patients diagnosed with temporal lobe dysfunction reported more psi

experiences than other patients to a marginally significant degree (p = .049), with female patients showing more signs of temporal dysfunction than males (p = .005). In a follow-up study, Palmer and Neppe (2004) found that EEG abnormalities were positively related to reports of psi experience by females (p = .049), but weakly and negatively related to reports by males (p = .091).

Studies by Makarec and Persinger (1990), Persinger and Makarec (1987), Persinger and Richards (1994), and Roberts et al. (1990) suggest that people may be distributed across a continuum of temporal lobe lability. Persinger and Fisher (1990) found that females, who regularly participated in a psychic study group, showed elevated temporal signs and reported significantly more psi experiences than a matched normal control group (p < .001). It is relevant in this connection that some mediums have shown temporal lobe signs, as indicated by their EEG (Nelson, 1970), or by their responses on a survey of temporal signs (Reinsel, 2003).

Summary

A number of studies indicate that the ESP response consists of implicit emotional memories that correspond to the perceived object. Because memory and emotion are processed by the hippocampus and the amygdala, which are part of the temporal lobe, this lobe may shape the ESP response. Four studies, which indicate that temporal lobe lability is positively correlated with reports of subjective psi experience, offer preliminary support for this view. On the basis of these studies, it may be predicted that activation of hippocampus and the amygdala occur in the brains of subjects who are involved in psi tasks, a prediction that can be tested with brain imaging technology.[6]

Four studies indicate that the population is distributed over a continuum of temporal lobe lability, and three studies that mediums and psychics displayed elevated temporal lobe signs. Based on these studies, we predict that psychics and mediums may be found along the upper end of the temporal lobe lability continuum.

Mainstream neuropsychological studies using PET (Okuda et al., 2003) and fMRI (Addis et al., 2007; Botzung et al., 2008) show suggestive evidence that the medial temporal structures (particularly the hippocampus) are active when a person attempts to either mentally re-experience a past personal event, or imagine an event that will occur in the near future. If the medial temporal regions were also found to be active in precognition and retrocognition, this would be a large step towards understanding these forms of ESP.

7. PK AND THE BRAIN

Compared to ESP, relatively little has been done to explore brain correlates of PK. In the limited number of studies that have been done, researchers have looked at PK performance in relation to three areas: 1) EEG correlates, 2) cerebral hemispheric processing, and 3) other brain structures that may support PK.

7.1. EEG Correlates of Micro-PK Influence

Several studies have examined random event generator (REG) correlations with EEG patterns. Schmidt and Terry (1977) continually recorded their subject's EEG, and an electronic frequency discriminator device monitored the EEG for a particular brain wave pattern (alpha on half of the runs, beta on the other half). When the device detected the pattern, it activated an REG to produce a random sequence of high- and low-pitched tones, which were presented to the subject as feedback and also as targets for PK. When given the task of producing more low tones, the subjects showed PK hitting (p < .002), while chance results were found when they attempted to suppress the tones.

In a test by Heseltine (1977), in which the REG was activated only when his subjects' EEGs crossed a line of zero electric potential, significant PK scores ($p \leq .015$) were obtained during runs in which the subjects received audio feedback, while chance scores resulted from the no-feedback runs. Similar

results were obtained in a replication study by Heseltine and Mayer-Oakes (1978) with roughly the same design ($p \leq .025$). In both studies, the PK hits were associated mostly with the alpha rhythm, and, to a lesser extent, with the beta rhythm.

Honorton and Tremmel (1979) had their subjects try to influence their own EEGs with the goal of producing and sustaining alpha, as indicated by audio feedback. Unknown to the subjects, background data were collected from an REG that was activated whenever alpha activity registered on the EEG. Significant PK hitting was found in the REG data when the subjects were successful at the task ($p = .002$). Varvoglis and McCarthy (1986) obtained a similar result in a study with a similar design ($p = .005$).

By way of a computer-based neurophysiological feedback system, Hinterberger et al. (2004) had their subjects develop a self-chosen strategy that was aimed at voluntarily controlling the shifts in polarity (positive or negative) of the slow cortical potentials (SCPs) being produced on their EEGs.[7] The subjects then participated in a SCP influence task in which identical visual feedback was given to them, either from the EEG measuring their SCPs on certain runs, or from a running REG on other runs. Significant SCP control effects were produced by the subjects who displayed high motivation ($p < .001$), and the same mental strategy they had developed and applied to control SCP also seemed to affect the REG output.

In the most recent study, Storm and Burns (2007) had their subjects attempt to voluntarily produce and maintain an alpha rhythm on their EEG as one of the ways to receive animated visual feedback in the form of a spinning human figure, as shown on a computer screen. The EEG data from this alpha production task were later compared to the EEG data collected during runs in which the subjects attempted to directly influence the motion of the spinning figure by PK, in order to see if alpha would be higher during this direct PK task. Contrary to prediction, alpha activity during the PK runs was found to be lower than, and not significantly different from, the alpha activity during the production task.

7.2. PK and the Cerebral Hemispheres

In a study of the phenomenological characteristics of PK, Heath (2000) reported that some of her informants indicated that suspension of the intellect is PK-conducive. For example, one of the informants stated, "I think the common thread that runs through [the PK experience] is that the cognitive left brain analyzing part of the mind is out of the picture for a while" (p. 59). Other informants indicated that either their or another person's inability to let go of their intellect seemed detrimental to their PK attempts (p. 67).

Following the design of Braud and Braud's (1975) ESP lateralization study, Andrew (1975) had one half of his subjects listen to an audio tape emphasizing left hemispheric mentation, and the other half listen to a tape emphasizing right hemispheric mentation, before having both groups each participate in a REG PK task. He found that subjects who listened to the right mentation tape showed PK hitting ($p = .02$), whereas subjects who listened to the left mentation tape showed PK missing ($p = .011$); the difference between the two groups being significant ($p < .002$). In a replication attempt (Braud et al., 1976), PK hits were obtained by subjects listening to the right mentation tape ($p < .0014$), and PK misses were obtained by subjects listening to the left mentation tape, the latter result being insignificant.

In the replication study by Heseltine and Mayer-Oakes (1978), where the REG was activated by brain voltage activity (Section 7.1), half of the PK runs were collected from EEG electrodes placed along the right hemisphere, while the other half were collected from electrodes along the left hemisphere. Runs in which the right hemisphere was measured resulted in PK hitting ($p \leq .0025$), whereas runs in which the left hemisphere was measured resulted in PK missing ($p \leq .025$).

7.3. Other Brain Structures and PK

The possibility that the temporal lobe may be involved in PK has come up in neuropsychological studies of RSPK agents. Roll (2007) found that two agents, who currently exhibited RSPK, showed evidence that their brains were prone to seizure activity (by epilepsy in one case, and by Tourette's syndrome in the other). A previously active RSPK agent in another study (Roll, 1969) displayed a brief period of EEG spiking that would have indicated complex partial seizure if more pronounced. Roll (1977, pp. 400 – 401) had previously found in a survey of 92 agents that 22 had either been diagnosed with epilepsy, or displayed symptoms of complex partial seizure (one of the 22 was the active agent diagnosed with epilepsy).

Insofar as PK is volition working outside the body, it may rely on the same brain processes that govern volition within the body. Using BOLD fMRI, Lau et al. (2004) found enhanced activity in the pre-supplementary motor area of their subjects' brains when attending to their intention to move a finger. In another fMRI study, Nachev et al. (2005) found the caudal pre-supplementary motor area to be active in the generation of volitional plans. A third fMRI study by Winterer et al. (2002) found the supplementary motor area to be active in conjunction with the neighboring motor region of the dorsal anterior cingulate cortex. Some studies have suggested that the wider prefrontal cortex may have a role in volition (Ingvar, 1994; Nachev et al., 2005).

From this, it may be predicted that the pre-supplementary motor area and the motor region of the anterior cingulate cortex underlies PK. However, the possibility that the prefrontal cortex is involved in PK is counter-indicated in an REG study by Freedman et al. (2003), where a male patient with frontal lobe damage showed PK hitting ($p = .0015$).

7.4. Summary

Although limited in amount, the results of neuropsychological studies of PK show consistency with those for ESP (Sections 2, 5, & 6). Five studies (Heseltine, 1977; Heseltine & Mayer-Oakes, 1978; Honorton & Tremmel, 1979; Schmidt & Terry, 1977; Varvoglis & McCarthy, 1986) suggest that PK is mostly associated with alpha wave activity.[8] Studies of cerebral hemispheric mentation (Andrew, 1975; Braud et al., 1976; Heath, 2000) and EEG correlation (Heseltine & Mayer-Oakes, 1978) show some evidence that PK-hitting is associated more closely with the right hemisphere than with the left. Two of the studies (Andrew, 1975; Heseltine & Mayer-Oakes, 1978) further produced evidence suggesting that the left hemisphere is associated with PK missing. However, the evidence for positive and negative PK in these studies may be experimenter effects rather than results of the subjects' PK. The indication that the temporal lobe is involved in PK is due to neuropsychological studies of active RSPK agents.

Additional studies are needed to confirm these findings, preferably by brain imaging technologies such as fMRI and SPECT. Insofar as seizure within the body is comparable to the "seizure" of objects at a distance from the body, i.e., RSPK, both may rely on the same or similar neuropsychology.

8. CONCLUSION

Several ESP-alpha studies suggest that the two are linked, although this interpretation is limited by methodological issues. There are also indications that ESP is associated with the occipital lobe and perhaps with the parietal lobe. In addition, ESP may be facilitated by lability in the temporal lobe. Evidence of engagement by the occipital lobe has emerged also in presentiment. Studies of two psychics, Sean Harribance and Ingo Swann, have shown evidence to the effect that the parietal-occipital region of their right brain hemisphere is sensitive to ESP, and most other studies suggest that the right hemisphere is sensitive to ESP. Event-related potentials (ERPs) and their variant, contingent negative variation (CNV), have indicated unconscious precognition in several experiments. In several studies of ESP and PK, the evidence consists of negative deviations from chance.

A great deal of research indicates that the ESP response consists of implicit memories activated by the perceived object in much the same way as sense perception consists of implicit memories activated by sensory stimuli.

As in ESP, several PK studies suggest that the presence of the alpha brain wave may facilitate PK, while other studies indicate that audio or visual PK feedback may do the same. An experiment which showed that measurement of the right hemisphere led to PK hits and that measurement of the left hemisphere led to PK misses, may suggest that the positive and negative PK were experimenter effects.

Studies suggest that voluntary PK and voluntary bodily behavior may utilize the same brain processes. Similarly, involuntary PK behavior of the RSPK kind, which may be caused by seizure activity in the brain, seems akin to involuntary bodily behavior which may also be due to such factors, thereby indicating that both may result from the same neuropsychological processes.

In general, there is considerable evidence that ESP and PK utilize the same or similar brain processes as familiar forms of perception and behavior. These findings, together with the observation that results of psi experiments are consistent with quantum physics, demonstrate that parapsychology is on par with the recognized branches of science.

NOTES

1. In order to extend the principles of quantum theory to neuropsychology, and to provide possible solutions to the "hard problem" of consciousness, some consciousness researchers have proposed quantum models of the brain. For discussion of these models, we refer the interested reader to the overview by Atmanspacher (2004).
2. Electrode sites refer to the layout of the International 10-20 electrode placement system.
3. It should be noted that although Kelly and Lenz (1976) state in their *RIP 1975* article that the MANOVA was significant, they cite no specific probability value.
4. Don, McDonough, and Warren have also conducted ESP-brain studies with two ostensible psychics, Olof Jonsson and Susan (Cottrell) Goebel. Because of previous suspicion of trickery (Hansen, 1990), the brain studies of these subjects are not included in our review.
5. Although Moulton and Kosslyn's study is presented as a telepathy test, they suggest (p. 184) that precognition may also have been possible because the percipients could have received impressions of the target images they would be shown as feedback after they had made their responses.
6. One reason for the paucity of imaging studies exploring the functional activity of the limbic structures, both in mainstream psychology and in parapsychology, may be due to the fact that it is somewhat difficult to obtain high-resolution fMRI scans from the area around the amygdala because nearby sinus regions may interfere with BOLD signals (Merboldt et al., 2001).
7. Slow cortical potentials are EEG voltage signals occurring at frequencies below 1 to 2 Hz (Hinterberger et al., 2004, p. 39).
8. The association between PK and alpha activity faces the same limitations as those for the ESP-alpha association; see the summary for the latter (Section 2.5).

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REPORTING ON CONSCIOUSNESS: COMMUNICATION IN MENTATION NARRATIVES

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ABSTRACT

In this paper we report on an analysis of mentation reports from a series of autoganzfeld experiments. The data come from the sender/no sender experiments conducted at the Koestler Parapsychology Unit in the 1990s (Morris, Dalton, Delanoy & Watt, 1995). Previous research on mentation narratives has tended to focus, firstly, on the degree to which participants' descriptions of their imagery correspond to the characteristics of the stimulus materials, secondly, on identifying psychological characteristics of the participants' experience during the ganzfeld procedure. The analysis presented here, however, takes a different perspective. Drawing from methods for the analysis of communication in social science and linguistics, we treat mentation reports as socially organised and discursive events. Instead of examining participants' reports to identify indicators of inner cognitive experience then, we analyse them to identify communicative skills and practices through which mentation narratives are pragmatically constructed. We offer a review of three findings. First, we make some observations on the temporal organisation of imagery descriptions. Second, we examine a discourse strategy by which participants may exhibit a stance or position on the status of the imagery they report. Finally, we note some poetic features of imagery description in mentation reports. In the discussion we explore the implications of these findings, and this kind of analysis, for parapsychological research on mentation reports, and for the use of introspective data in the study of consciousness more generally.

INTRODUCTION

In this paper we report on an analysis of mentation reports from a series of autoganzfeld experiments.

In the context of the ganzfeld experiment, the mentation narrative has particular significance. It is assumed that the mentation imagery may provide clues as to how psi processes interact with more routine psychological processes. The significance of the mentation imagery is demonstrated by the inclusion of a mentation review in many ganzfeld procedures, in which the experimenter reads out his or her notes of the mentation narrative to ensure that the record is correct, reminding participants of the comments that they made during a prolonged period (typically of half an hour). The review also allows the participant further opportunity to expand upon aspects of their imagery which were recalled subsequently and therefore not raised in the original mentation.

Previous research on mentation narratives has tended to focus, firstly, on the degree to which participants' descriptions of their imagery correspond to the characteristics of the stimulus materials. For example, Parker and his colleagues have identified what appear to be striking, real time correspondences between participants' reports and events depicted on video clips used as target materials (Parker, 2000; Parker, Grams & Pettersson, 1998). In this, the verbal mentation reports have been taken as − at least potentially − broadly accurate representations of the participants' inner experiences.

Alternatively, mentation narratives have been examined to identify psychological characteristics of the participants' experience during the ganzfeld procedure. For example, Carpenter (2001) analysed a corpus of 364 transcribed mentation narratives collected from a number of ganzfeld trials. The objective of his analysis was to study the "explicit experiential approach of the percipient to the ganzfeld task" (Carpenter, 2005, p. 17). From this analysis, he developed a set of rating scales which captured

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psychological predictors of the experience. These scales addressed various aspects of the participants' experience of the ganzfeld procedure: idea units (which relate to broad overarching categories of mentation experience); physical experience; cognitive aspects of imagery; the ways in which imagery may be enlivened; emotional arousal; and perceptions of colour. In a subsequent study (Carpenter, 2004), these scales were used to examine an additional corpus of 251 mentation narratives. Statistical analysis suggested that these psychological characteristics of the experience may be predictive of successful or unsuccessful performance in a ganzfeld trial. So for example, failure to identify the target material was associated with over-intellectualization of the task, anxiety and excessive verbosity; successful trials were associated with a particular type of imagery (that which indicated self transcendence), and broadly positive emotional and physical experiences during the experiment.

The work by Parker and his colleagues and Carpenter exemplify what might be termed a traditional experimental approach to the analysis of mentation narratives, and one that reflects methodological procedures and assumptions that inform much psychological and social science research which uses verbal reports as data. These are:

[a] It is assumed that the mentation narrative offers a more or less reliable and accurate representation of the participant's experience of consciousness.[1] In this, the perspective implicitly assumes a correspondence theory of language, in that descriptions are taken as broadly 'standing in' for the states of affairs to which they refer.

[b] Analysis is directed towards the development of coding or rating scales which permit statistical analysis, and which can be used as predictors of outcomes in subsequent experimental trials.

[c] The focus of analysis is on the psychological and experiential nature of the participants' participation in the experiment when the mentation narrative is being produced. As such, participants' reports are examined as a resource in the exploration of the psychological experiences they are assumed to reveal. Mentation narratives are not studied as topics in themselves. This is reflected in the fact that data from mentation narratives rarely appear in research literature, even in published accounts of research in which analysis of mentations have been undertaken (for example, Stanford & Frank, 1991).

The analysis presented here, however, takes a different perspective. Drawing from methods for the analysis of communication in social science and linguistics, we treat mentation reports as socially organised and discursive events. Instead of examining participants' reports to identify indicators of inner experience, then, we analyse them to identify communicative skills and practices through which mentation narratives are pragmatically constructed.

Our objectives are twofold, and interrelated throughout the analysis. First, we strike a cautionary note about treating narratives as unproblematic reflections of inner experience by describing some structural properties of mentation reports which suggest that they are socially organised practices. However, by examining the discursive properties of mentation reports, we hope to be able to contribute to the broader concerns that animate parapsychological research in this area. A second goal of this paper, then, is to argue that communicative and descriptive practices through which mentation narratives are produced may have a bearing on the content of the report.

[1] The epistemological value and ontology of first-person experience and reports has long been contested (e.g., Kant, 1781; James, 1890; Wundt, 1907; Titchener, 1898; Nisbett & Wilson, 1977; Chalmers, 1999; Dennett, 2003). The topic is currently one of vigorous scrutiny, with an emphasis on how best to elicit reports that are reliable and valid (e.g., Ericsson, 2003; Hurlburt & Heavey, 2006; Overgaard, Gallagher, & Ramsøy, 2008; Varela, 1996). The approach advocated in this paper brackets the problematic status of first-person reports, focusing instead on verbal reports as social acts, with an awareness of the contextual and intersubjective nature of consciousness and language.

DATA AND METHOD

The data for this study are transcripts and audio recordings of mentation narratives from ganzfeld ESP experiments conducted during the mid 1990s at the Koestler Parapsychology Unit in the Department of Psychology at the University of Edinburgh (Morris, Dalton, Delanoy & Watt, 1995). Using transcription conventions from conversation analysis, 27 mentation narratives (approximately 13.5 hours of recorded audio recordings) were transcribed, yielding a corpus of 100 pages.

The analytic method adopted here draws from Conversation Analysis, or CA. CA is a formal, qualitative method for the analysis of naturally-occurring interaction. It developed out of the studies of Harvey Sacks and his colleagues Emanuel Schegloff and Gail Jefferson. The application of conversation analytic methods to parapsychology and to the analysis of parapsychology experiments more specifically, has been outlined in a number of publications (Allistone & Wooffitt, 2007; Wooffitt, 1994, 2003, 2006; Wooffitt & Allistone, 2005, 2007). These papers detail the analytic perspective and assumptions adopted in conversation analytic research, but it is useful to rehearse in outline the key methodological goals and principles.

CA seeks to describe the tacit communicative skills and competences that underpin strongly patterned or robust properties of naturally occurring language use. As such, it sits at the intersection of linguistics, psychology and sociology. Despite its name, it may be applied to any form of naturally occurring verbal communication, including data which may seem monologic, such as interview accounts (Wooffitt, 1992), political speeches (Atkinson, 1984; Heritage & Greatbatch, 1986), market traders' sales spiels (Pinch & Clark, 1986) and the stage performances of management 'gurus' (Greatbatch & Clark, 2003).

Conversation analysis offers a qualitative description of how people use language in real life settings. It is not, therefore, an experimental procedure. Nor does it rely on methodological procedures associated with quantitative approaches, such as the development of coding schema. Empirical research, however, is highly formal. Analytic claims are warranted through an unusually close description of audio recordings of interaction facilitated by detailed transcriptions. Moreover, analytic claims are generated from the close examination of collections of individual cases. In this, the approach is more like that of the scientific naturalist than the laboratory scientist. (For introductory overviews of conversation analysis, see: Heritage, 1984; Hutchby & Wooffitt, 2008; Sacks, 1992; Schegloff, 2007).

CA transcriptions try to capture characteristics of verbal interaction omitted from transcripts that merely record the spoken word. This is because research has shown that even speech events that seem trivial can have important consequences for the participants. This means that transcriptions capture aspects of utterance delivery and periods in which there is absence of talk, as well as what was said. To capture these often overlooked features of verbal interaction CA employs a transcription system which uses symbols available on conventional typewriter and computer keyboards, a description of which is provided in the Appendix.

ANALYSIS

In this paper we describe three sets of findings. First, we make some observations on the temporal organisation of imagery descriptions. Second, we examine a discourse strategy by which participants may exhibit a stance or position on the status of the imagery they report. Finally, we note some poetic features of imagery description in mentation reports.

The temporal organisation of imagery descriptions

It is noticeable that in most mentation reports, participants do not provide continuous reports of their imagery. Instead, reports of discrete images are temporally attenuated. In the following case, for example, the participant provides minimal descriptions of imagery (sometimes only one or two word

reports) between which are lengthy periods of the absence of any talk (indicted in seconds and tenths of seconds in the brackets)

(1) (01-05: 'S' is the subject/receiver)

S: u:m: (2.4) something: about (0.3) ˙h butterflies (3.8) ˙h and there's somebody swimming
(27.)
u:m: (2.6) an: engine
(25.5)
(hh)wa:y:, in the horizon >far away< (1.3) °j'st a° dot
(19.4)
˙hh a:: doorwa:y h (0.7) ˙h made of stone,
(15.4)
hhh things seem to be- (.) um:, (0.9) pa:ssing (2.4) °(t)° going pa:st.
(28.0)
°hh ˙h ↑u-° a picture (0.4) in a fra:me
(11.3)
°°>↑uh-< (pt)°° (0.5) u:m:
(8.0)
a shoe::
(10.1)
h >might've been a< footprint cos there's some: (0.6) sea:
(11.3)
something in the air as well
(12.4)
apple
(34.0)
°'n there's=a° tunnel, (2.2) going into a tunnel.
(6.2)
>there's a< present,
(4.6)
hh and a cable ca:r: (1.2) going do:wn.
(44.9)
˙hhh >christmas< tree:: (.) well. a fir tree
(50.0)
u::m (0.9) °(p)hh° a boat in the water:=leaving a wake
(31.0)
'n: a pi:le of something
(36.5)
°a(h)° f:rog, (5.5) big one
(18.3)

In this sequence, the subject reports a range of discrete imagery experiences. These are separated by periods of silence ranging from 50 to 4.6 seconds. This kind of temporal distribution of imagery is very common. It also occurs in the mentations of participants who provide more extended or elaborated reports of their imagery. In extract 2, for example, many of the participants' reports are built from more extended phrasal, clausal or sentential units.

(2) (**01-28)**

now all I seem to think about is war-=water seems to be rush, ˙hhh
(11.2)
>feels like< I'm just constantly: floating °from° place to pla-, °˙hh°
(17.9)
°s'like I'm getting further and further away from° °°°everythi(hh)ng°°
(23.2)
°°seems incredibly darker agai(h)n?°°
(5.0)
body's feeling °heavier,°
(10.9)
°°↑can't°° °see anythi=hh°

The following extract reveals that the mentation narratives of even highly verbal participants may display similar temporal distribution. In extract 3, the subject produces extensive clusters of descriptions relating to particular imagery, or descriptions of images, that are related to and develop from a primary image or experience. The periods of silence between these descriptive clusters (arrowed in this transcript) last for 20.3, 70.2, 45.6 and 20.7 seconds respectively.

(3) (01-82)

S: the first thing I notice is- (.3) um:: (.6) for a start that my body doesn (.) 't (.) feel (1.3) quite as though I'm >sitting in=a< chai::r it- (1) it's as though my ar:ms feel thi:s (.4) u*h::: they=were*:: (.7) >the other way up< (.2) than they we:re (.4) >to start off wi:th< (.) >and bu- I'm I'm< not >sort've< sitting in=the same positio:n (1.5) that (.) almost as though it e: (.5) the feeling >that you might get if you're sort've< (.5) drifting in space

→ (20.3)
>there seems to be some sort've::< (.) i:*mpression=of:: (.3) um:: (1.3) >I=mean maybe< it's the >it's the< noi:se >>that's reminding me of the sea: but s'rt've<< (.8) sitting=on a*:: a- a- a- cliff on on on the top of a hi:ll an- (1.3) not so much (.4) hearing the sea as >j'st s'rt've< (.4) staring out=at=a big expanse of of of sea

→ (70.2)

>someho:w I get the idea=of a=lot've< (.5) uh: colours(.2) °°uh°° °I don't kno:w° (2.3) u:::: >I=don't=know what colours or anything but s'rt've< u::: >>or whatever the other they're reasonably<< (.) bri:ght (.3) >>they're=not<< um::: (3) s-s- >s'rt've< u*m::: (1.5) °°u:::°° (.) psychedelic >they're not< u*m::: (.5) >>°they're=not°<< natural (1.4) °°*u:::°° (.) something like on *a:::: (.)°*a::° (.)°*a::° (.4) °*a::° (.) >>s'rt've<< (.3) °*a::° (.7) ˙hhh unreal like=a gamesho:w or something or:=or: °um:::° (2) o*:n the:se (.) these adverts (.3) °*u::°

→ (45.6)

>I:=also: get the impression=of< (.7) feeli:ng (.6) *um:: (.3) qui:te- o:possi:te >s'rt've< (.2) ˙hhh (feeluh) isolated a::=as th*ou:gh (.3) u::m (2.7) >I=dunno<=u::: (.) >very differe:nt-< as as though you:: you're in=a *a (.6) *yu:: u:: (.2) big long tunnel o:r:: (.2) ˙hhh (.2) in an ice cave or something like that where where:: (.4) n: n-n-not- that- (.4) you:'re the only one that- (.7) >just=that=there's< ˙hhhh (.7) °°°*u::°°° (.2) *you're surrounded by: (.2) by: (1.6) °°*u::m°° (.7) °°*u::°° (.2) somethi:ng >>something<< very big (.) *u::m (.5) °*u:m° (.8) >something tha-=you can't< tou:ch (.)°maybe*::° (.) >°that sort've thing°<

→ (20.7)

>>I'm=also:<< >getti:ng< (.2) >the=idea=o:f< (.3) u:::m (1.9) LOOking through two (.3) °°°*u::°°° (.2) tunne:ls
((continues))

These periods of silence between discrete reports of descriptive clusters are interesting for this reason. The participants have been asked to report on their experience of their own consciousness throughout the sending period of the experiment. If we take the view that mentation reports are a literal representation of the participants' experience, we might assume that during these periods, there is nothing to report, and from which we might conclude that for these (and other) participants, imagery/consciousness is intermittent. However, this is unlikely, as it runs counter to our intuitive experience of the phenomenological continuity or stream of consciousness (Hurlburt, 1990; Hurlburt & Heavey, 2006; James, 1890). What these periods of silence suggest is that there is a tacit *ordering* of reports. Moreover, it would suggest that this ordering is independent of whatever phenomenological experiences the subject may be having. There is at least one sense, then, in which we should be wary of treating mentation narratives as a more or less straightforward reflection of the experience of phenomenal consciousness.

Displays of epistemic stances towards imagery

During the mentation, participants do not merely report; they perform other kinds of discursive acts as well. In this section we look at instances in which participants appear to question their own imagery. We argue that this feature of speech production may be a systematic device by which the nature of the imagery may be established and via which the subject may display an epistemic stance or position towards the status of their experience.

In extract 4, the subject describes imagery concerning a drill. During this (arrowed) report, the subject produces an exclamation, "oh", with a marked rising or 'questioning' intonation (indicated here by the use of a question mark).

(4) (01-18)

°u°=mickey mou:se,
(15.5)
→ ˙hh it's in slow motion like a:: (0.6) ˙h oh? i's: like a drill like a:, (1.4) ˙h I see the threads of a drill spinning roun:d.
(5.0)
<could be >there's an< octopus spinning.
(10.8)
˙hh I have the humming top that's spinning now

There is a report of movement, "it's in slow motion"; an attempt to convey what the imagery is like, "like a drill", which is prefaced by the question-marked "oh"; and then there is a report of how this imagery appeared in consciousness: "I see the threads of a drill spinning roun:d". This descriptive cluster, then, is constructed from three components.

Three-partedness is a culturally available and normatively expected feature of listing and descriptive practices in a range of discursive contexts: conversational interaction (Jefferson, 1990), political rhetoric (Atkinson, 1984) and advertising materials (Drew, 2007). The construction of a three-part report of a mentation item suggests that an orientation to socially organised communicative practices informs reports of utterly private mental states.

There is another feature of three-parted organisation which is relevant here. Studies have shown that three-part lists can be used to indicate a general quality common to the items in the list. It is a way of marking some commonality between the objects or events so described, (Jefferson, 1990). With respect

to the section from extract 5, the three parted construction works to establish that the discrete items − 'movement', 'drill', and 'a drill spinning' are references to the same event in consciousness.

The question-marked 'oh' makes a particular contribution to the sense that there is a single phenomenological entity occupying conscious awareness. Heritage (1984) has analysed the use of 'oh' in conversational materials and found that it is a 'change of state' news receipt token on the part of the speaker. However, this is not a claim that this particle is a public display of some real change at a cognitive or mental level. As Heritage observes, there are occasions when news is reported, or informings occur, but which are not marked with 'oh' receipts. For example, in medical consultations and news interviews, one participant will inform another, but these kinds of interaction are distinctive because of the *absence* of 'oh' particles (Heritage, 1984, p. 336) This strongly suggests that the use of 'oh' is informed by interactional contingencies of relevance to particular social contexts.

In extract 4, the three part construction of the descriptive cluster incrementally establishes the sense that there is one determinate image or sensation manifesting in the participant's consciousness, and in this context, the question marked 'oh' change of state token does particular work, as it acts as a public display of 'coming to realize': in this case, 'coming to realize what something was all along' (Wooffitt & Allistone, 2005).

In the following extract, question marked intonation occurs with respect to a longer segment of talk. Examination of this extract provides further evidence that participants may establish a stance toward their imagery. It also allows us to point to some recurrent design properties of question marked components.

(5) 01-18

S: >feel like< I'm much bigger:, (.) feel like °I'm:° (0.3) ˙h >hundred foot<
tall >u- feel< °u:::° (0.2) ˙hh my hands feel SO LIGHT that they're very
>heavy< (6.7) >>feel like there's uh<< <like I'm inflated from::. °eh° ˙hh I'm:: >>s't've<< one big balloo::n
(21.5)
˙hhh feel a bit °°of a°° pain in my lower stoma:ch, (.) °like° >my lower
→ gut< (5.6) °°>>u: yu-<<°° feel like I'm::, ˙hhh e:r::: >could be something< like aeroplane:? °°>>t-uh,<<°°
(58.8)
now I manage to- (1.4) °l°=leave my body a bit (2.3) °>>uh bu-<<° I feel
→ less:, (.) °u-° inside my head (5.3) °be°gin to feel s'r'ta higher?
(35.8)
I'm going upwards

There are two (arrowed) cases in these descriptive clusters: ">could be something< like aeroplane:?" and "be°gin to feel s'r'ta higher?" These components of the imagery description share some common properties, and perform similar tasks.

They are, first, in what may be termed terminal position, in that they are the last component of the descriptive cluster. There is no further talk on that imagery; there follows a lengthy period of silence, and when the subject speaks again, they begin to report a different set of experiences. They are, then, devices by which description of a discrete imagery may be concluded.

Second, both question-marked components seem to be touched off by some difficulty or dysfluency in the prior stretch of talk. So, in the first case, the talk prior to the question marked component is abandoned in mid production, and the utterance ">could be something< like aeroplane:?" is introduced with a speeded up delivery. In the second case, the report of the imagery is marked by perturbations and dysfluency; there are words that are cut off, attempts to describe the experience are launched but then abandoned mid-production, and there is notable fluctuation in the tempo of the delivery. It is in the context of this, what may be termed a troubled report, that the question-marked component is produced.

In conversation analytic terms, the question-marked components are self-repairs (Schegloff, Jefferson & Sacks, 1977) on on-going utterances.

Finally, in both cases, self-referential pronouns ('I' and 'me') are absent. We may note that they may be *designedly* absent, insofar as there are personal references in the immediately preceding stretches of talk. So, for example, in the first case, the subject reports a pain in "my lower gut"; and in the second case, there are several uses of the pronoun 'I'. The talk prior to the question marked components then clearly exhibits the participant's perspective, or invokes his agency (for example, in trying to understand the experience being described). Yet, this personal perspective is deleted in the question marked components, and there is no reference to 'I' or 'me'. This absence is conspicuous in the second case, in that the clause "°be°gin to feel s'r'ta higher?" strongly implies the subject normally identified by a pronoun. The absence of a personal reference is in marked contrast to the last component of the prior cluster, in which the subject states declaratively the nature of his experience, and in which there is an explicit first person reference.

We propose that, in conjunction with a questioning intonation, deleting reference to personal agency is a discursive practice by which participants may establish a position of neutrality with respect to the content of a discrete report by which they attempt to clarify or convey the nature of their experience.

Why might a question marked intonation be used for these particular descriptions? We offer some tentative observations. In the two cases from extract 5, the subject has been reporting on his experience of his own consciousness. In doing this, he is in a position of epistemic authority: we have rights to speak authoritatively on what our own inner experience is. The talk in the question-marked components, however, constitutes a shift in focus. There is a move away from private experience ('what it is like in my mind at this moment'), and toward a characterisation of that imagery which draws from *everyday* or *publicly available* experiences (the bodily sensations encountered in aeroplane travel; the sense of elevation). This may be one basis for the subtle downgrading of epistemic certainty established by question-marked intonation.

Before we conclude this section, it is useful to demonstrate that these design features may be recurrent. The following cases come from later in the same mentation.

(6) **(**01-18)

S: I c'n see: a <bal-=it's like I'm flying over, (1.3) flying over a big canyon
no:w (0.6) ˙hh there:'s more like a valley=I c'n see::, ˙h it's not >>a river-<< I can see s'rt've um::,
(0.3) towns 'n (.)˙h houses and a lot °of.° (1.1) by >flyin'< above
→ the:: u:::: >the level< of the: (0.3) ˙hh hhh >it< reminds me of >u:< miser verde?
(13.1)
mice:. >something< ˙hh (.) >>u=yes<< I >>>s'rt've<<< can't've quite make it out
→ °u: u:° <maybe 's that's why >it makes you< think of mice:?
(49.1)
a::nd >vicki< waiting *((continues))*

Briefly: both (arrowed) question marked components are in terminal position; they both occur in turns in which there is some expressed difficulty in describing the imagery, or a degree of dysfluency and perturbation in the prior speech stream; and in both, the agency of the subject is minimised, either via report of being (passively) reminded of something, or reporting that imagery makes 'you' think of mice; that is, it is a thought anyone may have had.

Poetic organisation and the description of imagery

In some of his lectures on interaction, Harvey Sacks discussed the poetics of mundane conversation: instances in real life interaction when aspects of our talk constitute a poetic relationship to prior talk, or to the content of on-going talk. This poetic relationship can be realised acoustically, lexically or

semantically. In the mentation narratives, there is strong evidence that poetic relationships inform word selection. For example, in the previous section we saw this sequence:

(7) (01-18)

I can see s'rt've um::, (0.3) towns 'n (.) ˙h houses and a lot °of.° (1.1) by >flyin'< above the:: u:::: >the level< of the: (0.3) ˙hh hhh >it< reminds me of >u:< miser verde?
(13.1)
mice:. >something< ˙hh (.) >>u=yes<< I >>>s'rt've<<< can't've quite make it out °u: u:° <maybe 's that's why >it makes you< think of mice:?

There is alliteration and assonance between the last utterance of one cluster, and the first word in the report of the next set of imagery; "miser verde" and "mice" begin with the same letter, subsequently contain the same next 'i' sound, and then contain similar sounds in the sibilant, almost soft 'z' sound of 'miser' and the soft 'c' of 'mice'. Sacks (tentatively) argued that these kind of related and proximally produced sounds suggest the operation of a procedure for word selection which is 'historically sensitive', in that it suggests that tacitly people "engage in employing recent words as a source for finding new words" (Sacks, 1992,vol. II, p. 342).

Analysis has revealed a number of robust poetic relationships in the mentation narratives. Here, we report briefly on two. The first might be described as the production of locally relevant sounds: stretches of talk in which discrete images or imagery clusters are produced, in which particular sounds seem to occur with conspicuous frequency. Extract 8 comes from the mentation of a subject who produces minimal, one or two word reports of imagery. Note how frequently the sounds 'f' and 's' occur in this sequence of descriptions.

(8) **(**01-46)

S: foo:tprints
(35.2)
((clicking sound)) (.8) 's=like a (.) a wrought ir:on ga:te
(13.1)
fer:ns:
(42.1)
for:k:
(15.5)
sunse:t
(32.8)
sta:rs
(32)
°s:nowfla:kes°
(9.6)
(fie:lds)

In this stretch of eight discrete reports, there are four words that begin with 'f' and three with 's'. One word, "snowflakes", rather nicely captures both sounds.

Can we explain this clustered co-occurrence of common sounds in terms of some overriding categorical relationship which links these words, and provides a logic for their co-occurrence? It is possible to conjure such categorical relationships, but at a stretch. So, the words "footprints", "ferns" and "fields" may be connected to 'the outdoors', or 'farmland' (for those readers not familiar with UK flora, a fern is a rugged, non-flowering herb plant usually found on rocky ground, such as moorland); and perhaps "fork" could refer to a split in a country road, as opposed to an eating utensil. And there

may be a case for arguing that there is a categorical relationship between the words "stars" and "sunset", although the case for "snowflakes" would perhaps be harder to make.

But even if there were some overriding categorical relationship to which these words could be related, such as 'things seen in the sky', this alone would not necessarily explain the predominance of these sounds. This is because when we describe, or refer to an object or state of affairs − even mental imagery − there is a (potentially inexhaustible) range of words and combinations of words that may legitimately be used. For example, with regard to the description of location, or 'place' Schegloff has written:

> Were I now to formulate where my notes are, it would be correct to say that they are: right in front of me, next to the telephone, on the desk, in my office, in Room 213, in Lewisohn Hall, on campus, at school, at Columbia, in Morningside Heights, on the Upper West Side, in Manhattan, in New York, in the Northeast, on the Eastern Seaboard, in the United States, etc. Each of these terms could in some sense be correct … were its relevance provided for (Schegloff, 1972, p. 97).

There is, then, no one-to-one correspondence between a referent and a description of it. Just because something may be described as (for example) a 'fern', this does not mean it is not also 'a plant', 'creeping root stock', 'Moonwort' (or whatever species of fern it is), 'undergrowth', 'brushwood', 'gorse', 'dingle', 'thicket', and so on. In the light of the referential options available in producing any description, the predominance of a particular initial letter sound strongly suggests a word selection procedure informed by the operation of poetical considerations.

Evidence of the operation of a historically sensitive, poetically-oriented word selection procedure can also be found in the following extract. Note the preponderance of words beginning with or containing the letter 'p' (here arrowed).

(9) 01-46

S:→ ˙hh j's keep on (.25) spinning (.25) round
(16.9) ((*breathing sounds continuous*))
→ 's::pe:ckle:d (figh-) (.7) so-=rt've (1) dalma:tion type (.) pattern
(43.8) ((*breathing sounds continuous*))
→ ˙hh (1.3) dark: (.3) pipes: (2.2) wit wa:ter (1) >undergro:und pipes<
(12.3)
º(och=um)º (.4) corner of a (.2) a white room
(14)
corrugated (.) surface
(6.1)
→ ˙hh (.5) like the face of (.) pla:ying cards (.) like=th (.) ace of spa:des?
(10.6)
˙hhh=(ts) (.2) 's=like a (1.1) a mohican hairstyle? (.4) 'gainst a (1) ºs'rt'veº (1.6)
→ (t:) (.4) pinkish (.) ba:ckgrou:nd
(9.2) ((creaking noise)) (60)
(wheels)
(14.5)
→ ˙hh (.5) 's=like an ear sha:pe
(32.5)
˙hhh
(6)
→ pa:rro:t
(14.7)
→ ˙hh (.4) 's:=like a (.) a ro:bo:co:p (.4) type (.2) fi:gu:re

(10.7)
→ ˙h (.4) pro:fi:le of=a fa:ce
(24)
˙h (1.8) ˙hh (.3) got a (.2) image of like- (.3) the=insi:de of a roo:m
(16.2)
→ ˙h=s=like an ol:d (.2) bi plane

Numerous words start with the letter 'p': 'pipes', 'pattern', 'playing', 'parrot', 'profile', and 'pinkish'. The letter 'p' also figures as dominant sound in a number of other words: 'spade', 'speckled', 'Robocop', 'type', 'bi-plane'. Also, many of the words that begin with or contain the letter 'p' are components of utterances that elaborate upon or extend an initial description. So for example, 'pattern' occurs when the subject expands upon the imagery of a (what sounds like an attempt to say) 'speckled fish'; 'spades' is produced in an elaboration of a report of a playing card; and 'pinkish' is produced in a description which further characterises the background against which a distinctive haircut is perceived. Although we may treat these subsequent descriptive components simply as the participant's attempts to provide as much detail about that discrete imagery as possible, it seems perhaps conspicuous that these subsequent descriptive components are built from words beginning with or containing a strong 'p' sound. It is as if these additional reports are *vehicles* for further production of the predominant locally relevant sound in this stretch of the mentation.

It may be the case, then, that these aspects of conscious experience are reported not merely because 'that's just what happens to be in the participant's mind at the time'. Rather, they are *formulations* of inner experience, the design of which is informed by the operation of a historically sensitive word selection procedure oriented to poetic concerns that are primarily social and performative in character.

The poetic construction of mentation narratives is not only to be found in conspicuous recurrence of particular sounds. It can also be found in the way that word selections are designed to produce (sometimes delicate) puns. Extract 11 comes from the start of the mentation, and is the participant's report of their first imagery.

(10) 01-05

S: u:m: (2.4) something: about (0.3) ˙h butterflies (3.8) ˙h and there's somebody swimming
(27.0)
u:m: (2.6) an: engine

The participant's first words are "something: about (0.3) ˙h butterflies (3.8) ˙h and there's somebody swimming". There are, then, ostensibly two images reported here, one about "butterflies", the other concerning "swimming". However, these may be examined as one discrete cluster, as there is evidence that that is how they were produced. The second component is prefaced by "and", thereby establishing that what follows is at least connected to, if not a continuation of, the prior report. Moreover, the silence between the two components is noticeably shorter than that between subsequent descriptive clusters that clearly do report entirely unconnected and new imagery. To illustrate, the extract has been extended to show that the subsequent imagery report, concerning an engine, comes after 27 seconds of silence following the completion of the report about swimming. Therefore, we can treat the report "something: about (0.3) ˙h butterflies (3.8) ˙h and there's somebody swimming" as a cluster that describes one discrete experience of imagery.

A first analytic point on this description is the poetic symmetry in its two components. Structurally, they are of similar length and composition. This becomes clear if audible breathing and periods of silence are removed:

u:m: something: about butterflies
and there's somebody swimming

There are common sounds: there are recurrent ‘b’ and ‘s’ sounds, in addition to which there is the repetition of ‘some’ in “something” and “somebody”. In both components there is a matching vagueness or imprecision: it is “something” about butterflies, and it is an unspecified “someone” doing the swimming. But, perhaps the most interesting poetic feature here is the rather subtle pun. The first part of the description focuses on butterflies; the second on swimming. But, the butterfly is a recognised swimming stroke. In this sense, “somebody swimming” stands in a pun-like relationship to the prior description.

There are a numerous instances in the mentation corpus of subsequent word selections that constitute a pun on prior reports. In the following case, for example, two very different objects (confectionary and an emotional response) are described using words which share a core acoustic root.

(11) **(**01-05)

S: ˙hhh hh=a ca(h)ke (1.0) with lots of tiers
(3.7)
tearful.

There is some delicate work being done here to ensure that it is clear that a pun-like relationship is being established. If the subject had simply said ‘tiers’, and then ‘tears’, as both words are pronounced in the same way, it would not be clear that they referred to very different states of affairs, or that the outcome was a pun, rather than simple repetition. However, the use of the adjectival form “tearful” makes it clear that this is not repetition, and exposes and makes explicit the punning character of the subsequent description on the prior.

Similar pun like qualities inform the next extract.

(12) **(**01-79)

S: >bird<
(8.4)
blue:: sky??
(9.3)
↑SEA
(14.8)
s:ma::ll shi:p (1.1) sail
(13.3)
I ˙hhh (6) ˙hhhh
(2.5)
naval ho::t

Here, the subject is reporting imagery which seems to display a topical coherence, in that discrete imagery items relate to the category of ‘the sea’ or ‘seaside’: so ‘blue sky’, the ‘sea’ and ‘small ships’ are all things which might be associated with a seafront vista. However, the subject then reports that a part of his body is hot (that he is feeling warm is a continuing theme in this participant’s mentation). However, it is noticeable that he uses the word ‘navel’ to report that part of his body in which he feels heat. This lexical choice is conspicuously precise, referring as it does to a small and usually private part of the torso. But it is particularly fitted to the prior theme of the sea, in that it is the same sound as the word ‘naval’, which refers to the navy or maritime activities. (It is also notable in this respect that the transcriber wrote ‘naval’, not ‘navel’, thus suggesting that he, too, heard the word as relating to its association with the sea, and not the body.)

Extracts 10 to 12 are significant, in that they suggest an important implication for the way in which we understand how mentation reports are produced, and for how they may be used subsequently in

parapsychological research. The words used by the subject to describe a current imagery may be selected on poetic considerations: to retain an acoustic theme from earlier imagery; or to establish a pun-like relationship between two discrete reports. Thus, the record of a participant's imagery (and data which may be used for subsequent parapsychological research) may be determined at least in part by poetic or semantic considerations as much as by the experiences and imagery in conscious being reported. We return to this point in our discussion.

DISCUSSION

In this paper we have examined three properties of mentation reports: the temporal distribution of descriptions; the use (and placement) of question-marked intonation to establish neutrality with respect to the description being offered; and the poetic organisation of word selection. These structural properties suggest that descriptions produced in mentations are socially-organised, pragmatic activities through which 'what is being reported' is constituted. There are three concluding points we wish to raise.

Methodologically, more analysis of the discourse of mentations is required. The analyses presented here suggest that we should be wary of treating mentation narratives as mere reports that express an independent phenomenological reality. This is not to say that parapsychological interest in what these reports tell us about the nature of experience during the ganzfeld need be abandoned. Indeed, new lines of research may be generated from recognition of the communicative and pragmatic skills that inform the production of mentation reports. For example, the operation or influence of psi processes may be explored with respect to the poetical organisation underpinning word selection, or the use of 'questioning intonation' in mentations may be examined in relation to psi-outcome statistically. Other word selection procedures, yet to be identified and explicated, may also offer sites in which to investigate psi influences.

Moreover, investigation of the way descriptions are produced to display the subjective stance towards the content of their reports may tell us a great deal about the interpersonal dynamics of participation in laboratory parapsychology experiments.

Finally, mentations are introspective reports on ongoing experience. In recent years there has been a resurgence of interest in the generation, limits and analysis of introspective data, both in parapsychology (for example, Cardeña, 2004) and in the study of consciousness more generally (for example, Jack & Roepstorff, 2003). Introspective data, though, are usually discursive data: spoken or written reports of what consciousness is like. The argument that we should not treat mentation data as neutral reports of inner experience applies to other kinds of introspective materials. The analysis of mentation reports as pragmatic activities may have a broader relevance, then, in that it may contribute to our understanding of how the phenomena of subjective awareness – whether they have parapsychological significance or not − may be investigated as discursively managed objects.

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APPENDIX

Transcription symbols

The transcription symbols used here are common to conversation analytic research, and were developed by Gail Jefferson. The following symbols are used in the data.

(.5)	The number in brackets indicates a time gap in tenths of a second.
(.)	A dot enclosed in a bracket indicates pause in the talk less then two tenths of a second.
˙hh	A dot before an 'h' indicates speaker in-breath. The more h's, the longer the inbreath.
hh	An 'h' indicates an out-breath. The more 'h's the longer the breath.
(( ))	A description enclosed in a double bracket indicates a non-verbal activity. For example ((banging sound))
-	A dash indicates the sharp cut-off of the prior word or sound.
:::	Colons indicate that the speaker has stretched the preceding sound or letter. The more colons the greater the extent of the stretching.
( )	Empty parentheses indicate the presence of an unclear fragment on the tape.
(guess)	The words within a single bracket indicate the transcriber's best guess at an unclear fragment.
.	A full stop indicates a stopping fall in tone. It does not necessarily indicate the end of a sentence.
Under	Underlined fragments indicate speaker emphasis.
↑↓	Pointed arrows indicate a marked falling or rising intonational shift. They are placed immediately before the onset of the shift.
,	A comma indicates a continuing intonation.
?	A question mark indicates a rising inflection. It does not necessarily indicate a question.
CAPITALS	With the exception of proper nouns, capital letters indicate a section of speech noticeably louder than that surrounding it.
° °	Degree signs are used to indicate that the talk they encompass is spoken noticeably quieter than the surrounding talk.
°° °°	Double degree signs have been used to indicate whispered or extremely quiet talk.
Thaght	A 'gh' indicates that word in which it is placed had a guttural pronunciation.
> <	'More than' and 'less than' signs indicate that the talk they encompass was produced noticeably quicker than the surrounding talk.
>><<	Additional 'more than' and 'less than' symbols mean that the talk they encompass is extremely quick relative to the surrounding talk.
=	The 'equals' sign indicates contiguous utterances. For example:
[	Square brackets between adjacent lines of concurrent speech
]	indicate the onset and end of a spate of overlapping talk.

A more detailed description of these transcription symbols can be found in Atkinson and Heritage (1984, pp. ix-xvi).

PREDICTION OF FUTURE RANDOM EVENTS WITH AN ARTIFICIAL INTUITION DEVICE

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ABSTRACT

The 5-month experiment with an Artificial Intuition Device was performed to check whether it can predict entropic potential of future random macro-events. The device's detectors were built to form "radioactive isotope / Geiger counter" couplings wrapped in special protective material, and placed into a hermetically sealed jar with mirrors and several layers of protection. This Artificial Intuition Device was used to detect entropic potentials of different numbers participating in the Ontario "Pick3" lottery. A description of the method and the algorithm is provided. Statistical analysis of the results show that the probability of making so many correct predictions randomly is less than 0.00015. The described Artificial Intuition Device obtains a higher quality of predictions on days with low geomagnetic activity than on high geomagnetic activity days, making it similar to human intuition. The correlation between the quality of predictions of the device and Ap-index of geomagnetic activity for 150 days in 2006 was $r=-0.159$ (confidence $p<0.03$), for 299 days in 2007 it was $r=-0.155$ (confidence $p<0.005$) and for both 2006 and 2007 it was $r=-0.153$ (confidence $p<0.00067$). The correlation between device efficiency and geomagnetic activity varies throughout the year and these trends are similar in 2006 and 2007. The overall profitability defined as a ratio [money won] / [money spent] is 1.98 (instead of expected 0.5) as found from 150 days of experimentation, and also depends on geomagnetic activity. The results of the experiment can be described using the "hydrodynamic model", in which intuition can be described as our ability to feel deviations of micro-event frequencies, (for example chemical reactions in our body), preceding events holding significant entropic potential.

INTRODUCTION

In the "hydrodynamic model" of intuition (see Appendix 1) the intuition is our ability to feel the deviations of micro-event frequencies, (for example chemical reactions in our body), preceding events holding significant entropic potential. This parameter ("Entropic potential of event") and corresponding formulas were first introduced by the author in 1989 (Zilberman, 1989). It describes the influence of the current event on the change of entropy of the system in the future (please see Appendix 1 for more details).

To check if this model is correct I built a device that generates the random micro-events and performed series of experiments to check if micro-event frequencies deviate near the random events with significant entropic potential and if these deviations can serve as indicator of future macro-event entropic potential.

EXPERIMENTAL DESIGN

Micro-event

The micro-event is a single, simple, low-energy, potentially noticeable by appropriate scientific equipment event, which discretely changes the entropy of the system on a step-by-step basis. Depending on the nature of a physical micro-event such micro-events may be:

radiation of one particle - in the radioactive decay,
separation of one molecule from the liquid - in the evaporation,
radiation of the quantum of energy - in the heat/cool dissipation,

migration of one molecule from the substance into liquid - in the dissolution of some material into the liquid etc.

Macro-event

The macro-events are events of our normal regular life. In accordance with the definition of entropic potential of event (below Z-potential), a macro-event has a non-zero Z-potential if:

it is not forced, i.e. if the probability of its realization is not equal to 1 (else mathematical expectations of entropy change before and after the event will be equal and potential will be 0),
and
it changes entropy of the system where it happened.

Here are some examples of macro-events with positive Z-potential: random selection of wrong road, lightning randomly targeted the house or human, wrong investment, lost money, wrong medicine taken by mistake etc. In other words - events where the entropy increase was greater that random.

Here are some examples of macro-events with negative Z-potential: random selection of a correct road, a successful investment decision, found money or a lottery win, miraculous safety in the a danger situation, etc. In another words - events where the entropy increase was less that random.

I built my experiment to check if there is deviation in the frequencies of micro-events near the macro event with significant entropic potentials and if I can use these deviations as detectors of future macro events.

Source of micro-events

In my experiment I used radioactive decay as the source of micro-events with predefined entropy change. The radioactive decay has several advantages as a generator of micro-events with positive entropy potentials.

Radioactive decay is a truly irreversible process with small but consistent entropy growth.

The radiation of one particle is independent from radiation of another.

Temperature does not influence radioactive decay. (It may influence the measurement equipment however).

Detectors

Please note, descriptions of hardware and software provided here are now patent pending in patent applications filed in the USA and Russia.

Below are descriptions of the 2 detectors used in the experiment. The first detector is R1 and second is R1A.

First detector (R1)

a. A small piece of a radioactive isotope was securely attached to a Geiger counter. This radioactive isotope piece was distributed under the CNSC License No.12783-2. I used Geiger counter "DRSB-88", manufactured in Russia by "OAO Kyshtymskii radiozavod". In the article below I will use the word "detector" instead of "radioactive isotope / Geiger counter couple". The detector was surrounded by small mirrors from 5 sides.

b. The detector was placed into a hermetically sealed glass jar with wall thickness of approximately 2 mm. This was done to protect the Geiger counter from the radon gas, which could penetrate

into the jar and give extra impulses to the Geiger counter. The five walls inside the jar were covered with larger mirrors.

c. The five walls inside the glass jar were also covered with 3-mm lead sheets, to protect the detector from background radiation. Control measurements without the radiation source attached and without lead sheets gave 3-4 impulses a minute coming from the background radiation.

d. This glass jar was wrapped with aluminum sheets from 5 sides.

e. Signals from the detector were recorded on a computer and inserted into a SQL database for future analysis.

f. The frequency of impulses from the detector was approximately 40-50 impulses a minute.

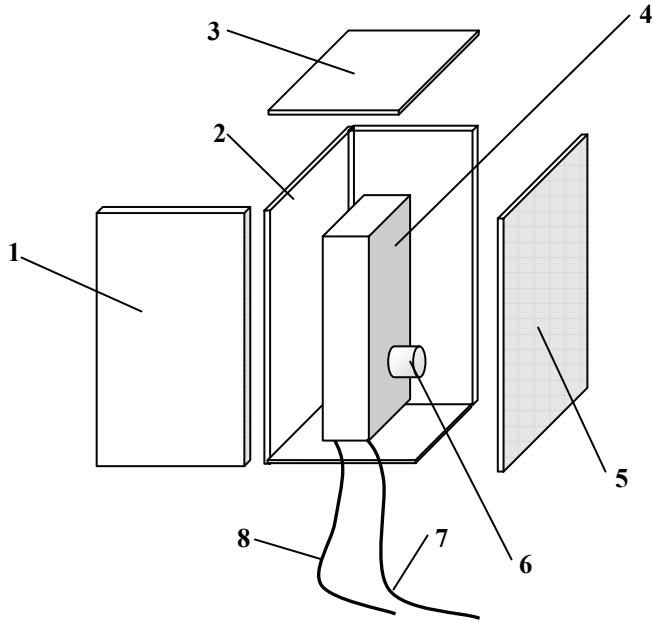


Fig.1 Details of physical elements of the detector and the protective box.

Fig.1 provides details of the physical elements of the "radioactive source / radioactive particles counter" couple (detector) and its protective box. The radioactive particles counter (4) detects the particles radiated by the radioactive source (6). Cable 8 connects the radioactive particles counter (4) with the power supply. Cable 7 connects the radioactive particles counter (4) with the input of computer. The walls (1,2,3,5) form the container, which covers the detector for protection. In preferred embodiment, these walls are made of a mirror with a reflective side facing inside the container. Wall 5 is optional and in the described experiment was not present.

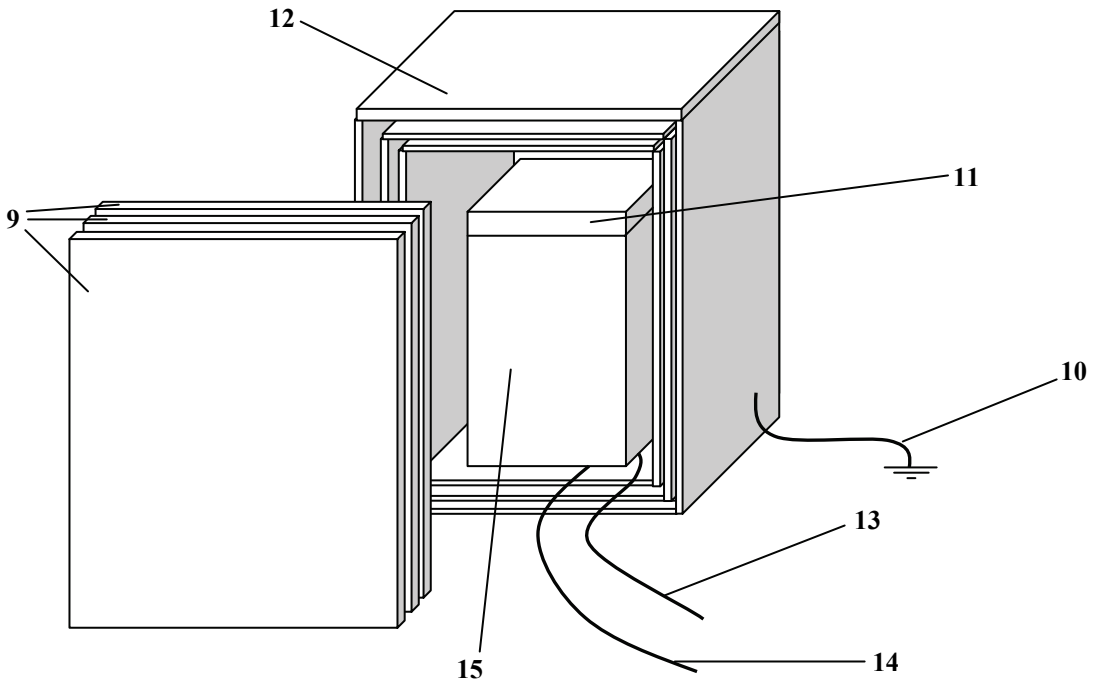


Fig.2 Details of the shield layers that protect detector from various influences.

Fig.2 provides details of the shield layers that protect the detector from various influences. The detector described in Fig.1, was placed into a hermetically sealed jar (15) with a lid (11). The jar (15) is shielded with additional protective layers of lead and aluminum (9, 12). Cable 14 connects the radioactive particles counter (located inside the container (15)) to a power supply. Cable 13 connects the radioactive particles counter to the input of the computer. Cable 10 grounds the entire container. Walls 9 are optional and in the described experiment were not present.

Second detector (R1A)

a. The second detector was build with the same specifications as the first, placed into the same glass jar and connected to the same computer through another channel.

b. The only difference in design was that the second detector was not covered with small mirrors mentioned above. This was done to check whether covering the detectors with the mirrors could make the effect stronger (if any). To do this we have to have one covered and one non-covered detector.

This glass jar was placed in a closed room in a basement. The room had no windows to outside or working sources of heat/cooling. The door to this room had a small window with double layers of glass and air between them, for thermo-stability. This small window was always covered with cloth. There was no light inside the room or in the rooms near by. Light was powered-on only a few times, when I performed maintenance on the detectors.

During the experiments nobody was near that room for longer than 10-15 minutes a day. The computer, which recorded the impulses, was located outside the closed room and was connected to the main computer through a LAN cable.

Target

One of the most intriguing abilities of human intuition is ability to predict the future. I built my experiment to replicate this ability on an Artificial Intuition device I describe above. Namely, I used this device to measure the entropic potentials of the numbers, which participate in the lottery draws.

In accordance to the definition of entropic potential of an event the lottery numbers have different potentials. Winning numbers bring some money and new equipment, prove the theory and increase reasons to continue the described research. The wrong numbers mean losing money and stress. All that means the change on the system entropy in the future depending on reaction of the system in the 'now' to exposure of digit before detector. And this by definition means non-zero entropic potential.

In the "hydrodynamic model" of intuition, the speed of physical processes is changing near the event with significant entropic potential. In our case, the "physical process", which we measure, is the radioactive decay and the "macro-event" is the process of testing the number for the coming lottery draw. If the "hydrodynamic model" of intuition is correct, we can expect that the speed of radioactive decay will change when we measure this speed for the number with non-zero entropic potential (i.e. for the number which will win in the coming lottery draw).

In experiment I used the Ontario "Pick 3" lottery. This lottery has very simple rules. Players forecast the 3-digit number, which is selected randomly in the following lottery draws. The winning number may contain repeated digits (for example combinations like "112" or "333"). Players can play in straight play or in the box play. The straight play wins if the 3-digit number the player marked match the winning number in exact order. The box play wins if it matches the winning number in any order.

The stakes in Ontario Pick 3 are not fixed. Organizers return to players 50% of what they collect from ticket sales. Therefore, the more people make correct predictions - the less is the amount each of them receives. The expectation of the prize for 3-digit box play with different digits (like 123) can be calculated using probability theory. The probability to correctly predict 3-digit number with different digits is 6/1000 (approximately 1/166) in box play. What this means is that players should spend on average $166 for each win. Because organizers return to players 50% - the expectation of prize is $166/2=$83.

Published statistics of winnings in 2006 for 3-digit box play with different digits (like 123) show the average prize in 2006 equal to $88.6 (by 269 such draws), close to the expectation of prize. Also note that the average prize the Artificial Intuition Device generated in 2006 was $96.0, slightly higher than the estimation of average prize by Ontario players.

Software and actions

Every 5 minutes my software displayed the next number in the application text box.

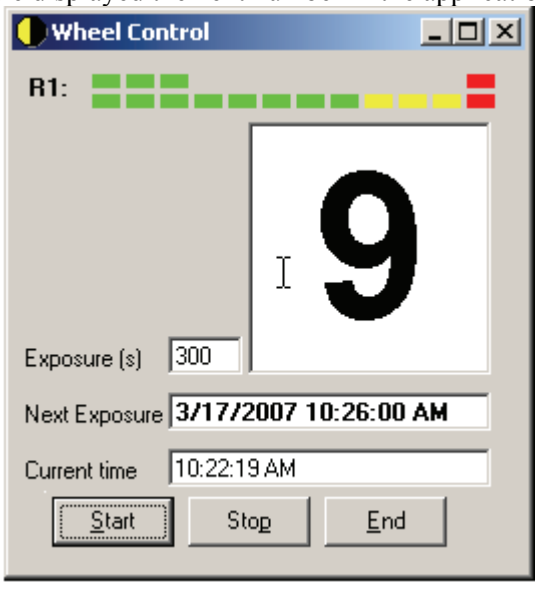


Fig. 3. An example of controlling application screen.

On the picture in Fig.3 this is number 9. This picture also displays the values of impulses coming from detectors R1 and R1A, exposure interval, moment of next exposure and current time. (It is worth noting that even if software displayed this number - there was nobody near the computer, who could see it. In addition, the computer monitor was powered off).

The exposed numbers ran in the sequence from 0 to 9. Each impulse coming from detector was recorded into SQL database with timestamp, detector's number and exposed number.

Each daily series started at 11:00 PM on the preceding day and finished at 10 PM on draw day. At 6 PM on each day my other application analyzed the recorded data, sorted it in accordance to algorithms described in the Appendix 2 and sent an e-mail message to my cell phone. In accordance with the received message I filled the lottery ticket(s) with the numbers received and submitted them to a lottery kiosk. I always marked only 'box play' option, i.e. the order of the numbers was not important. I always filled only different digits (like '123' and never like '112'). Usually I spent 1 dollar for each combination I filled.

The quantity of combinations I filled depended on the quantity of digits, selected by the described device.

- If the device selected and sent me less than 3 digits - I did not fill any combinations.
- If the device selected and sent me 3 digits - I filled them as one combination (like 123).
- If the device selected and sent me 4 digits - I filled them as 4 combinations (like 234,134,124,123)
- If the device selected and sent me 5 digits - I filled them as 10 combinations (like 321, 421, 431, 432, 521, 531, 532, 541, 542, 543).
- If the device selected and sent me 6 digits - I filled them as 20 combinations.
- The device never selected 7 digits or more.

Illustrations below demonstrate a lottery card with a filled-in combination (Fig. 4), a lottery ticket (Fig.5) and a receipt for the money won (Fig 6).

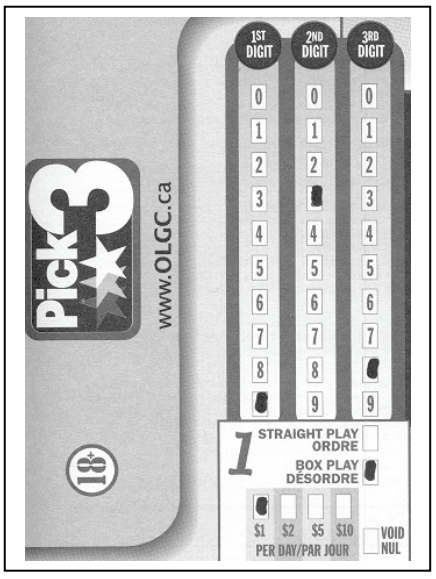


Fig. 4. Lottery card with filled combination

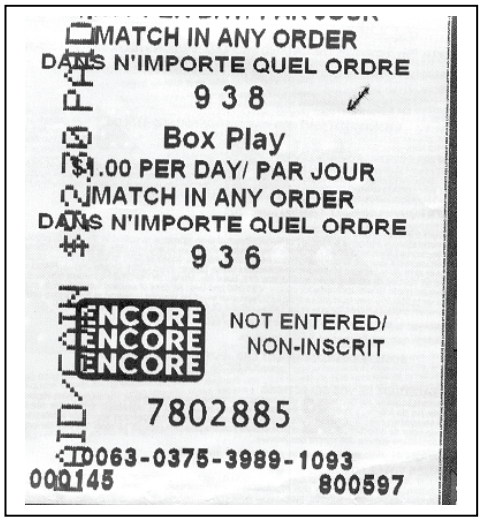


Fig. 5. Lottery ticket.

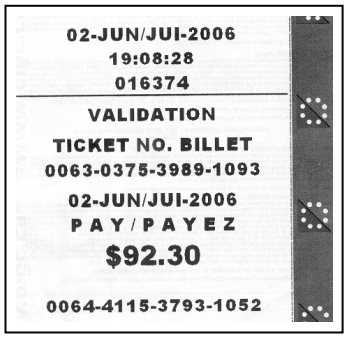


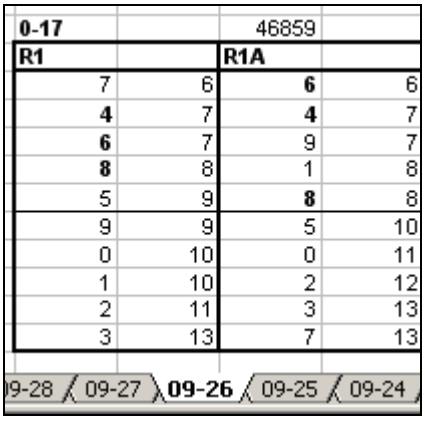
Fig. 6. Receipt for the won money.

STATISTICS OF RESULTS

The experiment started on May 23, 2006 and was completed on October 19, 2006. In total it took 150 days (approximately 5 months) of measurements. Observations were performed between 11 PM on the preceding day and 10 PM on draw day. There were no impulses analyzed between 10 PM and 11 PM, because I used this time for database backups and maintenance (if any).

I used 2 detectors (named below as R1 and R1A). Each detector recorded about 50 impulses per minute or about 70,000 impulses during the 23 hours of observation. Each of the 10 possible numbers (from 0 to 9) was exposed approximately 27 times with a total exposure time about 135 minutes per a day.

Using the algorithm described in Appendix 2 the software selected 6 numbers for each detector and at 6 PM sent me a message with intersection of the numbers. For example, on Sep.26, 2006 by 6 PM my software generated a table like one in Fig.7.



0-17		46859	
R1		R1A	
7	6	**6**	6
4	7	**4**	7
6	7	9	7
8	8	1	8
5	9	**8**	8
9	9	5	10
0	10	0	11
1	10	2	12
2	11	3	13
3	13	7	13

09-28 | 09-27 | **09-26** | 09-25 | 09-24

Fig. 7. An example of daily ranged numbers.

The first detector gave me the top 6 numbers as 7,4,6,8,5,9.

The second detector gave me the top 6 numbers as 6,4,9,1,8,5.

The intersection of the 2 detectors was the 5 numbers 4,6,8,5,9.
This produced ten 3-digit combinations to fill in the lottery card.

Because numbers 4,6,8 were selected in the Pick 3 lottery draw of that day - I marked them in bold color for future statistical analysis. I learn about the winning numbers mostly from the site LotteryCanada.com (web page
http://www.lotterycanada.com/lottery/?job=show_results&lottery=on_pick_3)
Having such tables (Fig. 7) ready for each day I accumulated statistics for all the experiment days. Table Fig.8 presents a part of such a table.

	A	B	C	D	E	F	G	H	I	J	K	L
2	Date	R1 - 5	R1 - 6	R1 - 7	R1A - 5	R1A - 6	R1A - 7	# inters(6)	$	#	Ap	W.
113	4-Sep	1	2	2	1	1	1	5	10	2	24	
114	5-Sep	2	2	2	1	1	1	3	1	3	13	
115	**6-Sep**	**3**	**3**	**3**	**3**	**3**	**3**	**6**	**20**	**3**	**8**	**83**
116	**7-Sep**	**3**	**3**	**3**	**2**	**3**	**3**	**6**	**20**	**3**	**8**	**91**
117	8-Sep	1	1	2	1	2	3	4	4	3	4	
118	9-Sep	1	1	2	2	2	2	5	10	3	2	
119	10-Sep	0	0	0	0	0	0	5	10	2	4	
120	11-Sep	1	1	1	2	2	2	4	4	3	7	
121	12-Sep	1	1	1	1	1	2	3	1	2	4	
122	13-Sep	2	2	3	3	3	3	4	4	3	4	
123	14-Sep	3	3	3	2	2	2	3	1	3	3	
124	15-Sep	1	1	1	1	2	2	4	4	3	1	
125	16-Sep	2	2	3	1	1	1	4	4	3	3	
126	17-Sep	1	1	1	1	1	1	3	1	2	18	
127	18-Sep	1	2	2	1	1	1	5	10	3	28	
128	**19-Sep**	**2**	**3**	**3**	**2**	**3**	**3**	**4**	**4**	**3**	**12**	**90**
129	20-Sep	1	2	2	2	2	2	4	4	3	4	
130	21-Sep	2	2	2	1	2	2	5	10	3	2	
131	22-Sep	0	1	1	0	1	1	4	4	2	3	
132	23-Sep	1	1	2	2	2	2	3	1	3	13	
133	24-Sep	2	2	2	2	3	3	4	4	3	24	
134	25-Sep	1	2	3	1	1	1	3	1	3	9	
135	**26-Sep**	**3**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**3**	**8**	**119**
136	27-Sep	2	3	3	1	2	2	4	4	3	3	
137	28-Sep	3	3	3	1	1	2	4	4	3	4	

Fig. 8 The quantities of winning numbers appeared in the selected top N numbers for each detector and other parameters.

Date - is date of experiment,
'R1 - 5' - is the quantity of winning numbers appearing in the selected top 5 numbers for detector 1,
'R1 - 6' - is the quantity of winning numbers appearing in the selected top 6 numbers for detector 1,
'R1 - 7' - is the quantity of winning numbers appearing in the selected top 7 numbers for detector 1,
'R1A - 5' - is the quantity of winning numbers appearing in the selected top 5 numbers for detector 2,
'R1A - 6' - is the quantity of winning numbers appearing in the selected top 6 numbers for detector 2,
'R1A - 7' - is the quantity of winning numbers appearing in the selected top 7 numbers for detector 2,
'# inters(6)' – is the quantity of digits in the intersection of top 6 numbers selected from both detectors,
'$' - Number of dollars spent to submit the lottery tickets. Because I used 1 dollar per board - this is also the number of 3-digit combinations I submitted for draw.
'#' - Quantity of different digits selected in the lottery draw (for example if the winning number was '223'- the # is 2, and if the winning number was '123'- the # is 3.
'Ap' - Ap-index of Geomagnetic activity, which I receive every morning via e-mail from the 'Solar Influences Data analysis Center - RWC Belgium' (http://sidc.oma.be/products/meu)

'W.' - Amount of money I won in the draw.

Here are some totals from the table above.

Total number of draws	150
Total money spent	$630
Average spent each day	$4.2
Number of draws won	13
Percentage of winning days	8.7%
Total money won	$1248
Probability	<0.00015

Table 1. Overall totals for all days of experimentation

Percentage of winning days was calculated as a ratio:

[Percentage of winning days] = [Number of won draws] / [Total number of draws]*100%

Probability was calculated as a binomial probability to make correctly 12 predictions in 630 trials when probability to make correct prediction in 1 trial is 6/1000. (My device actually provided me with 13 correct predictions).

$$P<BINOM (12, 630, 6/1000)=0.00015 \quad (1)$$

Here:
12 is [Number of won draws] - 1,
630 - is the total number of trials. Because the cost of filling of 1 board in Pick3 is $1, the number of filled combinations is equal to the total amount of money spent.
6/1000 - is the probability to win in 1 Pick3 lottery draw when the player uses the box play and always fills 3 different digits.

Strictly speaking, the binomial distribution does not give us the actual probability but rather, the upper limit of probability. The trials (or, in other words, submitted lottery combinations) are independent between the lottery draws. But they are not independent *within* the lottery draw. If, for example, I submit 20 combinations for a lottery draw and one combination wins, the other combinations cannot win because all the submitted combinations are different and only one combination wins per a draw. Therefore winning of one combination from the set of N combinations nullifies the chances of wins for the other N-1 combinations, and they can be removed from the total number of trials. However to avoid entering this argument, I removed nothing and used binomial probability for calculations using all the combinations. This way binomial probability considers all trials as valid, independent and includes all of them in the total number of trials, working as the upper limit, which is easy to calculate. However, even this upper limit was very small.

Graph of accumulated statistics

The graph Fig. 9 below shows the trend of probability to get the accumulated statistics randomly. It was calculated using formula (2) for every day of the experiment, while statistics were accumulated.

$$P=BINOM (S, N, 6/1000) \quad (2)$$

S is [Number of won draws] - 1,
N - is the total number of trials.

The vertical axis is the probability (in logarithmic scale) in accordance to formula (2); the horizontal axis is the date when this probability was calculated.

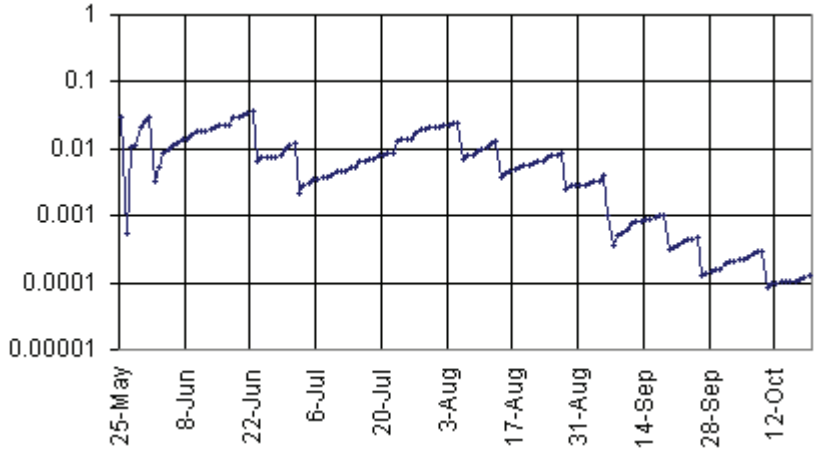


Fig. 9. Graph of accumulated probability

CORRELATION OF ARTIFICIAL INTUITION WITH GEOMAGNETIC ACTIVITY

Independent research (Persinger & Schaut, 1988; Radin & Rebman, 1996; Zilberman, 1995) shows that intuition (and more generally the paranormal abilities) correlates with geomagnetic activity (GA). The correlation is usually negative: the weaker the geomagnetic activity is - the stronger intuition is.

Reminder about my previous research

In 1995 I published an article (Zilberman, 1995) where I showed that:

a. On days with low geomagnetic activity (Ap<10) the true predictions density)* (TPD) in French and Russian numerical lotteries differs significantly from the density on days with high geomagnetic activity ($p<0.002$),
b. On days with low geomagnetic activity the TPD exceeds reliably ($p<0.003$) the random level of TPD, which can be calculated in the Russian lottery
c. The TPD correlates significantly ($p<0.005$) with geomagnetic activity exactly on draw days (but not the day before or after).

The graphs in Fig. 10 below present the dependence of TPD in French and Russian numerical lotteries on geomagnetic activity. These graphs built on base of 574 draws of Russian and 509 draws of French lotteries in 1980-1989 and were published in the article by Zilberman (1995). The horizontal line for the Russian lottery designates the mathematical expectation (or in other words the random level) of TPD, which can be calculated in the Russian lottery.

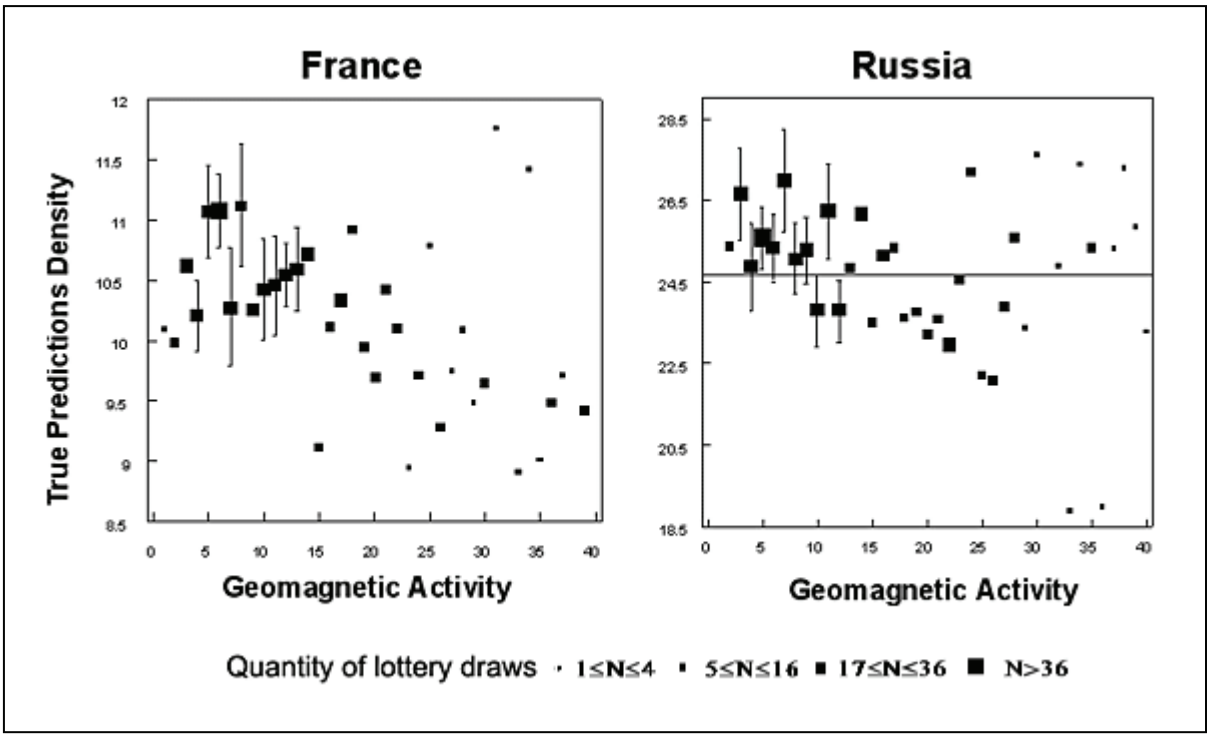


Fig.10. Dependence of True Predictions Density in French and Russian lotteries on Geomagnetic Activity.

As it was stated in the article (Zilberman, 1995), in the Russian lottery, where a random level of TPD can be calculated, the true predictions density on days with low GA not only differs from the density on days with high GA, but also statistically reliably *exceeds the random level*. For example, if we consider only 243 draws which happened on days with Ap<10, we receive TPD average 25.69 which is significantly above the random level E(TPD)~24.67 ($p<0.003$, $t=2.83$, $df=242$, one-tailed).

The random level of TPD in French lottery is unknown, but this lottery also shows differences in TPD between days with low and high geomagnetic activity. The average density F for draws with Ap<10 is F(Ap<10)=10.705, but for draws with Ap>10 it is F(Ap>=10)=10.23. The significance of the difference between these groups in accordance to t-test is also high ($p<0.01$, $t=2.55$, $df=507$, one-tailed).

The correlation coefficients between true predictions density and geomagnetic activity are not very high, but they are reliable. For the Russian lottery the discussed coefficient was equal to r= -.125. In N=574 draws this gives the significance of correlation ($p<0.002$, $t=2.989$, $df=572$, one-tailed). For the French lottery this coefficient was r=-.111 with the significance of correlation ($p<0.005$, $t=2.589$, $df=507$, one-tailed).

Because of all these reasons I checked if the detection of entropic potentials, (which I believe is behind the intuition phenomena), on described *Artificial Intuition* device correlates with the geomagnetic activity as well. As it was mentioned above, I used Ap indexes of geomagnetic activity, which I receive every morning via e-mail from the "Solar Influences Data analysis Center - RWC Belgium". (http://sidc.oma.be/products/meu)

General observations

The graph in Fig.11 (below) shows the daily values of Ap index during the experiment period. White diamonds mark days when described device correctly predicted the numbers, which won in the following draw. Looking at the graph in Fig. 11 you can see that:

- Most of the correct predictions were done on days with low geomagnetic activity. From total of 13 winnings, 10 happened in days with Ap<9.
- Winnings usually happened on days when the Ap was at a minimum as compared to neighbor days or when the Ap index went down. From a total of 13 winnings - 11 happened on such days.

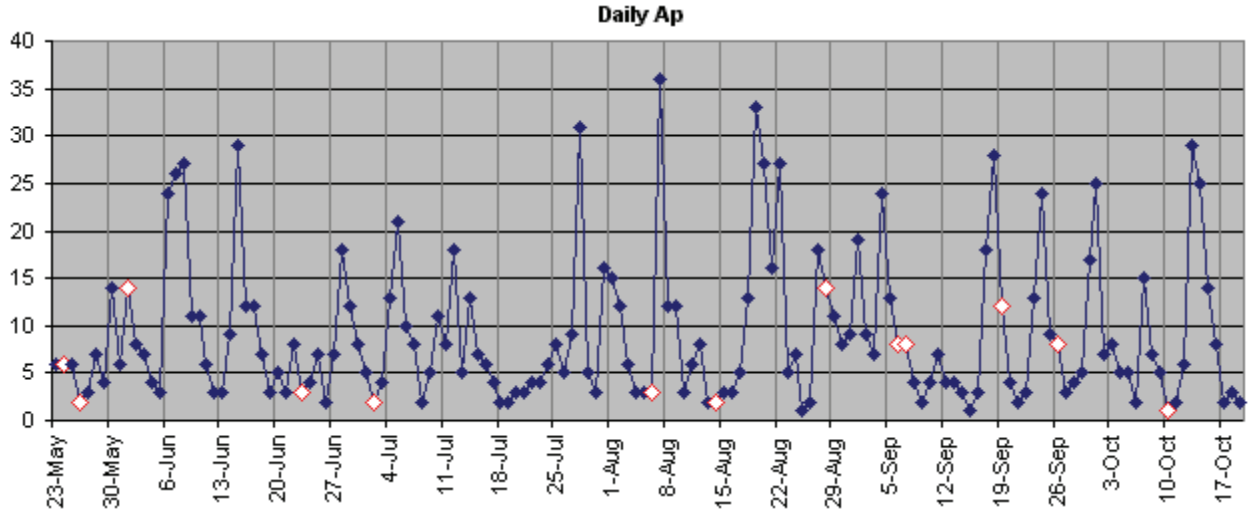


Fig. 11 Daily values of Ap-index of geomagnetic activity and winning days.

More detailed analysis

To calculate the correlation between geomagnetic activity and the ability of the described device to predict the future, I composed the daily values of device efficiency. It was done in several steps.

a. Calculation of hourly values

For each individual hour of the analyzed day, I selected the 5 digits, (from available 10), using the algorithm described in Appendix 2. After the draw I checked how many correctly predicted digits these hourly sets contained and entered this number into a table.

The table (Fig.12) below, presents part of the table with the hourly numbers of correctly predicted digits for each day/hour and total number of winning digits – 'win qty'. The 'win qty' shows the quantity of the different digits in the combination that won in the lottery draw of analyzed day. For example if the winning combination was '779' the 'win qty' was 2. If winning combination was '123' - the 'win qty' was 3.

T	U	V	W	X	Y	Z	AA	AB	AC	AD
Win qty	**Date/Hour**	**22**	**23**	**0**	**1**	**2**	**3**	**4**	**5**	**6**
3	11-Jul		0	1	3	1	3	1	1	2
3	12-Jul		3	1	1	1	2	1	1	1
3	13-Jul		2	2	1	1	2	1	2	1
3	14-Jul		2	2	2	1	3	0	1	2
2	15-Jul		1	1	1	2	1	1	2	1
3	16-Jul		2	1	2	1	2	3	2	2
3	17-Jul		3	1	2	2	2	2	2	2
2	18-Jul		1	2	2	0	0	1	1	1
2	19-Jul		1	1	1	2	0	1	1	1
3	20-Jul		3	2	2	2	2	2	1	2
3	21-Jul		3	2	1	1	1	2	0	2

Fig.12. Part of table with hourly numbers of correctly predicted digits and with total number of winning digits ('win qty').

b. Normalization

The reason to use 'win qty' is obvious. The table (Fig.12) is not normalized. My described device measures entropic potential of exposed digits, not the lottery combinations (see picture Fig 3). When device includes *2* won digits into the selected set and *2-digit* combination (like 122) wins - it means 100% efficiency, because device detected *all* won digits. However when the device includes *2* winning digits into the selected set and a *3-digit* combination (like 123) wins - the efficiency is only 66.6%, because device detected only 2 from the possible 3 won digits. This problem does not allow us to combine data from the different rows together because some rows belong to 2-digit and some to 3-digit winning combinations.

Use of 'win qty' allows us to normalize the table (Fig.12). To do this we can simply divide the number of correctly predicted digits from the table (Fig. 12) by 'win qty' of correspondent day. In this case, to get 100% true prediction density the cell must contain 2 when won combination contains 2 different digits (like 112) and must contain 3 when the winning combination contains 3 different digits (like 123).

Using this approach the table (Fig.12) produces the normalized table (Fig.13) below. Each cell in the table (Fig.13) was calculated as the value from the table (Fig.12) divided by 'win qty' and multiplied to 2. The coefficient 2 was used for convenience, to have the mathematical expectation of true prediction density equal to 1 rather than 0.5.

T	U	V	W	X	Y	Z	AA	AB	AC	AD
Win qty	**Date/Hour**	**22**	**23**	**0**	**1**	**2**	**3**	**4**	**5**	**6**
3	11-Jul		0	0.6666667	2	0.66666667	2	0.67	0.6667	1.3333333
3	12-Jul		2	0.6666667	0.667	0.66666667	1.3333	0.67	0.6667	0.6666667
3	13-Jul		1.3333333	1.3333333	0.667	0.66666667	1.3333	0.67	1.3333	0.6666667
3	14-Jul		1.3333333	1.3333333	1.333	0.66666667	2	0	0.6667	1.3333333
2	15-Jul		1	1	1	2	1	1	2	1
3	16-Jul		1.3333333	0.6666667	1.333	0.66666667	1.3333	2	1.3333	1.3333333
3	17-Jul		2	0.6666667	1.333	1.33333333	1.3333	1.33	1.3333	1.3333333
2	18-Jul		1	2	2	0	0	1	1	1
2	19-Jul		1	1	1	2	0	1	1	1
3	20-Jul		2	1.3333333	1.333	1.33333333	1.3333	1.33	0.6667	1.3333333
3	21-Jul		2	1.3333333	0.667	0.66666667	0.6667	1.33	0	1.3333333

Fig.13. Part of table with normalized values of hourly true prediction density.

c. Calculation of daily TPD

AT	AX	AY
TPD	**Ap**	**Date**
1.04	8	11-Jul
1.01	18	12-Jul
1.10	5	13-Jul
0.96	13	14-Jul
1.13	7	15-Jul
1.07	6	16-Jul
1.10	4	17-Jul
1.09	2	18-Jul
1.00	2	19-Jul
1.07	3	20-Jul
0.99	3	21-Jul

Having data in the table (Fig.13) normalized, we can now calculate the rows average from the table (Fig.13) and use it as a daily true prediction density (TPD) of the described device. Table (Fig.14) presents the part of such table. Here TPD is average of hourly TPD from the table (Fig.13) and Ap is the daily planetary Ap-index of geomagnetic activity.

Fig.14. Example of daily values of true prediction density and Ap-index of gepmagnetic activity.

Calculation of the correlation coefficient r (True Predictions Density, Ap-index)

Having daily values of true prediction density (TPD) and Ap-index of geomagnetic activity for each day of the experiment, we can calculate the correlation coefficient between these 150 daily values. It was r= -0.15944. On N=150 days of experiment it gives the significance of correlation ($p<0.03$, t=1.94, df=148, one-tailed).

It is worth noting that experiments in 2007 gave practically the same correlation coefficient as in 2006. Experiment was started on Feb. 23, 2007 and continued until Dec.31, 2007. In total, 299 days were recorded. (Several days' data is missing due to technical problems.) Using the procedure described in the steps a-c above I built the 299 daily TPD values and correlated them with Ap-index of geomagnetic activity in 2007. The received correlation coefficient was r= -0.15488, very close to the correlation coefficient from 2006 (r= -0.15944). On N=299 days of experiment it gives the significance of correlation ($p<0.005$, t=2.67, df=297, one-tailed).

The totality of all experimental days in 2006-2007 years gave the correlation coefficient r= -0.153. When calculated on the total 449 days of the experiment, it gives very high significance of correlation ($p<0.00067$, t=3.23, df=447, one-tailed).

It is also worth noting that received correlation coefficients between TPD and Ap-index of geomagnetic activity in both 2006 and 2007 years are also very similar to TPD in French and Russian lotteries, which we discussed above.

	Correlation coefficient	**Volume**	**t**	**Significance**
French lottery	-0.111	509	2.59	<0.005
Russian lottery	-0.125	574	2.99	<0.002
Artificial Intuition Device in 2006	-0.159	150	1.94	<0.028
Artificial Intuition Device in 2007	-0.155	299	2.67	<0.005
Artificial Intuition Device in 2006 & 2007	-0.153	449	3.23	<0.00067

Trend of correlation coefficient between TPD and Ap-index of Geomagnetic Activity

Having daily values of true prediction density (TPD) generated by Artificial Intuition device and Ap-index of geomagnetic activity, we can also check whether the correlation coefficient between TPD and

Ap-index is approximately constant or variable. To do this I calculated the correlation coefficient between TPD and Ap-index in 25-day sliding intervals encompassing the entire experiment (see graph Fig.15 below). In other words, the first point on the graph Fig.15 below was calculated as the correlation coefficient between TPD and Ap-index for the days from 1 to 25, the second point on the graph Fig.15 was calculated as the correlation coefficient between TPD and Ap-index for the days from 2 to 26 etc.

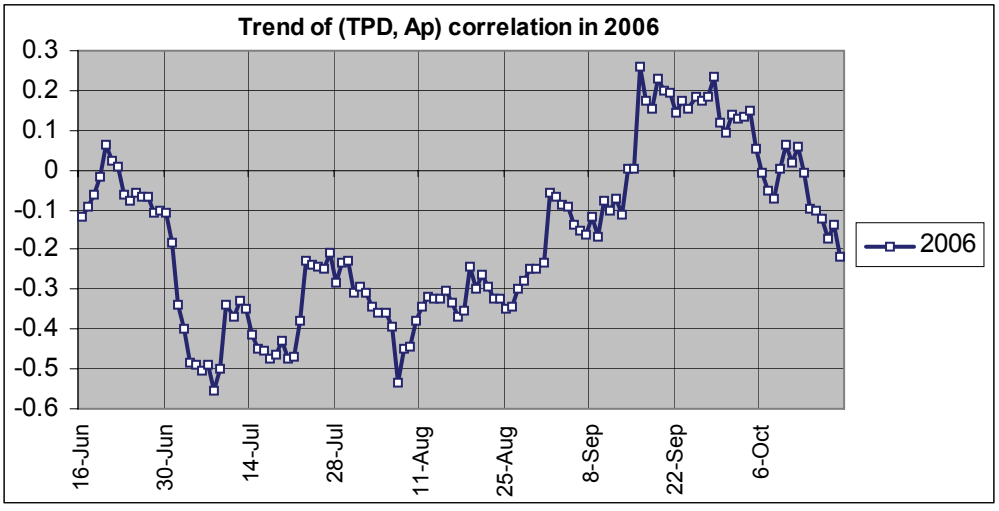


Fig.15. Correlation coefficient between TPD generated by Artificial Intuition device and Ap-index of Geomagnetic Activity. Each point on the line represent the corelation coefficient within a 25-day interval ending on that date.

It must be noted that the points on the Fig.15 are not independent of each other since adjacent intervals have 24 days in common. Therefore to check the validity of this trend, I made 2 independent tests.

a. Using the same method and time period I built the sliding 25-days coefficient correlation for the year *2007*. From the totality of 299 experimental days in the year 2007, I extracted the period from May 23, 2007 to October 19, 2007, and built the correlation graph exactly as I did for the year 2006. Fig.16 presents trends of correlation coefficients between TPD and Ap-index of Geomagnetic Activity for both 2006 and 2007.

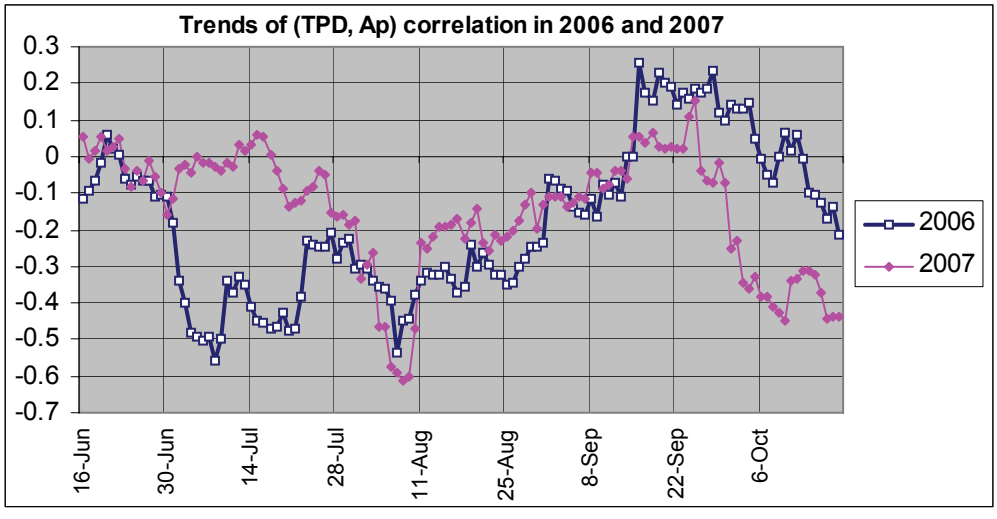


Fig.16. Trends of correlation coefficient between TPD and Ap-index of Geomagnetic Activity in 2006 and 2007.

The resemblance of two graphs is obvious. It is also worth noting that most of the points in both years are located below zero level.

b. Another way to check the validity of trends is to build a graph of correlations between TPD and Ap-index in *non*-intersected intervals. To do this I divided 150 days of observations in 2006 into 6 non-intersected 25-day intervals and calculated the correlation coefficients for each of them. Fig.17 below presents these values for year 2006 (and for comparison for year 2007). All points in this graph are independent from each other.

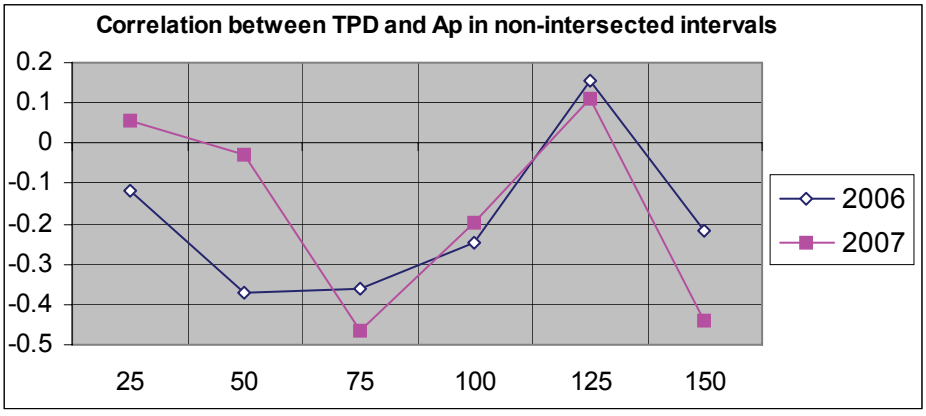


Fig. 17. Correlation between TPD and Ap in 25-days non-intersected intervals

The resemblance of the two graphs is obvious.

USE OF INTERSECTIONS, EFFICIENCY AND PROFITABILITY

In this section I will try to estimate the profitability of the described system and explain why the use of intersections of 2 detectors is needed to make the described system profitable.

Rows Qty and Qty (3) in the table 2 below present the column totals from the table in Fig.8.

	R1 – 5	R1 – 6	R1 – 7	R1A - 5	R1A - 6	R1A - 7
Qty	150	150	150	150	150	150
Qty (3)	14	31	47	12	25	35
Could win ($)	1,344	2,976	4,512	1,152	2,400	3,360
Had to spent ($)	1,500	3,000	5,250	1,500	3,000	5,250

Table 2 A posteriori calculations of detector's efficiency without use of intersections.

Here Qty is the total number of experiment days, Qty (3) is the number of days when all 3 winning numbers appeared in the X selected numbers of a specific detector. For example, it was 14 times when detector R1 selected all 3 won numbers into the 5 selected numbers and 31 times when detector R1 selected all 3 won numbers into the 6 selected numbers.

I received as winning prizes in average $96 (what is slightly greater than $88.6, which lottery organizers paid to players for combinations with non-repeatable digits in 2006). Knowing this, we can estimate that I could win 1,344 dollars in these 14 draws (=$96*14). *All these calculations are a*

posteriori and in reality I used the method of intersections from beginning of experiment. I put this value into the line 'Could win ($)' in the table 2 above.

To submit 10 possible 3-digit combinations, which 5 selected numbers produce I had to spend $10. What this means is that in 150 draws I had to spend $1,500 using this method. I put this value into the row 'Had to spent ($)'. It is obvious from the table 2 in all cases, the use of a single detector does not generate profit. Detectors put gains *above* the random level (which is approximately 60% of spent amount), but still did not generate profit. This is because the lottery is organized in such a way that players receive back only about 60-65% of the money spent. If the lottery returned on average all the money it received from the players, the use of any detector and method could be profitable.

Keeping this in mind I used the method of intersections of numbers selected by both detectors.

Let's imagine that first detector selected 1,2,3,4,5,6 and second selected 1,2,4,5,7,8. Let's consider only the numbers, which were selected by *both* detectors. In this case we'll have in the intersection only 1,2,4,5. I.e. instead of paying $20*2=$40, we will pay only $4, which is needed to fill 4 boards to cover the 4-digit combination 1,2,4,5 with 3-digit sets (245,145,125,124).

Of course, if the detectors selected numbers 100% randomly, the use of intersections would make no sense at all, because the probability to win would always the same. However, testing the non-randomness of selected numbers, we assume that correct numbers have more chances to be selected into top X numbers using the described device.

And because it should be true for both detectors, these correct numbers should appear in the top X sets generated for both detectors. And therefore correct numbers have more chances to appear in the intersection than non-correct.

Quantity of numbers in the intersection was also recorded in the table in Fig.8 (column H).

Table 3 below presents the totals after the 150 days of experimentation broken down by the quantity of numbers in the intersection:

Intersection	$	#	Spent $	Won $	Won #	Efficiency	Probability	Probability (bin)
2	0	4	0	0	0	-		-
3	1	54	54	0	0	0.00		-
4	4	64	256	381	4	1.49	0.06792	0.06967
5	10	24	240	565	6	2.35	0.0025	0.00354
6	20	4	80	302	3	3.78	0.0063	0.0126
Total:		**150**	**630**	**1248**	**13**	**1.98**	*	**0.00015**

Table 3. Totals broken down by the quantity of numbers in the intersection.

Here

Intersection - the quantity of numbers in the intersection,

$ - amount I paid to cover specific intersection (for example when only 3 digits appeared in the intersection - I had to fill only one combination to cover it and spend $1, when 4 digits appeared in the intersection - I had to fill 4 combinations and to spend $4, for 5 digits - I spent $10 etc),

- how many times the intersection with specific number of digits appeared,

Spent $ - total amount I paid to fill for all such intersections, *[Spent $]=[$] *[#],*

Won $ - amount of money this specific intersection generated,

Won # - how many times this intersection won,

Efficiency - ratio [money won] / [money spent],

Probability - binomial probability to have 'Won # -1' successes in '# ' trials when probability to win in 1 trial is 6/1000* '$'. Probability column was calculated as 1-BINOMDIST([won # -1], #, '$'*6/1000), where BINOMDIST is a function of the binomial distribution. Here # is how many times

the intersection with the specific number of digits appeared, and '$' is the number of 3-digit combinations this intersection produces.

Probability (bin)- binomial probability to have *'Won #'* successes after the *'Spent $'* trials. It is presented here mainly as an illustration. As described in Table 1, the Probability (bin) provides *the upper limit, b*ecause it considers all trials as valid, independent and includes all of them in the total number of trials.

Here is the important difference between "Probability" and "Probability (bin)". Calculations of "Probability" do not combine all combinations into one set. The "granularity" for calculations of "Probability" is the draw, not the individual combination. For example, when we consider an intersection with 5 digits which produces 10 combinations, the probability to win in one draw is 10*6/1000=0.06 and the probability to get *"Won #"* successes for this intersection is 1-BINOMDIST([won # -1], #, 0.06).

"Probability (bin)" however, combines all individual combinations for all draws into one set. While we consider each intersection separately, it is equally easy to calculate the exact probability and upper level of probability - "Probability (bin)". However, when we combine trials from different intersections together, it is much easier to calculate the upper level of probability "Probability (bin)", than the exact value.

Probability for all trials is marked with * sign and is derived from complex formulas used to combine several trial sets with different probabilities. However like in other places, the binomial probability provides the upper level, is easy calculable and is small enough (0.00015).

Profitability

As Table 3 shows, the use of intersections made the described system profitable. The efficiency was greater than 1 for all intersections, with exception of intersection with 3 numbers. Overall efficiency was 1.98 (total won amount $1,248, total spent amount - $630).

Similar analyses for geomagnetic-quiet days (Ap<9 and Ap<5) showed that the less is the Ap-index of geomagnetic activity - the higher is the efficiency and profitability of described device. This is in concordance with observations by other scientists who investigate the influence of geomagnetic activity on human intuition.

DISCUSSION AND PERSPECTIVES

Alternative explanations

The described experiment was designed to test the "Hydrodynamic model" of intuition. In spite of strong statistics accumulated in 2006, repeatability of the experiment in 2007 and correlation of data with external factor (geomagnetic activity), we cannot tell that the "Hydrodynamic model" of intuition is the *only* possible explanation. There are at least 2 alternative explanations.

1. Psychokinesis. I learned about predicted numbers in several hours before the lottery draw took place. What if I unintentionally influenced the outcome of the "Pick 3" lottery using my PK-abilities? This alternative may also explain the negative correlation with geomagnetic activity, because paranormal abilities correlate negatively with geomagnetic activity (see for example, Persinger & Schaut, 1988; Radin & Rebman, 1996).

   However this explanation should probably be rejected because I marked on lottery card the intersection of results predicted by *two* detectors. However detector R1 (which was covered with mirrors) provided much better efficiency than detector R1A (which was not wrapped with mirrors). The psychokinesis hypothesis can not explain it because it assumes that I basically got the random

data from both detectors and used my own PK abilities to deviate the lottery outcome to desirable side.

2. Retropsychokinesis. What if information about future winning numbers influenced somehow the outcome of "radioactive isotope / Geiger counter" couple and changed frequencies of radioactive decay for the correct predictions.
   Of course in such a broad formulate this alternative can not be rejected. And this alternative can even be correct.

   Only, 3 facts should be mentioned.
   a. The negative correlation of efficiency of described device with geomagnetic activity means that retropsychokinesis mechanism should also depend on geomagnetic activity.

   b. If the higher efficiency of detector R1 comparing to detector R1A related to mirrors, which covered the R1 detector, the retropsychokinesis should explain this.

   c. In spite of what theory ("Hydrodynamic model" of intuition or Retropsychokinesis) stays behind the described Artificial Intuition Device, this device works and is able to consistently generate the correct predictions, exceeding the limits which probability theory allows.

Perspectives

As I mentioned in the item "Correlation of Artificial Intuition with geomagnetic activity" I continued the experiment in 2007. That experiment was started on Feb. 23, 2007 and continued until Dec.31, 2007. In total, 299 days were recorded. In the near future I am going to write an article based on combined 2006 / 2007 data. However few items could be mentioned right now.

a. The effects discovered in 2006 were repeated in 2007 with even better statistical significance.
b. Detector R1 (covered with mirrors) continued to over-perform the detector R1A in 2007.
c. There are the monthly and hourly trends in efficiency of Artificial Intuition Device.
d. Detectors (R1 and R1A) in 2007 continued to correlate negatively with the geomagnetic activity as it was in 2006.
e. Using daily averages of efficiency it was possible to build the detailed graph between efficiency of Artificial Intuition Device and Ap index of geomagnetic activity.

The continuation of experiments will bring greater statistics and may answer the following questions.
a. Do observed effects depend on the distance to random process, which outcome the Artificial Intuition Device predicts?
b. Does the increase in the number of detectors allow an increase in the quality of predictions?
c. Do changes in protection materials, configuration of reflectors, type of detectors, speed of radioactive decay increase the quality of predictions?

APPENDIX 1. HYDRODYNAMIC MODEL OF INTUITION

Here is quick reminder about the "Hydrodynamic model" of intuition. This model uses physical parameter "entropic potential of event". This parameter and corresponding formulas were first time introduced by the author in 1989 (Zilberman, 1989). It describes the influence of the current event on the change of entropy of the system in the future.

As it is well known, entropy of a system measures the organization of the system, its distance from chaos. It operates with the current state of the system as it is on the moment of measurement. However,

what happens when we want to estimate the influence of the event which happened in the system *now*, in relation to development or degradation of the system in the *future*? Or, in other words, what if we want to estimate the potential of the current event to change the entropy of the system in the future?

Of course, in accordance with second law of thermodynamics, entropy in a closed system grows permanently. But it can grow with different speed. There can be some processes, which speed-up entropy growth and some which slow-down entropy growth. Is it possible to distinguish these processes by some parameter? This is the purpose of "entropic potential of the event" (Z-potential below).

Fig.19 below illustrates the "entropic potential of the event" visually.

1 - is the "river" of events, which happen in the system R while the time is passing,
2 - the analyzed event, which happens in the system at some specific moment,
3 - are events, which happened in the system because the event 2 happened. Events, which could not have happened without event 2, or at least, which had a lesser probability of occurrence.

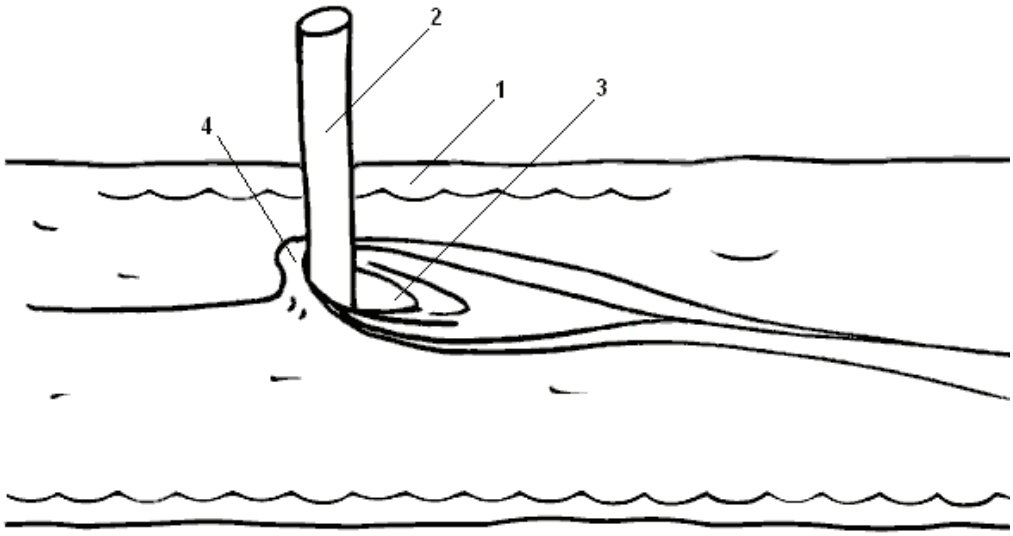


Fig.19. Illustration of the "Hydrodynamic model" of intuition

The horizontal axis is time, the vertical axis is the entropy of the system.

On this picture - the further we are going along the river from the event 2 to the right - the less is number of events, which happened exclusively because of the event 2. And therefore the influence of event 2 on the entropy level of the system becomes weaker and weaker with time passing.

With the entropic potential definition in mind, the entropy of the system in area 3 becomes different in comparison to the neighboring areas of the river. This happens because of the event 2. If event 2 did not happen, the entropy level in the area 3 could be the same as in neighboring places. It became different because event 2 happened. This way the depth and width of area 3 can be a visual illustration to the entropic potential definition.

So far everything mentioned above was only the visual illustration of Z-potential. We introduced a new mathematical term, which is convenient to describe the potentials of events for entropy change of the system. But, did it put us closer to understanding what intuition is?

Let's return to the "hydrodynamic model" described above. On the left side of the "event" 2 we can note a small rise 4. In a real river this rise happens because the flow of water meets an obstacle, which

slightly pushes the water level up. The greater the obstacle the bigger, higher, and longer (to the left) is the water rise 4.

Imagine that you go along the river in small boat during the night. In the absolutely darkness (or 100% fog) you can not see if there are any obstacles in the front of your boat (in our model in the future). However even in darkness you will be able to detect the presence of the water rise, which you may feel at the moment when you pass it (in our model in the "now"). And as soon as you detected the water rise you know that there is an obstacle in the front of your boat!

Can it be that our intuition does the same? If intuition is simply our ability to feel the "rise" preceding the event with significant entropic potential? For example by detecting the change in the speed of chemical reactions in our body or some other processes. Of course the "hydrodynamic model" is only an analogy. There is nothing in current physics that supports the existence of such kind of "rise", which precedes a process with significant Z-potential. And it is highly speculative to think that such a "rise" can be detected. Only experimentation can prove or reject its validity.

APPENDIX 2. SOFTWARE TO PROCESS AND ANALYZE THE RECORDED IMPULSES

This routine was written in T-SQL language for SQL Server.

1. This routine accepts 2 input parameters: FromDate and ToDate. These parameters allow the user to select the interval where analysis of impulses frequencies will be performed.

2. During the initialization this routine creates 3 temporary tables

#Numbers	(num int, r real, Qty int)
#AllNumbers	(num int, r real, Qty int)
#t	(dat datetime, qty int, num int)

3. The routine defines the hourly intervals between FromDate and ToDate. For example, if FromDate ='Mar 13, 2007 10:00:00' and ToDate='Mar 13, 2007 18:00:00' - it divides all impulses recorded between FromDate and ToDate into 8 intervals:

from 'Mar 13, 2007 10:00:00' to 'Mar 13, 2007 11:00:00',
from 'Mar 13, 2007 11:00:00' to 'Mar 13, 2007 12:00:00',
...
from 'Mar 13, 2007 17:00:00' to 'Mar 13, 2007 18:00:00'

4. For each hourly interval it:
   a. Cleans the temporary tables #t and #Numbers
   b. Inserts into the table #t the total number of impulses arrived in each minute of analyzed hour and number, which was exposed on computer monitor during that interval.
   c. Using the data loaded into the table #t, the described routine calculates the average frequency of detected impulses grouping them by exposured number and combining them by all minutes of analyzed hour. The average frequency is calculated as:

$$\frac{\textit{total \# of impulses combined by all minutes of the analyzed hour when the analyzed number was exposed}}{\textit{total \# of minutes in the analyzed hour when the analyzed number was exposed}}$$

   d. The described routine may optionally limit the number of detected impulses per minute to be above some predefined threshold. For example, it can be programmed to consider only the minutes when there are at least 10 impulses recorded. This allows the routine to ignore the

minutes when no impulses or only background impulses were recorded (for example, due to technical problems).

e. After completion of the calculations described in item 4-c above, the routine inserts the exposed number, calculated frequencies and the total quantity of impulses for each exposured number into temporary table #Numbers, which was created in step 2 and cleaned in step 4-a.
f. Using the data in the table #Numbers, the described routine sorts the records by frequency and selects the numbers with the highest frequencies and correspondent hour from the table #Numbers into the table #SelectedNumbers. In the preferred embodiment, the routine inserts 50% of records with the highest frequencies into the #SelectedNumbers table. Obviously this number can vary if necessary.

5. After processing of all hourly intervals is finished, the routine calculates how many times each analyzed number appears in the #SelectedNumbers table, sorts the analyzed numbers by quantity and notifies the user. The simplest way to notify the user is to display the result on the computer monitor. However, other methods of notification, like sound alert, printing of output, SMS messaging, or e-mail / cell phone notification are also possible.

6. The example in fig. 7 presents the analyzed numbers (from 0 to 9) and how many times each analyzed number was inserted in the #SelectedNumbers table on the step 4f. For example, number "7" was inserted into the #SelectedNumbers table 6 times for the detector R1, number "4" was inserted into #SelectedNumbers table 7 times etc. As it was described in the item 4f, the routine inserts into #SelectedNumbers table the 50% of records from the table #Numbers with the *highest* frequencies for each hour. In result the bottom part of the table in fig. 7 contains the analyzed numbers corresponding to higher speed of radioactive decay (because more times this number was included into top 50% of records with highest frequencies). Correspondingly the top part of the table in fig. 7 contains the numbers corresponding to lower speed of radioactive decay.

7. Acceleration vs. deceleration criteria. Having the fig 7 table, the user makes the key decision - which numbers to fill in the lottery ticket. In the "hydrodynamic model" of intuition, the speed of physical processes is changing near the event with significant entropic potential. In our case the "physical process" is the radioactive decay and the "event" is the process of testing the number, which can be entered for the coming lottery draw. A priori we do not know if the radioactive decay will speed-up, slow-down or do something else near the correct number (number with non-zero entropic potential). If we accept the model in picture 19 "as-is", we can expect the *acceleration* of the radioactive decay near correct prediction (rise 4 on the picture means acceleration of the entropy growth, and corresponds to the acceleration of radioactive decay in described experiment). Therefore I started the experiment using the acceleration of the radioactive decay as indicator. In other words I selected the numbers from the *bottom* part of the table fig.7.

By the September 16, 2006 I had accumulated strong statistics, proving that the described Artificial Intuition Device works. By that time it won in lottery 10 times, had efficiency 1.88 (instead of random expected 0.5) and had binomial probability of random accumulation of 10 winnings after 496 trials less than 0.001 (1-BINOMDIST(9, 496, 6/1000)<0.001).

To check if *deceleration* of radioactive decay can also be used as indicator, since September 17, 2006 until the end of experiment I used deceleration criteria to detect non-zero entropic potentials. In other words I selected numbers for lottery tickets from the *top* part of the table in fig.7, where numbers corresponding to *slower* radioactive decay are located. This criteria during the period September 17, 2006 - October 19, 2006 allowed me to win in lottery 3 times, provided the efficiency 2.35 (instead of random expected 0.5) and had binomial probability of random accumulation of 3 winnings after 134

trials less than 0.05 (1-BINOMDIST(2, 134, 6/1000) <0.05). Therefore it appears that both criteria work fine.

8. Conversion of the selected numbers into lottery combinations. Let's return to the picture in fig.7. Because the detector R1 selected top 6 numbers as (7,4,6,8,5,9) and the R1A detector selected top 6 numbers as (6,4,9,1,8,5), the intersection of these sets contained 5 numbers 4,6,8,5,9, selected by *both* detectors. If the "hydrodynamic model" is correct, these 5 numbers had more chances to win in the coming lottery draw. I filled only combinations with different digits (like 123 and never like 112). Therefore the selected 5 numbers (4,6,8,5,9) produced ten 3-digit combinations: 486, 456, 458, 658, 496, 498, 698, 495, 695, 895, because there are only 10 different ways to extract the unique 3-digit combination from the given five digits. Having these 10 combinations I entered them for the coming draw into the "Pick 3" lottery card.

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INÁCIO FERREIRA: THE INSTITUTIONALIZATION OF THE INTEGRATION BETWEEN MEDICINE AND PARANORMAL PHENOMENA

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ABSTRACT

Paranormal or psychic phenomena may impact society in several ways. Sometimes they are institutionalized through academic organizations. In Brazil, through spiritism, paranormal phenomena have been integrated to practices of mainstream Western medicine for almost a century in dozens of spiritist psychiatric hospitals throughout the country. The present study aims to present a historical investigation of the Spiritist Sanatorium of Uberaba, one of the oldest and most important spiritist hospitals in Brazil, since its foundation in 1933 until the death of its first director, Inácio Ferreira, in 1988. We have also studied Ferreira's life as a physician, since he was the first major spiritist psychiatrist in Brazil and probably in the world. Ferreira conducted research, wrote and published several books reporting case studies of patients at the Sanatorium, their treatment and follow up. His work at the Sanatorium reached press, lay audience and researchers from several countries. Ferreira had a prominent role in pursuing the integration of psychic experiences with conventional medicine, in institutionalizing spiritist practices and representations regarding the diagnosis and treatment of mental disorders, mainly ideas referring to the importance of the influence of discarnate intelligences and past life experiences on mental health. He was the major promoter of these principles and practices in Brazil and abroad. Ferreira's work often raised resistance among physicians and was not adopted by Brazilian academic medicine. We are not aware of any academic study on Ferreira or his work at the Spiritist Sanatorium of Uberaba. The present historical paper is a brief report of an ongoing investigation that aims to help fulfill that lack in historical studies.

INTRODUCTION

Paranormal or psychic phenomena may impact society in several ways. Many times they are institutionalized in religious and/or healing traditions. More rarely, this institutionalization happens through academic organizations. In Brazil, through spiritism, paranormal phenomena have been integrated to practices of mainstream Western medicine for almost a century in dozens of spiritist psychiatric hospitals throughout the country (Almeida, 2007; Moreira-Almeida e Lotufo Neto, 2005). The integration between conventional medicine and paranormal phenomena has been institutionalized by the foundation of dozens of spiritist psychiatric hospitals throughout the country (Puttini, 2004). In Brazil, the union between medicine and spiritism was more intense than in any other place (Aubreé & Laplantine, 1990; Hess, 1991).

Most Brazilian spiritist hospitals did not produce publications with wide circulation describing in depth the combination of medical and spiritist treatments. A major exception to this pattern was Inácio Ferreira M.D., from the Spiritist Sanatorium of Uberaba, state of Minas Gerais, Brazil. For 55 years he directed and worked at the Sanatorium, one of the oldest and most important spiritist hospitals in Brazil. The present study aims to present a historical investigation of the Spiritist Sanatorium of Uberaba since its foundation in 1933 until Ferreira's death in 1988. We have also studied Ferreira's life as a physician, since he was the first major spiritist psychiatrist in Brazil and probably in the world.

METHODS

This study works with the cultural history's concepts of practices and representations. We aim to investigate the process by which the spiritist view of mental disorders produced new practices for the understanding, diagnosis and treatment of madness. The history of the Spiritist Sanatorium of Uberaba will be studied as an institutionalization that marks in a visible and permanent way the existence of a group (Chartier, 1988). This historical investigation is mainly based upon primary sources: books, articles, letters, notebooks, documents, patients' charts and other first hand materials produced by our historical subjects. We also interviewed people who worked with and/or had a close relationship with Inácio Ferreira and his work at the Sanatorium.

RESULTS AND DISCUSSION

The physician Inácio Ferreira (1904/1988) was born in Uberaba, state of Minas Gerais, Brazil. In 1924, he was admitted to the medical school at University of Rio de Janeiro[1], getting his MD degree in 1929 (De Vitto, 2008).

In 1928, a group of spiritists started building a spiritist psychiatric hospital, the Spiritist Sanatorium of Uberaba, that was opened on December 31st, 1933. Despite being a materialist, Inácio Ferreira accepted to be the physician assistant and the clinical director of the Sanatorium, beginning his duties in early 1934. The hospital, like all spiritist hospitals, is a nonprofit one, devoted mainly to care for poor patients. It was opened with 60 beds, with 10 being allocated for free treatments (Bacceli, 1987).

Ferreira stated that during the first year of his work at the Sanatorium, he only used orthodox medicine to diagnose and treat mental disorders. The complementary spiritist treatment was provided by volunteers and was based on passes (laying on of hands), prayers, and mediumistic séances of disobsession[2]. Around one year after beginning his work at the Sanatorium, Ferreira declared having accepted Spiritism (Ferreira, s/ed.). Since then, until his death in 1988, he integrated conventional medical therapies to spiritist treatments.

Throughout his career he wrote and published books of several genres. Six of them were directly related to Spiritism and Medicine: "Têm Razão?"(Are they right?) (1942), "Novos Rumos à Medicina I e II" (New directions to medicine vol. I and II) (1945;1948), "Espiritismo e Medicina" (Spiritism and Medicine) (1941), "Psiquiatria em face da Reencarnação" (Psychiatry in face of reincarnation) (1940), and "Peregrinos da Vida" (Pilgrims of life) (1982). In these books, Ferreira presented evidence for spiritual etiology for many cases of madness and for the efficacy of spiritist treatments. Some of his books were translated into Spanish.

The main thesis advocated by Ferreira was that conventional medicine limited its own possibilities of investigation and therapeutic interventions when it refused to study the spiritual factor of mental diseases and the hypothesis of reincarnation. Spiritism (supporting the role of spiritual influences and past live experiences), together with psychosocial and biological factors, would be an essential tool for a qualitative leap in psychiatry, leading to a better understanding and treatment of mental disorders.

The cause for such resistance would be the materialistic dogmatism and the authoritarian character of the academic milieu, bound to the *magister dixit*, self-interests (religious or financial) and prejudices regarding to spiritism (Ferreira, 1944, 1944a). Ferreira's claims raised strong opposition from part of the medical class and the Catholic Church.

[1] This school of medicine, founded in 1808, is the second oldest in Brazil. Rio de Janeiro was Brazil's capital between 1763 to 1960. Sources: http://www.medicina.ufrj.br/; http://www.medicina.ufba.br, accessed in 14/04/2008.

[2] Obsession is considered a persistent negative influence of discarnate spirits. Disobsession is a mediumistic séance where a spirit who would be causing obsession communicates through a medium and is counseled to stop doing harm to the patient (Kardec, 1868).

In addition to psychosocial and biological causes of mental disorders, Ferreira added spiritual influence and past lives experiences. In his clinical practice at the Sanatorium, he first used to interview the patient and his/her family and to perform a physical and mental status examination. His first target was to detect any organic cause for the mental disorder. If he did not find any evidence of an organic origin, the patient was observed during some days at the psychiatric ward using no medication. During this time Ferreira used to ask, in a mediumistic meeting, for some information regarding the patient's disorder and its etiology. If information gathered from clinical observation and mediumistic sources pointed to a spiritual cause, spiritist therapeutics were initiated, in isolation or in conjunction with conventional medical therapies.

Ferreira claimed that the high cure rate obtained with very scarce resources was evidence for the efficacy of spiritist therapy[3]. According to a report of the activities developed from 1934 to 1944 at the Sanatorium, 1,352 patients were admitted, 554 (41%) were discharged cured, 210 (16%) had improved (16%), 163 (12%) were transferred, 241 (25%) were removed and 51 (4%) died. In this period, 423 cases were classified as obsession, being the diagnostic classification that allowed for a greater percentage of cures, to nearly 100%[4] (Ferreira, 1993; Moreira-Almeida & Lotufo Neto, 2005).

His books were not written in technical language, they seem to be directed also to the lay public. The style is often emotional and grandiose, announcing the advent of a new era for medicine. The abounding case reports, despite not describing the psychopathological details, provide good illustration and try to prove the spiritist theory for mental disorders, but he usually did not provide strong evidence of truly paranormal phenomena (Moreira-Almeida & Lotufo Neto, 2005). One example is described bellow:

A 38 year old woman suddenly started showing marked behavior changes. Late at night she often left home in agitation saying that a voice from a dead person was calling her. She was admitted to the Sanatorium where symptoms persisted in addition to fearful and paranoid behavior. Mental examination showed that level of consciousness, memory, and orientation were preserved. Thirteen days after the patient's admission to the hospital, a medium in trance in a mediumistic meeting said that an obsessing spirit caused her disorder because, in a previous life, she had done much harm to the obsessing spirit when it was incarnated. The obsessing spirit communicated through a medium and was persuaded to release the patient. After that, the patient had some improvement in her clinical condition, but still kept some symptoms. Ferreira raised the hypothesis that she might have another spiritual influence. It was confirmed a few days later by a manifestation of another obsessing spirit at mediumistic meetings. The patient's total recovery was obtained just after the second obsessing spirit had accepted freeing her. The patient was soon discharged with no symptoms despite the use of no medications; her therapy was totally based on spiritist therapeutics.

The influence of Ferreira's medico-spiritual practice expanded largely beyond Brazilian spiritists. His works reached press, lay audience and researchers from several countries, mainly between 1940s and 1970s. We were able to have access to letters that he received from Argentina, Bulgaria, Chile, Paraguay, Portugal, Puerto Rico, Spain, United States, and Venezuela asking for diagnosis and treatment of a wide range of mental disorders. Spiritualist/spiritist magazines from several countries (Conocimento de La Nueva Era – Argentina; Cosmos - Puerto Rico; Prismas – Venezuela; Voz Informativa – Mexico; Light - United Kingdom, and La Revue Spirite - France) published articles about Ferreira and his work.

[3] It is worth to note that Ferreira published most of his books before the "psychopharmacologic revolution", when contemporary standard psychiatric medications were developed at the 1950s decade (Rosenbloom, 2002). So, Ferreira wrote his books in a period when almost no effective treatment to severe mental disorder was available. We have started the investigation of the impact of psychopharmacologic revolution over the therapeutics used at the Sanatorium.

[4] Inácio Ferreira reported several cases of "spectacular cures" due to spiritist therapies. However, most of the current standard methodological rigor such as randomized controlled clinical trials was not available at that time (Dehue, 1999).

Karl Müller, president of the International Spiritualist Federation, published two papers about Ferreira's work at the magazines "Yours Fraternally" (official organ of the International Spiritualist Federation) and "Spiritualisme Moderne" (published by the Belgian Spiritist Union).

Inácio Ferreira published dozens of papers in spiritist magazines from Brazil ("Revista Internacional do Espiritismo" and "O Revelador") and Argentina ("Revista Constancia", from the Argentinean Spiritist Association) proposing the spiritist view of mental disorders as an essential complement to conventional medicine. He was invited to deliver lectures in spiritualist congresses in Brazil and Argentina (at the Argentinean Spiritist Confederation and at the Pan-American Spirit Confederation - CEPA).

In 1947, Natalio Ceccarini (president of Argentinean Spiritist Confederation) delivered a lecture in Buenos Aires: "Dr. Ignacio Ferreira: Spiritist and revolutionary of psychiatry". This address was published as a book in Spanish prefaced by Inácio Ferreira (Satto, 1951).

In 1959, Argentinean spiritists made a proposal to Consejo Nacional de Salud Mental of Argentina to build a spiritist hospital in Buenos Aires. This proposal was refused. As an answer to this refusal, Salvador Satto published a book in 1961 (The spiritism at psychiatry's defendant's bench) asserting the importance and efficacy of spiritist therapies. The case of Ferreira at the Sanatorium was an important topic in the book.

Ferreira's book "Novos Rumos à Medicina" (1945) was in the reference list of a parapsychology course offered in 1958 by the Institute for High Studies of Montevideo.

Ferreira was in touch with several physicians and people interested in psychic research and parapsychology, in addition to researchers in the field. These contacts usually aimed to obtain more information regarding Ferreira's diagnostic and treatment methods; reports of cures and cases suggestive of reincarnation as well as arranging visits to the Sanatorium. Joseph Hansell from Metaphysical Research Foundation (USA), staff from Instituto Internacional de Parapsicologia de Puerto Rico, and Enio Hernandez Freites, director of Instituto Venezolano de Parapsicologia were some of these contacts. According to Karl Müller, Ian Stevenson, from University of Virginia (USA), contacted Inácio Ferreira and exchanged some letters with the Brazilian psychiatrist about his work at the Sanatorium and the book "Psiquiatria em Face da Reencarnação" (1940). Stevenson visited Ferreira and the Sanatorium in 1960s.

Ferreira's work on spiritist psychiatry raised strong resistance from Brazilian medical community. Just later in his life, Ferreira was honored with several awards. In 1979, the Medical Association of Minas Gerais (the state where he lived) awarded him by his 50 years of work in medicine. The Rotary Club, in 1980 and in 1987, awarded him in acknowledgment for his services to Uberaba (his city) and with a "Merit in Medicine". Also in 1987, the School of Medicine of Triângulo Mineiro and the Society of Medicine and Surgery of Uberaba paid tributes to him. He was also a very active member of Freemasonry, having received several homages in it. Despite those acknowledgments for his life devoted to medicine, Ferreira's practices integrating spiritism to medicine were not adopted by Brazilian academic medicine.

Inácio Ferreira had a prominent role in pursuing the integration of psychic experiences in conventional medicine, in institutionalizing spiritist practices and representations regarding the diagnosis and treatment of mental disorders, mainly ideas referring to the importance of the influence of discarnate intelligences and past live experiences on mental health. He was the major promoter of these principles and practices in Brazil and abroad. We are not aware of any academic study on Ferreira or his work at the Spiritist Sanatorium of Uberaba. The present historical paper has a more descriptive approach because it is a brief report of an ongoing investigation that aims helping to fulfill that lack in historical studies.

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IRELAND THE ANOMALOUS STATE: WRITING IN THE CELTIC TWILIGHT ZONE

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INTRODUCTION

" All this Spiritism & Spiritistic investigation leads to nothing. It is just turning round & round in a circle and is never a spiral. Spiritists do not want to be convinced- they are that already. Unbelievers scoff at the whole thing & Scientists will accept nothing but strictly Scientific demonstration… It wants a particularly hard, precise & unimaginative mind to sum up the for and against of all these matters..."

Letter from occultist W.T. Horton to poet W.B. Yeats , July 24th 1914.

Hansen (2001) notes that in times of great cultural change, anti-structural manifestations are particularly apparent, and the supernatural is an important part of them. While from a British perspective, considerable scholarship has been devoted to charting the history of spiritualism (Conan Doyle, 1926: Oppenheim, 1985; Owen, 1989; Bassett, 1990) and the early years of the Society for Psychical Research (Salter, 1948; Gauld, 1968; Haynes, 1982) considerably less has been written about activities in Ireland. Yet on that 'Other Island' active engagement with the supernatural played a large part in the national awakening which was to lead to the 1916 Easter Rising and in the internationally recognised achievements of the writers and artists of the Irish revival. While Psychical Researchers Arthur and Gerald Balfour both took turns to serve as Chief Secretary for Ireland an entire swathe of the Anglo-Irish literary set was engaged in lively experimentation with matters paranormal. This was to prove a rich source of inspiration and a potent stimulation for creative people engaged in strategies of personal and national reinvention. At the same time as writers such as W.B. Yeats, Somerville and Ross, George William Russell (AE) and James Cousins were variously involved in mysticism, spiritualism, Theosophy and ceremonial magic, three of the most remarkable mediums in history, Hester Dowden, Eileen Garrett and Geraldine Cummins were also features of the Anglo-Irish literary scene. Hansen (2001) has also argued that 'Psi' may be seen as communication and that literary theory deals with information and communication in a more fundamental way than do the sciences. It is thus perhaps not surprising that this group of professional communicators should choose to engage so profoundly with the paranormal, and that automatic writing should also form a recurring feature of their literary subculture.

MATERIALS

A considerable volume of written material for analysis exists in the form of poems, novels, dramatic works and personal memoirs by this group of authors. Significant amounts of unpublished writing produced are also held in Irish archives. The Somerville and Ross collection held at Queens University Belfast holds a collection of diaries spanning the 75 year time period from 1873-1948 including numerous messages in automatic writing and notebooks containing records of spiritualist séances in the period 1930-41. A collection of Geraldine Cummins' own papers consisting of her manuscripts, letters, and psychic material is also part of the Irish national archive held in Cork. The Occult Papers of W.B. Yeats held in the National Library of Ireland also hold useful information on his psychical research activities and records of séance attendance. These materials, as well as contributing examples of automatic writing previously unexamined by psychical researchers, also serve as an exceptionally rich source of information on psychic experiences across the course of several life-times, from accomplished writers socially well-placed to observe and personally well-equipped to describe the place

which the paranormal held in the culture to which they belonged. A two part approach to the examination of this written material is proposed.

METHODS

Part One: Case Studies

This part of the project will take a case study approach, a research strategy of empirical inquiry that investigates a phenomenon within its real-life context. Case study research can involve single and multiple case studies, rely on multiple sources of evidence, be based on any mix of quantitative and qualitative evidence and benefit from the prior development of theoretical propositions (Yin, 2002). The case study approach is particularly useful in the study of rare events, which as a rupture in the routine, may shed light on underlying psychological and social processes (Harding, Fox & Mehta, 2002) and as such, this technique may be well suited to a study of the paranormal. The research will examine written records of paranormal events within a) the lives of individual writers and mediums b) the Anglo-Irish literary subculture and c) Ireland as nation. Case studies will be examined in the light of the Trickster archetype, an abstract constellation of qualities, usually personified in the form or a person or a group (but potentially including entire cultures) involving tales of "disruption, loss of status, boundary crossing, deception, violation of sexual mores and supernatural manifestations" (Hansen, 2001: p29). The review will take a narrative approach to explore themes such as: scepticism versus belief, the paranormal as a muse, occult practice as a means of excluded groups obtaining power, the unquiet dead, multiple identities, imagined communities, secret messages and codes, the paranormal as a meme and the ways in which identities are constructed in texts. Further themes may be explored in the course of the review or proposed themes discarded.

This process may also be expected to reveal details of unusual incidents as yet unrecorded in the parapsychological literature, for example, Somerville and Ross' 1914 encounter with what they believed to be an elemental spirit. Interesting accounts of séances with well-known mediums of the day may also be found (Cousins, 2008a). Furthermore, an increased awareness of Geraldine Cummins' literary, political and social activities within this particular historical and cultural context may allow for a fuller examination of her mediumship. Of particular interest may be her network of social connections and the potential for acquisition of information by non-paranormal means (Barrington, 1966; Cousins, in press).

Part Two: Linguistic Analysis

The second part of the research will focus on automatic scripts produced within this Anglo-Irish literary subculture. Automatic writing provides a unique opportunity for research into mediumship in that it occupies an interesting space between physical and mental mediumship, whereby through the process of writing, mind becomes text and the resulting scripts are physically present as material evidence. Although a considerable amount of evidence may be assembled in the previously outlined case study approach, any qualitative approach to mediumship research is always open to claims of subjectivity. Whereas 'process-orientated' approaches to spiritualism and mediumship are a valid method of inquiry, and a considerable amount of detailed accounts have already been produced from within a variety of academic disciplines (Arnason, Hafsteinsson & Gretarsdottir, 2003; Emmons, 2001; Emmons & Emmons, 2003; Gillen, 1987; Hazelgrove, 2000; Oppenheim,1985; Owen, 1989; Leonard, 2005; Richeport, 1992; Skultans, 1974; Swatos & Gissurarson, 1997; Spencer, 2001; Sword; 2002; Walliss, 2001; Wood, 2001; Wood, 2003; Wood, 2004; Wood, 2007)[1] for parapsychology research to

[1] This list is far from exhaustive. UK Parapsychologists might be particularly interested in Walliss' (2001) account of his fieldwork in English Spiritualist Churches and with SNU Mediums and Wood's (2001, 2003, 2007) recent explorations of 'New Age' channelling and possession.

entirely eschew a proof-orientated approach to mediumship, is to negate parapsychology's raison d'etre as the only academic field which does seek such evidence. This part of the study will attempt to address this issue by using linguistic analysis software programs to examine issues of language use in texts received through automatic writing, and then taking language use itself as a method of assessing evidence of identity in those scripts.

For years social psychologists have exalted the power of the situation; across different situations and with different people, individuals may act in a variety of ways and even talk using a variety of styles (Goffman, 1956). Language and Identity are both fragmented processes, in constant states of creation. Gergen (1972) began his explorations of shifting masks of identity when he noticed something unusual about the letters he wrote to his friends; he realised that he came across as a "completely different person" in each letter:

> "In one I was morose, pouring out a philosophy of existential sorrow; in another I was a lusty realist; in a thirds I was a light hearted jokester" (p 32).

Niederhoffer and Pennebaker (2002) note that this is a prime example of the inherent knowledge of the mutability of language with respect to varying social contexts. Newman et al (2003) have argued that social psychology has generally under-appreciated the value of studying people's language use, however, a growing body of research suggests that a great deal can be learned about individuals underlying thoughts, emotions and motives by counting and categorising the words they use to communicate. Of particular interest is that the words that reflect how people express themselves can often be more informative than what they are expressing. Features of linguistic style such as pronoun use, emotionally toned words, and prepositions and conjunctions that signal cognitive work have been linked to a number of behavioural and emotional states. For example, Newman et al (2003) have shown that three language dimensions are associated with deception: fewer self references, more negative emotion words and fewer markers of cognitive complexity. Niederhoffer and Pennebaker (2002) have demonstrated that individuals may also exhibit linguistic style matching, in that if one person interacts in brief bursts, then the other tends to follow and the pair constructs a linguistic style that maintains itself. Similarily, the overall linguistic complexity and tone covary between the participants. Previous discussions of automatic writing have concentrated on matters of factual accuracy, handwriting analysis and even speed of writing, nevertheless the linguistic style itself may be worthy of technical analysis.

This part of the study will involve using two computer software packages Linguistic Inquiry and Word Count[2] (developed by Pennebaker's team at the University of Texas) and Copycatch Analyst[3] to examine the automatically produced writings of Geraldine Cummins (1890-1969). These are widely used programs which offer a detailed numerical, statistical, phrasal and vocabulary analysis of texts and by these means qualitative linguistic data can be categorised, counted and transformed into quantitative data. As public and private texts from Geraldine Cummins are available over a considerable number of years and in situations in which she writes both as herself and with the assistance of a number spirit controls this will allow for the adoption of a quasi-experimental design using matching and time series analysis, with language use designated as the unit of analysis. Experimenter effects will be minimised as participant and researcher will not meet and the analysis is carried out by automatically by the software. Data thus categorised by Linguistic Inquiry and Word Count software may then be subjected to statistical analysis via SPSS in order to answer the following questions:

- Does linguistic style change when the medium channels automatic script?
- Is there evidence of linguistic matching between medium and sitter?

[2] Information on the reliability and validity of the LIWC program may be found online at: www.liwc.net/liwcdescription.php

[3] Copy Catch software has been used by the Universities and Colleges Admissions Service to monitor personal statements submitted by applicants to United Kingdom universities since 2007 (BBC News 2007). It has also been used by the legal profession and law enforcement agencies, further details may be found online at: http://www.copycatchgold.com/index.html

- Is there evidence of deception indicators in automatic script?
- Does linguistic style vary with each spirit control?

As the Copycatch Analyst software has been specially designed for authorship identification and the historical investigation of anonymous texts it also has potential to shed new light on the legally disputed authorship of the Cleophas scripts (Cummins v. Bond [1927] 1 Ch. 167; Cousins, 2008b). An analysis of the F.W.H. Myers attributed scripts in *The Road to Immortality* (Cummins, 1935) using this software's capacity to uncover 'textual fingerprints' as evidence of identity may additionally have some relevance to the survival question.

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PARANORMAL HEALING, PARANORMAL BELIEF, AND PHYSICAL AND PSYCHOLOGICAL WELL-BEING IN ARTHRITIS SUFFERERS[1]

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INTRODUCTION

There are many factors that could be involved in claims of distance healing, including placebo effects, an expectation of healing, and faith in the healer. There are a number of healing techniques that have been tested in research settings. Astin, Harkness & Ernst (2000) divided distance healing research into three categories: Therapuetic Touch, Prayer and Other distant healing methods. The present study falls in the category of Other distant healing methods. In this study healers practice distant mental influencing or intentionality, they are given names, ages and photographs of participants to work with, but do not meet with or have any interaction with participants. Using questionnaire measures, participants indicate their subjective well-being as the primary dependent variable. Healers were chosen based upon their experience with absent healing, but they employ a variety of specific techniques and training backgrounds. These individual differences will be explored as healers are asked to take a log of their healing practice. Very few studies have examined the role of belief specifically to healing. Considering the literature and research on psychoneuroimmunology and psychophysiology (Pert, Ruff, Weber, & Herkenham, 1985; Rossi, 1993), belief may be an important aspect of the healing process. In a study with a similar design to the present one, Walach, et al. (2008) found that expectation of improvement had a slight significant effect on self-reported physical health outcomes in a trial for patients with chronic fatigue syndrome. The present study will take into account participant beliefs about distant healing, as well as their knowledge of the condition to which they are assigned, by conducting a partially blind study. In a study of placebo response rates in long-term randomized, double-blind, placebo-controlled clinical trials unblinding was only found to have a postive effect on the treatment group, with no negative effect on the placebo group as might be expected (Walach, Sadaghiani, Dehm & Bierman, 2005). It will be interesting to see if trends found in the present study are consistent with those in clinical trials of conventional treatments.

METHODS

Objectives. This small clinical trial aims to explore the role of placebo and distance healing effects in arthritis sufferers, including assessments of the efficacy of the different treatment conditions in terms of physical and psychological well-being. The role of paranormal belief as a potential moderator variable will be assessed.

Design. Participants will be randomly allocated to distance healing treatment versus control. In order to test for the effects of belief and expectancy, half of the participants will be blinded and half will know their treatment allocation. The four groups will each be measured at three points (baseline, post-treatment, one month follow-up). The analysis will focus on the first two measurement points, giving a 2x2 factorial design. The follow-up measurement will be used as an exploratory indicator of outcome stability. The study design and procedures were ethically approved by Lothian NHS ethics board. The primary dependent variable will be subjective well-being as measured by the General Health Questionnaire and the Short Form McGill Pain Questionnaire (see below).

[1] We are grateful to the Bial Foundation for supporting this study.

Participants. It is hoped that 60 individuals will enrol in the study; at the time of writing 58 participants are enrolled and the study is underway. Participants were recruited primarily through NHS arthritis clinics, and also through a number of websites advertising the study (Arthritis Care, parapsychology blog, Koestler site). Alison Easter (AE) is the experimenter, supervised by Caroline Watt (CW).

Healers. Healers were self-referred in response to an article in the Harry Edwards Healing Sanctuary's magazine, *The Healer*. The healers in this study come from a variety of backgrounds and training. Each was chosen based on self-reported experience and training.

Randomisation. Random number tables are used to randomly assign participants into one of four treatment conditions and to one of six possible self-identified healers.

Measures. Self-report questionnaires include the IPIP (Goldberg, 2001), General Health Questionnaire (Goldberg & Williams, 1988), Short Form McGill Pain Questionnaire (Melzack, 1987), Paranormal Belief Scale (Lange, Irwin & Houran, 2000), Spiritual Connection Scale (Hyland & Wheeler) and Satisfaction with Life Scale (Diener, Emmons, Larsen & Griffin, 1985). Participants will also answer a four-item questionnaire designed (by AE) to assess their specific belief in paranormal healing. Aside from the primary outcome measures, the other questionnaire measures described above will be used for exploratory post hoc analysis.

Procedure. Following recruitment, participants are randomly assigned to an experimental or control group. Half of the treatment and control group are blind, and these are be double-blind conditions since neither participant nor experimenter (AE) knows the condition allocation. The other half are informed of their treatment group, and these are single blind since only the experimenter does not know condition allocation. In order to keep AE blind to condition allocation, CW informs the healers of their patients, and informs participants of their treatment condition. Participants provide basic information regarding their physical condition as well as a photograph for the healers. This information is posted to the healers, who never meet participants in person. Healers work with the participants for 6 weeks and are asked to practice distance healing at least once per week. The healers use their normal healing techniques and are asked to record the time, duration and type of distant healing for each patient. Keeping a record of the date and time of healing will provide some structure for the healers, and at the same time may give insight into the effectiveness of different healing regimes and techniques. Participants are free to continue their current medical treatment or seek additional treatment as they wish. The control groups receive no intervention. They will complete the same measurements as the treatment groups. The questionnaire measures are administered to participants at baseline, after 6 weeks of healing, and at follow-up 1-month after the healing period has ended. Following conclusion of the study, those participants who did not receive distance healing will be given the opportunity to do so.

Hypotheses and Planned Analyses.

Hypothesis 1: Participants who receive distance healing will report greater relief from their illness compared to the control group.
Hypothesis 2: Participants who have a belief in distance healing will report greater relief from their illness than those with low belief.
Hypothesis 3: Participants aware of placement in the healing condition or who believe that they may be receiving distance healing will report greater relief from their illness than those aware that they are not receiving distance healing or who believe that they are not receiving distance healing.

Planned analysis: Due to limited resources, this study is regrettably of low statistical power. However, although it may be difficult to obtain statistically significant effects, the calculation of effect sizes may nevertheless give an indication of treatment outcome that may allow comparison with the small amount

of previous research which has used a similar design (Walach et al., 2008). The data for each healer will be combined. An analysis of variance will be used to calculate between-group differences of the post-treatment (after 6 weeks of healing) scores for the Short-form McGill Pain Questionnaire and the General Health Questionnaire. The baseline scores will be included as covariates using pre-treatment scores, using an ANCOVA. The Healing and Paranormal belief scale pre-treatment scores will be included as additional covariates.

Exploratory questions: Further analysis using data collected pre-treatment including age, gender, severity of illness, personality, spirituality and satisfaction with life may be entered into the model if found to be significant. Additionally, data from each healer will be analyzed separately to see the effects of possible difference in technique. The logs kept by the healers may provide some descriptive information about different experiences and approaches to practicing distance healing – it will be interesting to see if differences in questionnaire responses are evident in the participants assigned to each healer as well.

DISCUSSION

It is important to understand the phenomena and experience of healing to make use of the potential benefits and risks involved in distant healing. By examining the psychological factors (such as the role of belief and expectancy) present in the experience through various measures, research outcomes will have more depth and quality. The present study has focused on quantitative analysis of distance healing. Our future research plans to include both quantitative *and* qualitative approaches to assist in a more holistic understanding of the capacities and extent of the mind in relation to wellbeing.

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A REPRESENTATIVE POPULATION SURVEY OF LUCID AND NON-LUCID DREAMS AND REPORTS OF PARANORMAL EXPERIENCES

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INTRODUCTION

The importance of considering the state of consciousness one enters whilst dreaming, when exploring the occurrence or nature of paranormal phenomena, has already been established. This has occurred initially through the prevalence of this state in case collections of spontaneous paranormal experiences, where the majority of experiences are reported as having occurred whilst dreaming (Ullman, Krippner & Vaughan, 1989; Irwin, 1994). This has been further supported by the results of numerous experiments exploring extra-sensory perception (ESP) in the dream state, as identified in a meta-analysis by Radin (1997) and an overview of dream ESP experiments by Sherwood and Roe (2003). Other altered states of consciousness (ASCs) have also been explored with some success (see Alvarado, 1998 and; Parker, 2003 for an overview), and yet the state of consciousness one enters during a lucid dream, defined, most simply, as a dream during which you know that you are dreaming, has yet to be treated to the same level of enquiry. Perhaps one of the reasons for this apparent lack of interest in lucid dreaming as a state during which paranormal experiences may occur, is that there seem to be no case collections of lucid dream ESP comparable to those of normal or 'non-lucid' dream ESP. Thus this has not generated the same level of experimental research to which the normal dream state has been subjected.

However, results from surveys which have explored a possible relationship between lucid dreaming and reports of paranormal experiences have been encouraging. Palmer (1979) carried out a mail survey of university students and local townspeople which asked questions about paranormal experiences, ASCs, attitudes towards these phenomena and activities related to the paranormal, such as meditation and dream analysis. The results of this showed that both lucid dreaming and dream recall demonstrated a positive significant correlation with reports of experiences involving ESP, OBEs and sightings of apparitions for both the student and non-student groups. The same questionnaire, issued by Kohr (1980) to more than 400 members of the Association for Research and Enlightenment, also found that frequency of dream recall and lucid dreams significantly correlated with reported experiences of parapsychological phenomena. Similar evidence of a link between both lucid and non-lucid dream recall, and parapsychological experiences has been demonstrated, more recently, by Alvarado and Zingrone (2007).

This current survey has been designed to begin to assess the possibility that the lucid dream state–as subjectively and physiologically a separate and distinct state of consciousness (LaBerge, Levitan & Dement, 1986; LaBerge, 1990) which shares much in common with its non-lucid counterpart, including, importantly, some of the same relationships with parapsychological experiences–may also be a state during which ESP can occur, both spontaneously and through induction. The lucid dream state will therefore be treated as one of three states of consciousness, alongside the non-lucid dream state and a state approximating normal waking consciousness so that a comparison of the experiences in these states, both sleep related and potentially paranormal can be made. It is hoped that this will provide details of any lucid dream ESP and the frequency with which it occurs as well as more detail regarding the relationships between this state, other sleep phenomena and parapsychological or unusual experiences.

METHOD

Participants

The population from which the participant sample will derive consists of 600 names and addresses of Northampton residents which have been randomly selected from the edited electoral register by computer software utilized by Northampton Borough Council. Fink (1995) states that an unsolicited survey, such as this, should expect around a 20% response rate from the initial mailing, which may be increased through the use of follow-up mailings or incentives, such as money or gifts. Since the use of incentives of this kind is prohibited by the financial restrictions of this study, there will only be a single follow-up mailing, in the form of a reminder postcard, sent to each of the non-respondents within 2 weeks of the initial mailing. It is hoped that this will increase the response rate to approximately 30%, a total figure of 180. Fink also advises that as 'a statistical rule-of-thumb' (p.43) each sub-group within the sample should contain about 30 units, or people. In this instance the most important sub-group is that containing those who report lucid dreaming. Given that the lowest available estimate for lucid dreaming frequency of 1 or more a month is 14% (Palmer 1979) a 30% return rate would yield around 25 regular lucid dreamers, 5 less than the suggested number. If the number of returned surveys yields less than 30 respondents who report lucid dreaming with this regularity then questionnaires will be sent specifically to identified lucid dreamers until this number is reached. Demographic information on the participant sample will be summarized once all the data is in.

Materials

The questionnaire, which was designed specifically for use in this project, was given the title 'Sleep phenomena and unusual experiences' as this was felt to be more neutral in connotation and more readily comprehensible than one containing more details about the nature of the experiences under investigation. It takes the form of an 8-sided, A4 booklet and is printed on green tinted paper rather than white as this provides less of a contrast between paper and print and may consequently prove easier to read for individuals who experience difficulties such as dyslexia, photophobia and eyestrain (see Whiting 1985, 1993). It consists of 37 items which are broken down into 4 categories; General Information (demographic data, 4 items), Lucid dream experiences (13 items), dream experiences (specifically non-lucid, 12 items) and Waking experiences (8 items). Each category contains similar questions about experiences within a particular state of consciousness. In categories two and three this includes questions about the nature of the dreams experienced (e.g. pleasant or unpleasant), any unusual dream phenomena (e.g. false awakenings) as well as the occurrence of precognition, clairvoyance, telepathy or interaction with the deceased. Section three, which asks about experiences had during waking consciousness, replicates these questions with the exclusion of any relating solely to dream phenomena (e.g. false awakenings) and the addition of questions about psychokinesis and possible 'poltergeist' activity. Each of the sections mentioned above (with the exclusion of General information) offers the same mixture of response options. These are largely forced choice and refer to the frequency with which certain events have been experienced by the respondent. These options are either on a 7-point scale; Never, Once, A few times, 1-2 times a year, 1-2 times a month, 1-2 times a week, Almost every day or request a simple yes/no/unsure or follow free response questions requesting examples of certain experiences that the respondent may have had. The only exception to this is question 3 in section 2 which asks for an answer as a percentage of experiences reported. This format will allow for three main types of data to be collected; frequency of events reported by individuals, frequency of such reports within the sample and qualitative information about these experiences.

Along with the questionnaire each potential participant was provided with a stamped addressed envelope and a covering letter which provided information on how they had been selected, the nature and purpose of the project, ethical issues regarding participation and data protection and instructions for completing and returning the questionnaire.

Procedure

In order to check that the questionnaire contained no errors and was free from ambiguous questions or technical terms a pilot study was conducted with 8 questionnaires being distributed to a selected group of people containing a mix of age, gender, educational level and including 2 self-professed lucid dreamers. Four questionnaires were returned from this group without any reminders being issued. This resulted in a number of amendments involving the re-phrasing of questions and the adaptation of response choices which seemed to have caused some confusion for the respondents. Copies of the amended questionnaire, along with covering letter and a return, stamped addressed envelope, were then mailed to the 600 randomly selected Northampton residents, with the request that they be returned within 10 days.

PLANNED ANALYSIS

Data collection is ongoing and should be completed in time for the results to be presented at the convention. The planned analysis will consider relationships between the occurrence and frequency of experiences reported by individuals, the frequency of these experiences within the sample and the nature of any unusual experiences reported to have occurred during the lucid dream state. This will be acheived using Pearson's correlation coefficient, assuming that the data is judged to meet the necessary assumptions for this test, and involve the creation of a correlation matrix and the use of partial correlations which will allow non-lucid dream recall to be controlled for when looking at items which might share a relationship with both lucid and non-lucid dream recall.

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IS THERE A RELATIONSHIP BETWEEN THE PSYCHOKINETIC EFFECTS ON THE FALL OF DICE AND RANDOM NUMBER GENERATORS?

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INTRODUCTION

Large numbers of experiments to measure a psychokinetic (PK) effect have been performed on two systems: falling dice and binary random number generators (RNGs). The first meta-analysis of the results with binary RNGs was published by Radin and Nelson (1989) and the only one of those with falling dice by Radin and Ferrari (1991). They were based on 597 and 148 experiments, respectively, involving 312 to 390 million bits and 60 to 240,000 tossed dice. The meta-analyses showed mental intention to modify the distributions of the z-scores. The changes were approximated by both a shift in the desired direction of z and a widening of the normal distribution. The validity of the standard Gaussian distribution, $(2\pi)^{-1/2} \exp(-z^2/2)$, was confirmed by control experiments in the absence of mental intention. In an updated RNG meta-analysis Radin and Nelson (2000) included 175 additional experiments, but collapsed the 258 taken previously from the Princeton Engineering Anomalies Research (PEAR) group into a single one.

Recently, another meta-analysis of RNG data was presented by Bösch, Steinkamp and Boller (2006a) and a detailed critique of Radin and Nelson's was published by Schub (2006). Those authors were not convinced of the existence of the PK effect, attributing the shift of the z-score distribution to biased reporting and publishing of the experimental data. In comments, Radin, Nelson, Dobyns and Houtkooper (2006a,b) defended their affirmative position, while Bösch et al (2006b) maintained their doubts.

Perhaps the biggest stumbling block for the acceptance of PK as observed in RNG experiments is the finding that $\langle z \rangle$, the average value of z, is practically indifferent to the preset number N of bits. This independence, surmised by some (May, Utts & Spottiswoode, 1995; von Lucadou, 1995) but mostly thought to be impossible, was confirmed by Radin and Nelson (2000) on the basis of the experiments underlying their updated meta-analysis. A graph in Schub's paper displaying data points in z, log N coordinates illustrates the independence and at the same time the larger-than-normal scatter of the z-scores. In their comments. Radin et al. (2006a,b) come back to this independence and insist on it although it is in conflict with physical models of PK. On the other hand, there is a large body of PK experiments, especially many of the PEAR group (Jahn & Dunne, 2005), which more or less agree with the assumption that the effect per random event, e_{PK}, is constant. To resolve the discrepancy, it was suggested that $\langle z \rangle$ = const. applies to "isolated" experiments, while e_{PK} = const. is typical of "crowded" or serial ones (Helfrich, 2007).

The PK experiments with falling dice are fewer, in general older, and more prone to pitfalls than those with RNGs. Many of the problems were treated in detail by Radin and Ferrari and a few more were considered recently by Radin (2006). The discussions generally are in line with the hypothesis that the PK effect per falling die is independent of N which here is the number of tossed dice. Radin plots experiments of a serial nature which seem to suggest that the effect per toss does not depend on N. However, the fact that in the meta-analysis the distribution of z-scores can be approximated by a shifted and widened Gaussian distribution, as in the case of RNGs, may be taken to indicate that part of the experiments entering the meta-analysis obey the hypothesis of a constant $\langle z \rangle$.

Interestingly, the z-score distribution is more strongly shifted (and widened) with dice than with RNGs. Since we are dealing with experimental numbers, the question arises whether there are

mathematical relationships between them. In the following I will try to derive such a relationship between the shifts and then compare it to the experiments.

THEORETICAL MODEL AND COMPARISON TO EXPERIMENT

Binary RNGs can be realized very simply by coin flipping or based on exemplary events like radioactive decay. Frequently used sources of random events in RNGs are resistor noise or tunnel diodes. So far, no significant differences of the PK effect have been found among the various types of RNG. This indifference of the PK effect should also hold for the fall of dice if each single fall can be regarded as a binary random event.

Taking coin flipping as an example, we have without PK

$$< N_+> = (1/2)\, N$$

where N is the total number of flips and N_+ the number of flips of one outcome, say heads. In the presence of PK aiming for heads their number will be augmented by

$$(N_+)_{PK} = (1/2)\, e_{PK}\, N,$$

where e_{PK} is the PK effect per throw, the so-called effect size. Evidently, the PK effect can be interpreted as acting on the misses, the tails in our example, replacing a small fraction of them by hits, i.e. additional heads.

In the case of dice, we have for the mean number of them turning up a particular face, say the six-face,

$$<N_6> = (1/6)\, N.$$

In the presence of PK aiming for the six-face this number is expected to be augmented by

$$(N_6)_{PK} = (5/6)\, e_{PK}\, N.$$

Here we have introduced the assumption that each of the five other faces is subject to the same PK effect as is a missing coin flip. There is, of course, no proof of it, but it is the simplest assumption that can be made, representing another indifference.

In order to obtain the associated z-scores, N_+ and N_6 have to be divided by their standard deviations which are

$$<(N_+ - N/2)^2>^{1/2} = (1/2)\sqrt{N}$$

and

$$<(N_6 - N/6)^2>^{1/2} = (\sqrt{5})/6\ \sqrt{N}\,,$$

respectively. For the PK parts this results in the familiar formula

$$z_+ = e_{PK}\sqrt{N}$$

and the new relationship

$$z_6 = (\sqrt{5})\, e_{PK}\sqrt{N} = 2.34\, e_{PK}\sqrt{N}.$$

Accordingly, the average z-score as a function of N should be 2.34 larger with dice than with RNGs. If we express like Radin and Ferrari (1991) the PK effect in both cases by $z = e\sqrt{N}$, the effect size e of falling dice is predicted to be 2.34 times that of RNGs.

A direct comparison of the PK effects per throw, either bit or fall, is impossible if e_{PK} is not constant. With constant $\langle z \rangle$, the effect size for RNGs may be expected to be a function of N, obeying

$$e_{PK} = \langle z \rangle / \sqrt{N}$$

except in the case of "crowded" or serial experiments. Since z scatters strongly very many experiments will be required to obtain a stable value of $\langle z \rangle$ and thus e_{PK}. The original meta-analysis of Radin and Nelson (1989) and that of Radin and Ferrari show graphs of the z-score distributions. They also display their Gaussian approximations, from which one can directly read their PK induced shifts and widenings. Inspection of the graphs reveals $\langle z \rangle = 0.6$ for RNGs and $\langle z \rangle = 1.5$ for dice. The ratio of the shifts is 2.5 which is not far from 2.34, the predicted value.

Employing the mean z-scores for the comparison can make sense only if e_{PK} as used above for both RNGs and dice depends indeed not on the device but only on N. Also, it requires that the hypothesis of $\langle z \rangle$ being independent of N applies to a sufficient fraction of the dice experiments. I assume this on the basis of the argument given above, but it was neither proved nor disproved by Radin and Ferrari. For RNGs, the original data used to establish z-score distributions were slightly modified in later meta-analyses. Radin and Nelson (2000) gave $\langle z \rangle = 0.71$ and $\langle z \rangle = 0.61$ for the periods from 1957 to 1987 and from 1987 to 1990, respectively. Dividing the data of 380 high-quality experiments into four quartiles by size N, Bösch et al. (2006b) found $\langle z \rangle$ to range from 1.00 (smallest N, probably inflated by some selected test persons) to 0.41 (largest N, but $N \geq 10^9$ omitted). The overall mean was $\langle z \rangle = 0.67$. In the case of dice, $\langle z \rangle = 1.5$ was obtained by Radin and Ferrari also by straightforward averaging.

As an intriguing aside, let me check whether the present model could account for the results of Ertel's (2005) ball drawing test, although his data can be due to extrasensory perception as well as PK. Each of 231 (unselected) test persons drew 240 or 360 table tennis balls from an opaque bag containing at every single draw 60 balls marked by 1,2,3,4 or 5 in equal numbers. Aiming for a particular marking, they scored on average $\langle z \rangle = 0.80$ which is 33% more than 0.6, while the model predicts $z_5 = 2e_{PK}\sqrt{N} = 1.2$, i.e. an increase of 100%, in the presence of five normally equivalent choices. The agreement between the two percentages is unsatisfactory, but the predicted value of $\langle z \rangle$ seems accessible, if the psi-induced fractions of near misses are included among the psi-induced fraction of the hits. A relative preponderance of near misses was discovered by Ertel (2005) who calls them "good misses" and also gives some pertinent data. In the simplest, symmetric case the target is 3 while 2 and 4 are regarded as near misses.

CONCLUSION

I have tried to derive a relationship between the PK effects on RNGs and falling dice. The result appears to agree well with available data, but the comparison with experiment may be naïve. Several warnings seem to be in place. First, the experimental data may be not sufficiently complete, in particular for dice, or not replicable. Second, even if one accepts that e_{PK} is inversely proportional to $\sqrt{N}$ in experiments of a given type, the applicability of the same value of e_{PK} to RNGs and dice may be a wrong guess. Third, parapsychological phenomena are known to be elusive and may evade any

numerical relations. On the other hand, a mathematical relationship, if it is confirmed by further experiments, would very much benefit the credibility of statistical experiments in parapsychology.

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QUANTITATIVE MEASUREMENTS OF NON-CONTACT HEALING USING BIOPHOTONS

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ABSTRACT

We developed a way to evaluate the effects of non-contact healing such as laying-on-of-hands and prayer using biophotons. Pairs (control and experiment) of pieces of cucumber were given 30-min healing or 30-min non-healing treatments. Then, biophotons from the samples were measured for 18 h using a highly sensitive imaging detector which has an image intensifier. For each pair, the intensities of biophotons emitted from the experiment and control samples were compared. Healing treatments were given by 14 healers, half of them beginners. Healers answered a 186-item questionnaire to determine their profiles and daily performances at the time of the treatments. They tried to increase the intensity of biophotons from experimental samples without touch for 30 min. Control samples were set at 3 m from the experimental samples. Non-healing treatments were also done to discuss effects of heat and shadow of hands. Those treatments were done under various conditions: a thermal condition using 40°C water, instead of body heat; a covered condition to eliminate shadow of the hands); a thermal and covered condition; and an exposed condition under which all samples were exposed to room lighting. Healing increased intensities of biophotons significantly ($p = 6.5 \times 10^{-7}$, Wilcoxon signed-rank test, $n = 106$), but there was no significant difference between intensities of biophotons of experimental and control samples in non-healing. The difference of intensity of biophotons occurred 5 h after the start of measurement; this suggested that non-contact healing affected certain biochemical systems. Through biochemical tests, 3 chemical reaction systems were considered as possibly being affected: 1) oxidation reaction of ascorbic acid; 2) biosynthesis of C9/C6 aldehyde and alcohol; and 3) other defense reactions. A J value was introduced as a quantitative index of healing effect, where $J = \ln(I_E / I_C)$ was the logarithm of the ratio of intensities of biophotons from experimental samples and controls and was an empirical formula. The average J value of healing was 0.142 although J values of other conditions were nearly equal to zero ($p = 0.030$, ANOVA). The veteran healers showed larger J values than beginners. It was considered that healers could be classified by their own abilities; for example, $J>0.2$ is an expert, $0.2>J>0.1$ is intermediately skilled, and $0.1>J$ is a beginner. Moreover, healing abilities of the healers correlated significantly with pain control, age and the character trait item "careless-prudent". From the findings, two biological hypotheses of healing ability were proposed. (1) In order to control the pain produced as a result of aging, the self-healing ability for pain improves according to aging. (2) Non-contact healing to control another person's pain is an external application of self-healing ability. For parameters of daily performance, there were significant correlations between J value and physical (body) factors. J values did not correlate significantly with motivation, sense of success, "spiritual" state, sense of linkage to targets, sense of perception of vital power from targets, numbers or degrees of use of skills (visualization, concentration of attention, etc.). Physical factors were considered as more important than mental or conscious factors in non-contact healing.

Keywords: aging, pain control, biophotons, cucumber, spiritual healing, laying-on-of-hands, prayer, character trait, emission mechanism, *J* value, quantitative index

INTRODUCTION

Biophotons are very weak visual light emitted from living systems. We have developed a quantitative evaluation method for non-contact healing, such as laying-on-of-hands, using biophoton studies (Kokubo & Yamamoto, 2007, 2008; Kokubo et al, 2007a, b). Characteristic points of our method are as follows.

1) Targets for healing are cut pieces of cucumber. The intensity of their biophoton emission is remarkably larger than that from non-cut cucumber. Also, we can omit placebo and conditioning effects because the targets are plants.
2) Measurements are made after healing, not during healing.
3) Measurements are made for a long period of 18 h so sufficient intensity can be accumulated.
4) Control and experimental samples are measured simultaneously so we can cancel artifacts easily that are caused by fluctuations of temperature and background photons.
5) The quantity of psychokinesis (healing ability) can be described by physical quantities as an empirical formula, $J=\ln(I_E / I_C)$.

METHODS

Detection System for Biophotons

The detection system was comprised of a super-sensitive camera (Model C2400-47, Hamamatsu Photonics; sensitivity, 60mA/W at 400nm; range, 280-650nm) which had an image intensifier (I.I.), a counting system (Argus 20, Hamamatsu Photonics), and a control and analyzing program (AquaCosmos ver. 1.3, Hamamatsu Photonics). We used a dark box (Model A4178, Hamamatsu Photonics) to hold the samples for intensity measurements. A lens was attached to the camera, and the distance between the lens and samples was 250mm. The lens had a diameter of 30mm, focus of 50mm, and F of 0.95. The sample stage was a PMMS board (205mm x 293mm) with metal legs. A sensor for temperature and humidity and a deodrizer/moisturizer were set at the bottom of the dark box (Fig. 1).

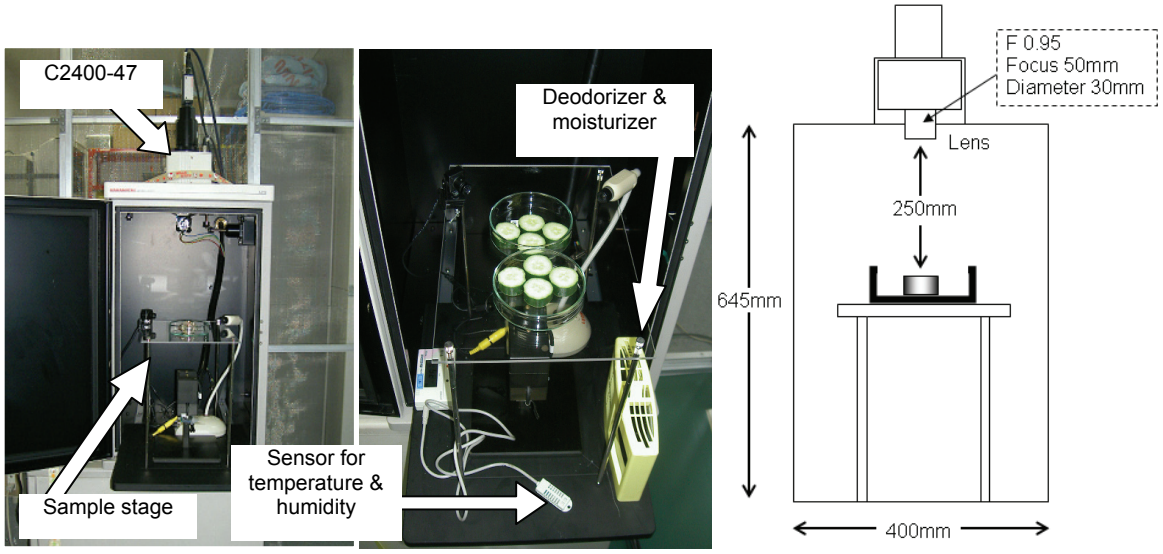

Fig. 1 Set-up for Measuring Biophotons

Targets

The targets were paired pieces of *Cucumis sativus*, a cucumber variety known as "Shiro-ibo kyuuri" in Japan. Cucumbers were purchased from a vegetable store for each experiment because fresh samples have much brighter biophoton intensity. We selected cucumbers which were 17-24cm long, with maximum diameters of 1.5-3.0cm, and straight shape and which were deep green in color and had no large abrasions on their surface. In summer, the cucumbers were supplied to the market one week after blooming.

The surface of the cucumbers was disinfected by washing with ethanol more than 1 h before the experiments. The cucumbers were allowed to dry naturally at 24°C by placing them on a table under usual fluorescent room lighting. A kitchen knife and petri dishes (inner diameter, 85mm) were disinfected in the same way before use. The inner walls of the dishes were covered with plastic wrap.

First, circular slices (thickness: 2 cm) was cut from a cucumber. Then, each slice was cut and opened at the center. Flower side part of the paired pieces provided the control samples and the other side provided the experimental samples (Fig. 2). Four pairs of targets were made from one cucumber. Control and experimental samples were placed symmetrically in two glass petri dishes. A paper identification label was put near the experimental samples. The flower side part of cucumber was always used for control samples and samples in the dishes were always arranged in the same order for A to D. These measures ensure the data variance is smaller and the calibration is easier if there are system biases. The petri dishes were covered with a glass plate during the 30-min treatments.

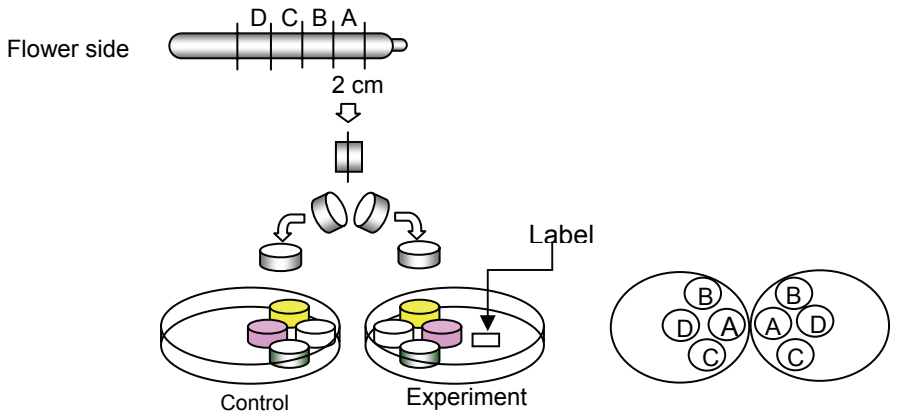

Fig. 2 Making Sample Pairs

Measurement of Biophotons

The measuring system was supplied with power more than 1 h before measurements. The dishes containing samples were set in the dark box; usually the dish with experimental samples was set on the right side. First, we took a photo such as Fig. 3(a) under LED lighting. After the LED was turned off, photons were accumulated automatically by AquaCosmos for 18 h (every 1 h) at room temperature (24°C). There was no emergency stopping of the system as an automatic protection in case someone opened the door of the dark box during measurements; once, the equipment stopped due to a power failure 1.5 h after starting.

After measurements, we manually drew measuring windows as shown in Fig. 3(b) in accordance with the outside of the samples. The experimental samples were assigned odds numbers for identification, and control samples were assigned even numbers. Windows No. 9 and 10 were used for counting background noise. The windows were copied and pasted onto row data, and then AquaCosmos was used to calculate the numbers of photons and pixels. Moreover, an accumulated picture was obtained at 18 h (Fig. 3(c)).

Next, the accumulation of photons at 18 h was converted to a value per 10000 pixels (approximately 5 cm^2, nearly equal to the area of the experimental or control sample). This value, minus background noise, was defined as the intensity of biophotons from a target. For the background noise, the data of No.9 were used for the pairs No.1 and 2, while data of No.10 were used for the others. The background noise of our system was lower for the upper one-third of the dish.

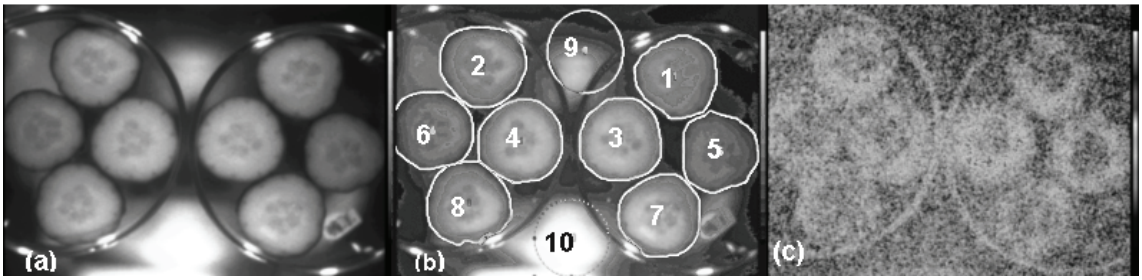

Fig. 3 Sample Setting

J Value

Generally, the intensities are very different depending on individual differences of cucumbers. Therefore, we introduced an index value, *J* as follows:

$$J = \ln(I_E / I_C).$$

We expected that *J* is a constant and an index of a healer's own ability when experiments are done under the same conditions.

Healing and Non-Healing Treatments

As reference tests, we measured biophotons after various 30-min treatments: a thermal condition using 40°C water, instead of body heat; a covered condition to eliminate shadow of the hands; a thermal and covered condition; and an exposed condition under which all samples were exposed to room lighting (Fig. 4) (Kokubo & Yamamoto, 2007; Kokubo et al., 2007a, b). (We previously described the exposed condition as "non-treatment" (Kokubo & Yamamoto, 2007).)

Healing treatment was done for 30 minutes by laying-on-of-hands (without actual physical contact being made), but only one trial was done by praying. We recruited 14 healers from a membership list of healers and through the Internet. They were healers of Johrei, qigong, quantum touch, breathing methods etc. The healers tried to increase the intensity of biophotons. Healers answered a 186-item questionnaire after treatments on their profiles and their daily performances and correlations between items and *J* values were analyzed.

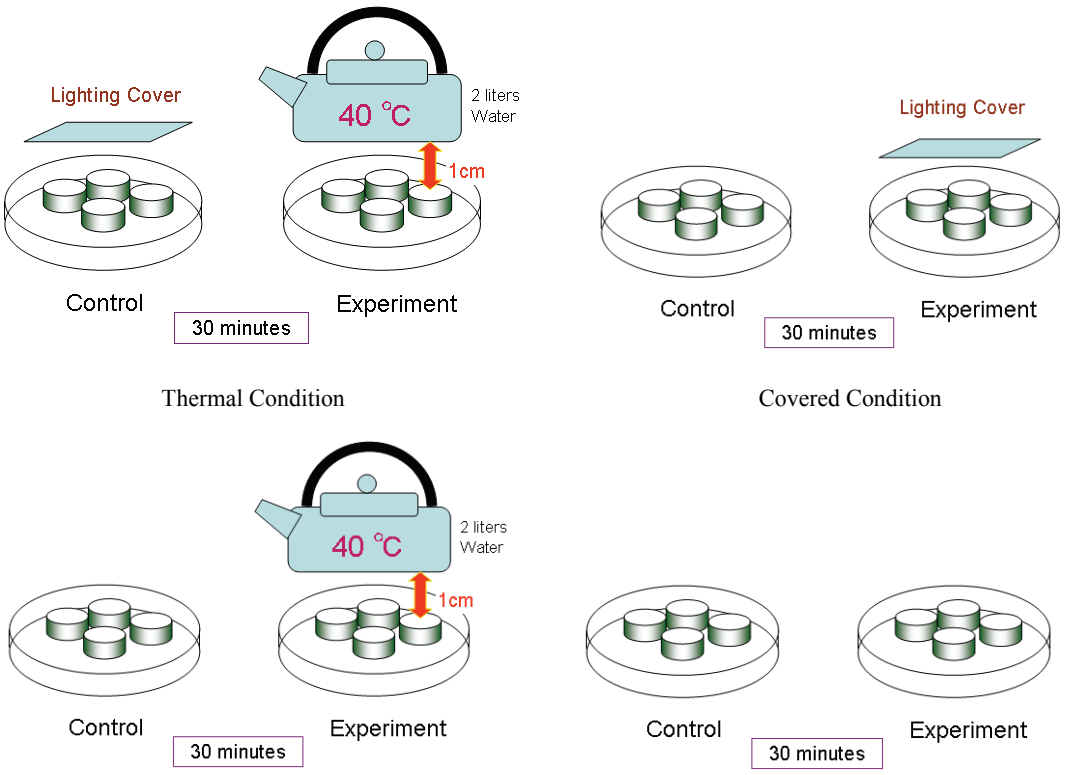

Fig. 4 Non-Healing Treatments

Mechanisms of Biophoton Emission

We considered 3 chemical reaction systems which emit biophotons possibly in our method, and then executed biochemical tests. The systems were: 1) oxidation reaction of ascorbic acid; 2) biosynthesis of C9/C6 aldehyde and alcohol; and 3) other defense reactions (Kokubo & Yamamoto, 2008).

SUMMARY OF RESULTS

Whole Data

Table 1 shows results of Wilcoxon signed-rank test for intensities of whole available data and average J values. Only healing data showed statistically significant results (Kokubo & Yamamoto, 2007). The distribution of J values was a normal distribution (Kokubo & Yamamoto, 2007). Fig. 5 shows averages of J values and 95% confidential intervals. Only healing treatment was not equal to zero (p = 0.030, ANOVA). In addition, when we compared healing and non-healing treatments, the difference of J values was also significant (p = 0.001, t-test, two tails).

Table 1 Intensity, *p* value and *J* value

Treatment	*n*	I_E	I_C	$I_E \square I_C$	*p* value	*J* value
Healing	106	88192	75890	12303	6.5×10^{-7}	0.142
Thermal	32	77966	76435	1531	0.501	0.005
Covered	31	57270	55038	2232	0.308	0.045
Thermal and Covered	16	64862	63295	1567	0.535	0.028
Exposed	15	69618	69857	-238	0.910	0.003

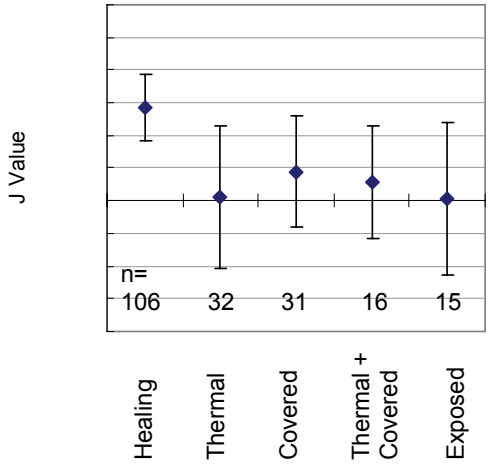

Fig. 5 *J* values and 95% Confidential Intervals

Fig. 6 shows transitions of intensities of healing treatment, excluding 4 data sets which were among data lost by a power failure. The transition can be divided tentatively into Phase I (rising phase), Phase II (peak phase) and Phase III (stable phase). There was no difference for Phase I, but there was an obvious difference for Phase II. Through biochemical tests, 3 chemical reaction systems were considered: 1) oxidation reaction of ascorbic acid; 2) biosynthesis of C9/C6 aldehyde and alcohol (so-called green order); and 3) other defense reactions (Kokubo & Yamamoto, 2008).

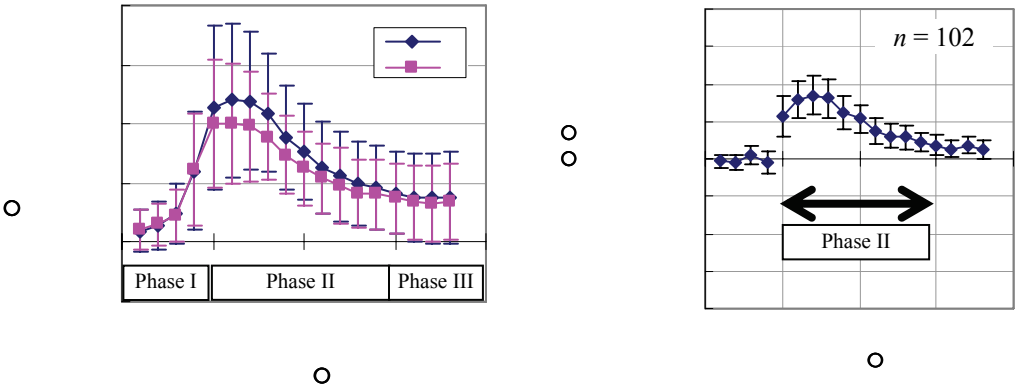

Fig. 6 Transition of Intensities and SD, Difference and 95% Confidential Interval

Correlation between J and Questionnaire Items

The details were shown in Kokubo et al. (2007b). The veteran healers showed larger *J* values than beginners (p = 0.025, t-test, one tail). *J* values correlated significantly with pain control (r = 0.568, p = 0.043, one tail), age (r = 0.633, p = 0.049, two tails) and the character trait item "careless-prudent" (r = 0.656, p = 0.039, two tails).

From the acquired knowledge, we proposed two biological hypotheses of healing ability.

(1) In order to control the pain produced as a result of aging, the self-healing ability for pain improves according to aging.

(2) Non-contact healing to control another person's pain is an external application of self-healing ability.

For parameters of daily performance, there were significant correlations between *J* value and body factors, for example, physical condition (r = 0.449, p = 0.047, two tails). *J* values did not correlate significantly with motivation, sense of success, "spiritual" state, sense of linkage to targets, sense of perception of vital power from targets, numbers or degrees of use of skills (visualization, concentration of attention, etc.). Physical (body) factors were considered as more important than mental or conscious factors in non-contact healing.

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THE SUBLIMINAL PRIMING OF FILM CLIPS USED IN THE GANZFELD

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ABSTRACT

The report here concerns an attempt to subliminally prime film clips with participants prior to their ganzfeld sessions. In total, 64 trials (32 traditional psi ganzfeld trials and 32 comparison trials with primed targets) were conducted with receiver-sender pairs taking part in a digital real time ganzfeld. Prior to the session, they viewed thematic material from all four potential film clips presented at 40 milliseconds exposures. Although there was clear evidence that the imagery from the clips later re-emerged as a major part of the ganzfeld imagery, this concerned the non-target clips more than as the target material. First place rankings on the target clips gave only 13.7% hits (MCE 25%) and it may well be that the methodology overloaded the participants with dynamic material. Similar, apparently reversed effects, have been found in other research in subliminal perception.

INTRODUCTION

In his introduction to *The New Unconscious,* a book which benchmarks the progress of experimental research in this area, James Uleman writes: "Over the past decade or two, a new picture of unconscious processes has emerged from a variety of disciplines that are broadly part of cognitive science. Unconscious processes seem capable of doing many things that were, not so long ago, thought of as requiring mental resources and conscious processes." (Ulleman, 2005, p. 3). Although the formulation "perception without awareness" is sometimes preferred (Greenwald, 1992), it would seem that the area generally known as subliminal perception has, after much controversy, gained acceptance. Since the progress in this area has been attributed to multidisciplinary research (Hassin, Uleman,& Bargh, 2004), this provides us with an opportunity to contribute further findings to this new and growing knowledge base.

The project is particularly inspired by the threads of research concerning the defence mechanism test, presentiment and precognitive habituation, all of which relate to perception without awareness. While the defence mechanism test has in itself somewhat of an anomalous history (see Haraldsson et al., 2004), the concepts and the findings relating to presentiment (Radin, 1997) and to precognitive habituation continue to support the use of methodologies which regard psi as an unconscious process (Sjödén & Parker, 2008).

The aim here is to integrate these psi and psychological aspects conceptually by specifically using the ganzfeld as a means of producing a potentially psi-conducive state. In practice, this means studying if the film imagery which has been subliminally presented to participants prior to the ganzfeld session, later re-appears as part of the content of the ganzfeld imagery (in the form of the mentation report). In principle, this provides a means of experimentally studying how access to unconscious material can shape the content of an altered state of consciousness; a relationship given much lip-service but for which there is actually a paucity of experimental studies.

The technique we developed for this involves a priming session prior to ganzfeld. During this priming session the essential frames of the film clips used in our ganzfeld studies are presented at an exposure speed close to the threshold for conscious recognition which is about 60 milliseconds. Although the recognition threshold will show individual variation and be influenced by the varying content of the film material, because of limited resources we opted for a 'one size fits all' approach. The procedure after that then follows the standardised ganzfeld test (Parker, 2000; Goulding et al., 2004)

with one of the four film clips being selected as the target to be viewed by the sender in the psi part of the experiment.

In the Gothenburg set up, we have used a traditional receiver-sender psi or GESP methodology and although recent findings by Roe, Sherwood and Holt (2004) indicate that the sender may not be a necessary component, we have retained this aspect because of the expectancies that appear to be embedded in the population we are using. The distinctive feature of the Gothenburg Ganzfeld is to use the real time digital recordings of the reported mentation images from the receiver. Since in our procedure the sender views successively two film clips, there are two trials per session and each two minute target film clip is shown 7 times giving a total viewing time of 14 minutes (with a short interval between clips) during the 30 minute ganzfeld period. This has allowed us to use one set of films as the experimental set and the other as the control set. For the study here, the experimental set in each session belongs to the set previously subliminally presented – that is the one which has been "primed" – while the other film clip is non-primed and serves as a control comparison. Both film clips and the sets of four films they belonged to, are randomly selected. The order of which part of the session which is to be the primed clip is also randomised.

Our hypotheses predict that the content of the mentation reports will relate to the set of films that were primed and can be distinguished from the non-primed set and that the reports will have a psi-mediated content which will enable the target film clips to be chosen with an effect size consistent with previous ganzfeld studies.

In designing a procedure to subliminally present that is to *prime* the film clips, a limiting factor concerns the refreshment time for computer monitor screens. Since each film length is 120 seconds, and the standard used for films is 25 frames per second, then this is potentially 3000 frames. Limits are imposed by refreshment times and the thematic continuity. To resolve this, we used the program *Inquisit* in order to provide 3 frames per picture for the 75 Hz monitor at an exposure of 3/75 seconds, that is 40 milliseconds, which is slightly below the threshold for conscious recognition (usually given as about 60 milliseconds). 24 pictures were exposed for 40 m.s. making the exposure time for each film sequence close to 1 second. Because of the thematic connections between pictures, we call this procedure *the rapid thematic picture presentation test r*ather than a true subliminal test.

METHOD

The experimental procedure required both the receiver and sender to place themselves directly in front of the monitor and view the randomly selected set of 4 film clips. Following the viewing of each of the primed film clips, the participants sketched what they had seen and wrote notes on any feelings that were aroused by the material. The participants were not told fully about the purpose of the priming procedure until after the ganzfeld session was completed.

The material from the priming then formed the basis for the later assessment by an external judge whose task would be to identify the objective correspondences between the film clips used for priming and the subsequent content of the mentation reports and on the basis of this content identify which part of the mentation reports related to the primed trials and which related to the non-primed trials.

The participant in the role of receiver spent 30 minutes in ganzfeld stimulation but using pink noise instead of ocean waves as the auditory source. Following this, the experimenter who had accompanied the receiver, logged into the computer in the receiver room and located on the server the sets of films that had been used to generate the choice of the first target film. The mentation report was then reviewed along with each of the four film clips in the set. Each film clip was then rated for its likeness to the mentation. This procedure was then repeated for the second film clip in the session.

Thirty-two participants receiver-sender pairs took part in the experiment (with one person returning for a second session in the role of receiver). Participants were recruited through advertising at meetings and notice boards for New Age and spiritualistic Society and through personal contacts. The entry criterion for talking part in the study was personal experience and belief in psi which we formally

assessed by using the Australian Sheep-Goat Scale. With two trials per session this should have given a total number of trials as 64 but because of technical failure in the equipment and the cancellation of one session (prior to any results) because of the absence of imagery, there were in total 58 trials.

Twelve sets of (four) film clips from our digital film clip library were used for the current project, these being the ones for which thematic pictures had been selected and introduced into the Inquisit program for the purpose of priming. These film clips had also been given to an external judge who wrote a simple blow by blow content description for each film clip. These content descriptions provided the basis for a later assessment of matches between the mentation imagery and that of each control and each experimental film clip. For this purpose, matches were classified as "direct correspondences" and "associative correspondences". The method was partly inspired by the word of Moulton (2001) who had assessed correspondences of mentation utterances to a checklist of single words that had been earlier determined for each target photo.

RESULTS

On the basis of a random sample (N=11) the external judge was, as predicted, able to distinguish the primed from non-primed mentation reports at a significant statistical level ($t = 2.80$; $p = .019$). This indicates that the content of the ganzfeld imagery reflects, at least to some degree, the material that the participant has been exposed to prior to the session. We are currently conducting a more complete and detailed analysis of this.

Contrary to our expectations, there were only 4 hits (13.79 scoring rate where MCE is 25%) out of the 29 trials for the primed targets. The non-primed control series gave double so many hits but a result which is close to chance expectancy: 8 hits of 29 (27.59% where MCE is 25%). A paired t-test showed the difference between direct hits for primed and non-primed target clips did not reach significance ($t = 1.28$, df. 28). Although in the psi-missing direction, the primed series did give an small to medium effect size at 0.20 which is compatible with the usual effect size claimed for the psi-ganzfeld.

DISCUSSION

Although we selected participants who appeared to have similar beliefs and expectancies those used our previous experiments and we attempted to carry out the sessions in a similar manner to that which previously had given positive results, the results here were the reverse of what we had expected. Since the participants saw four film clips prior to the ganzfeld session, it may well be the case that we overloaded them with emotional material from the film clips. Instead of priming the material and making it available for psi to "lift out", we may have initiated a ongoing working through process which blocked any possible psi influence. But how would this explain the possible "psi-missing" effect? Interestingly, effects similar to psi-missing have been in the priming experiments of cognitive psychology where they are called "reverse priming" and it is speculated that they are an automatic correction of unintended bias – an overcompensation (Glaser & Kihlstrom, 2005).

AUTHOR NOTE

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A QUALITATIVE EXPLORATION OF SPONTANEOUS PSYCHOKINETIC PHENOMENA

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INTRODUCTION

This research brief describes an ongoing research investigation which seeks to develop a deeper understanding of spontaneous psychokinetic experiences. Psychokinesis (or PK) reflects an ostensible effect of "mind over matter" whereby there is an apparent "causal influence of an organism on a region *r* of the physical world, without any known sort of physical interaction between the organism's body and *r*" (Braude, 1997, *p*. 200). Although parapsychologists have focused on PK performance in the laboratory, there is regrettably little in-depth exploration of the *spontaneous* PK experience (e.g., see Irwin, 1999). Apparent PK experiences seem to be universal in terms of subjective human experience, and can be documented in all periods of recorded history and in all countries of the world (Randall, 1982). Anomalous physical effects include healing, physical mediumship and the malfunctioning of electrical equipment, alongside many others (e.g., see Heath, 2003).

PK phenomena are reported less frequently than other forms of subjective paranormal experience. For example, there were only 178 cases of PK (Rhine, 1963) compared to 10,000 cases relating to ESP in L.E. Rhine's case collection (Irwin, 1999). Surveys have also revealed that between 1% (Ross & Joshi, 1992) to 7% (Gallup and Newport, 1991) and 8.8% (Neppe (1980) have had a PK experience. Belief in PK is a little higher, with around 17-18% (Clarke, 1991; Gallup & Newport, 1991) reporting some belief in these phenomena. These proportions are lower than those found in surveys of spontaneous ESP experiences (e.g., Palmer, 1979), but reflect a considerable proportion of the general population and as such, PK experiences should be further investigated and understood. It may well be that subjective PK experiences are less socially acceptable than ESP, which results in lower levels of reporting (Irwin, 1999; L.E Rhine, 1970).

We consider that spontaneous cases are a rich source of data which can considerably inform our understanding of PK phenomena. However, there are few large collections of spontaneous PK, and yet fewer attempts at content analysis (Irwin, 1999). L. E. Rhine's spontaneous case collection (e.g., 1961) includes a discussion of PK under "puzzling physical effects". Examples included the stopping or starting of clocks (27%); the falling of objects from a wall, mantel or shelf (36%), the breaking or exploding of objects (12%), the turning on or off of lights (9%), the opening, shutting, locking or unlocking of doors (8%) or the rocking or shaking of objects (7%) (Rhine, 1963).

PK experiences can be either non-recurrent (where a person has a one-off PK experience) or recurrent (whereby psychokinetic experiences are repeatedly experienced by a person) (Rhine, 1963). Recurrent PK experiences have been the focus of many researchers, although Rhine's focus was on non-recurrent experiences. PK experiences can also be either intentional, or unintentional (see Heath, 2000). Unintentional PK experiences occur out of the blue; for example, surrounding a client in a psychotherapeutic context (e.g., Kashara, 1983). A further distinction among different forms of PK experiences reflects the apparent agency (i.e., the origin of the anomalous physical phenomena) of the PK phenomena which can relate to the living, dead or dying (e.g., L.E. Rhine, 1963). It is interesting to note that the largest portion of Rhine's PK cases were associated with events occurring surrounding death or apparently from a discarnate agency. More recently, Wright (1998) noted a series of

spontaneous PK experiences following her bereavement of her spouse. These included a lamp flashing on and off and the strange behaviour of other electrical equipment.[1]

The current project seeks to address the phenomenology of subjective PK experiences. Braude (1997) considers that experiential data can be as reliable as more laboratory based evidence, and potentially able to indicate more about the nature of the situational interaction that may produce a (genuine) psi effect. He also suggests that this approach may allow for the recognition of patterns and consistency across cases and can be more interesting, have greater subjective impact and allow for deeper understanding of the human needs that may be met by such human experiences (*ibid*).

Rhine (1970) suggested that PK cases could indicate a response to an emotional need or situation of the living. It seems that they may sometimes be associated with a defense mechanism of displacement of things that cannot be accepted in the conscious mind, but then are released in the form of PK into the world at large (see Irwin, 1999). Heath (2000), however, found that the phenomenology of spontaneous and intentional PK experiences seemed similar in many ways to ESP phenomena, and did not necessarily include evidence of repression and emotional problems. In fact, she notes that many of the features associated with PK seemed to be more indicative of transcendence. This seemed to be the case for experiences that seemed to be superficially qualitatively very different, and featured two forms of PK (intentional and unintentional) experiences among the same group of people. According to Heath, PK is associated with altered states of consciousness, connection, dissociation from the individual ego, suspension of the intellect, the presence of playfulness or peak emotions, energy involvement, trust in the process, focused awareness, a release of effort/attention, guiding the process, an altered sense of time, investment, openness to the experience, a positive impact, and a sense of "knowing". Interestingly, laboratory PK performance seems also to be associated with a range of states, some of which reflect Heath's findings[2].

Heath's (2000) phenomenological work is a valuable addition to the literature and notable exception to the lack of systematic in-depth assessment of PK experiences in parapsychology. However, it fails to address the experiences of non-special claimants who experience PK. It is not yet clear whether there are personality and mental health differences in the form of PK experiences. It is also not clear whether people who experience one form of PK will experience it in all of its forms. Twenty-first century examples of spontaneous PK may also differ considerably from those reported at the time of L.E. Rhine's case collection, due to the technological developments of the last 40 years. This project will systematically explore physical phenomena from a phenomenological perspective, with a view to understanding the psychological and biological concomitants of the various forms of physical phenomena. Following on from this, we plan to develop a questionnaire that will allow for the assessment of PK incidence, and personality and mental health antecedents of apparent PK phenomena.

METHODS

Design

This is a qualitative study, incorporating face to face (where possible) or telephone based semi-structured interviews with those who experience PK phenomena.

Participants

To date, nine participants have participated in this study, of which seven are female and two are male. All those who have participated in the study are US citizens. Recruitment has taken place via

[1] See also Alvarado (2006) for a discussion of neglected death bed phenomena which include anomalous physical effects surrounding death and dying.

[2] See L.E. Rhine (1970), Stanford (1977) and Houtkooper (2004) for further discussion on states of mind associated with PK performance in the laboratory.

word of mouth and advertising on the website of the Rhine Research Center. It is anticipated that an additional 1-5 interviews will be undertaken so as to include British participants and those who experience other forms of PK.

Materials/Interviews

Questions to be explored during the interview schedule were given to participants prior to their participation in interviews. These covered a variety of areas including; states of consciousness, mood, diet, sleep patterns associated with the experience, their own conceptualisation of nature of PK, agency of PK, etc. Many participants had already submitted a summary of their PK experiences prior to being asked for interview, as such, interviewers had some prior knowledge with which to structure questions. Interviews usually began with an invitation for participants to describe the types of PK that they have experienced. As interviews progressed, participants were asked to consider states of consciousness, and other phenomena associated with the most subjectively impressive experiences. They were also asked to reflect across their own experiences to observe whether they saw any patterns (e.g., with mood, sleep, etc.).[3]

RESULTS

Interviews have been analysed by a combination of grounded theory (e.g., see Glaser, 1992) and transpersonal research methods (see Braud & Anderson, 1998). Several themes and patterns have been extracted indicating that PK experiences occurring in the real world are multidimensional, and differ according to perceived agency of physical phenomena (self or externally derived). Initial analyses indicate that there are social, personality and biological attributes associated with experiencing PK phenomena. These initial analyses will be expanded and amended according to additional interview material which will allow for questionnaire development and assessment of personality and mental health antecedents of PK.

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[3] Researchers approached interviews with an open minded perspective, and sought to suspend belief and disbelief regarding the existence or non-existence of PK phenomena described by participants.

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PARAPSYCHOLOGY & INVESTIGATING HAUNTING EXPERIENCES

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INTRODUCTION

Haunting experiences fit within the remit of parapsychology given that they are "apparent anomalies of…experience that exist apart from currently known explanatory mechanisms that account for organism-environment…and influence flow," (Parapsychological Association, 1989, pp.394-395). There have, however, been attempts, inside and outside of parapsychology, to provide evidence for possible explanatory mechanisms. Several of these attempts have been presented at previous conventions. In addition, there is a need to recognize, however skeptical, the wealth of evidence that comes from anecdotal reports of haunting experiences. With the public's ever-growing interest in haunting investigations, an interest exacerbated by the media, there is a need to disseminate knowledge regarding the contribution of parapsychology to such field research. The educational and training background of many parapsychologists is in psychology, a science in which there is a basic knowledge of transferable issues like visual perception, suggestion, group conformity and ethics. Additionally, some parapsychologists have declared their interest in the science to have been fuelled by spontaneous case research. Indeed, the panelists have been chosen specifically because of their collective experience in conducting haunting investigations, in addition to their knowledge of and experience in laboratory work. This panel hopes to provide some answers, learnt from psychology and elsewhere, regarding haunting experiences. It hopes to highlight also some unanswered questions regarding investigations and to promote recognition within parapsychology of the potential pitfalls of field research whilst at the same time the extreme importance of promoting its continuance. More importantly, it hopes to emphasize the necessity for further research, dissemination and education.

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ORDER OF PRESENTATION & TIME ALLOTMENTS

Ciarán O'Keeffe – Introduction *(2 mins)*

1. Devin Terhune – Suggestion, Contagion & Haunting Phenomena *(5 mins)*
2. Steve Parsons – Infrasound & Haunting Experiences *(5 mins)*

(13 min discussion period – Haunting Experiences & Possible Explanatory Mechanisms)

3. Ian Baker – The Ethics of Investigating Haunting Experiences *(5 mins)*

(15 min discussion period – What parapsychology can bring to haunting investigations)

[1] NB. Both Ciarán O'Keeffe and Simon Sherwood are panelists and will contribute to the discussion but are not presenting.

1. Devin Terhune - **SUGGESTION, CONTAGION, & HAUNTING EXPERIENCES**

ABSTRACT

Site-specific recurrent anomalous experiences, referred to as haunting phenomena, appear to be produced by a confluence of psychological processes (Lange & Houran, 2001). Such processes include affective, cognitive and motivational influences as well as environmental-neurophysiological interactions. Two cognitive phenomena of critical importance to the incidence of haunting phenomena and the investigation thereof are suggestion, in which an implicit or explicit environmental cue may induce congruent experiences, and contagion, in which one individual's experiences trigger similar reports in proximal individuals.

Suggestion and related constructs have been repeatedly found to play a critical role in the incidence of haunting phenomena. The reporting of anomalous experiences is associated with hypnotic and imaginative suggestibility (Kumar & Pekala, 2001) and the induction of hallucinatory experiences via suggestion is extensively documented (e.g. McConkey & Barnier, 2004). Haunting-type experiences have been induced by suggestion through different experimental techniques (Granqvist et al., 2005; Terhune & Smith, 2006). Haunt-specific suggestions have also been found to inflate the reporting of anomalous experiences in field experiments (Lange & Houran, 1997; Wiseman, Watt, Greening, Stevens, & O'Keeffe, 2002). Of the multiple haunting cases investigated by the author, in at least one the principal experient received a direct suggestion that the respective site was haunted prior to the onset of the phenomena; suggestion may also facilitate the cessation of haunting phenomena (Roll, 1977; Terhune, 2004). In addition to triggering haunt phenomena, suggestion may inform the content and interpretation of anomalous experiences and may contribute to the occurrence of false memories of haunting episodes. Research on the related phenomenon of contagion, though less studied than suggestion, indicates that under certain conditions, reports of anomalous experiences can trigger similar experiences in other individuals. This is in accordance with the finding that haunt phenomena are more likely to occur in sites with multiple individuals (McClenon, 2001). Finally, suggestion and contagion may function to determine the interpretation of ambiguous endogenous (e.g., somatic) and exogenous (e.g., unusual sounds) stimuli (Lange & Houran, 2001).

In addition to their role in the incidence of haunting phenomena, suggestion and contagion need to be taken into account in field experiments and investigations of alleged haunts. The extent to which suggestion may have induced haunt phenomena, or determined its phenomenology, and the extent to which experiences were facilitated by contagion effects should be closely considered in individual case investigations. In field experiments involving participant tours (Lange & Houran, 1997; Maher, 2000), investigators must be aware that identifying a particular site as a haunt can influence the perceptions reported by participants as well as experimenters. Some, but not all, of these effects can be circumvented in part through the use of double-blind experimental conditions and the inclusion of independent control sites in field experiments of alleged haunts (Houran & Brugger, 2000). However, the occurrence of contagion effects and the increase in suggestibility conferred by restricted environmental stimulation (Cardeña & Spiegel, 1991) may render common features of field experiments (e.g., multiple experimenter teams, night-time investigations) highly counterproductive.

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2. Steve Parsons – **INFRASOUND & HAUNTING EXPERIENCES**

ABSTRACT

Early psychical investigators recognised that sound vibrations were a component in some reported haunt and poltergeist cases (e.g., Fodor & Lodge, 1933). Whilst none of these early reports directly mention infrasound, the idea did actually gain scientific recognition in the 1940's. We now know that low frequency structural and airborne vibrations are produced by and also result from, infrasonic acoustic energy. The first direct claim of a possible causal link between infrasound exposure and reported anomalous experiences was made by Persinger (1974). He stated that although little public data has been available, weak infrasound energy from ambient sources could evoke vague responses and lead to reports of feelings of foreboding, depression of impending doom ahead of natural phenomena such as earthquakes (Persinger, 1974).

Probably due to the lack of research exploring possible links between infrasound and paranormal experiences, and also technical difficulties in measuring it, investigators did not begin to pursue the case for infrasound for many years. Now, infrasound is increasingly put forward as a contributing factor in the production of various physiological and psychological effects that are subsequently interpreted as a haunting experience (Fielding & O'Keeffe, 2006). Often such claims are not based upon empirical observations but instead draw upon similarities between witness reports and reported effects of exposure in laboratory studies. This interest closely followed the published research of Tandy and Lawrence (1998). Tandy traced an infrasound source to a defective fan within an allegedly haunted workplace. A key suggestion of this research was that infrasound, in addition to the psychological effects, may also be responsible at a specific frequency (18.98Hz) of causing eyeball vibration leading to visual effects that might be interpreted as apparitional encounters. Tandy later conducted a series of measurements in an allegedly haunted 14th Century cellar (Tandy, 2000). The results seemed to confirm that infrasound close to 18Hz might be responsible for anomalous experiences. These two papers seem to have been the catalyst for the claims now being made for infrasound involvement in haunting cases.

Braithwaite and Townsend (2006) observe that there are no published studies that have found any implications for cognition or experience of infrasound as weak as the levels reported by Tandy (2000). This is also commented upon by Tandy (2000) who suggests that as haunting effects are rather less spectacular this may simply reflect the lower amplitudes found. Certainly the seminal work by Tandy & Lawrence (1998; Tandy, 2000) remains the only real basis for the assumption of an infrasonic involvement in personal experiences at haunted locations. Inevitably, such primary studies are flawed as there is little preceding data for the authors to make use of when developing arguments. There is also a lack of information about levels of ambient infrasound at haunted locations. The need for such baseline data was also highlighted by Braithwaite & Townsend (2006). Given that infrasound is produced by so many natural and man-made sources it is unlikely that infrasound on its own is the cause of people reporting paranormal-like experiences although this cannot be ruled out in all cases.

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3. Ian Baker - **THE ETHICS OF INVESTIGATING HAUNTING EXPERIENCES**

ABSTRACT

In June 2005 an investigator accidentally dropped his burning cigarette and caused £5000 worth of damage. He had been investigating alleged apparition sightings in a Residential Home. He was drunk.

A derelict 19th Century hospital near Sunderland has been boarded up and security increased in a bid to prevent amateur ghost investigators from entering without permission. Owners and local police have voiced concerns over damage, burglary and also the safety of anyone entering the premises.

CCTV has been installed at the site of Borley Rectory, reputedly the most haunted location in the UK, to monitor hordes of ghost hunters and sightseers that are indulging in anti-social behaviour, criminal damage and causing nuisance to residents.

Though these are rare and extreme cases, there are potential ethical problems inherent in investigations of haunting experiences. These include, but are not limited to: free access to the experient's home; freedom of movement for anything up to 24 hours at a time; potential distress for experient; investigator's and/or experient's motivation for investigation; and lack of any formal recruitment or screening of group members. Left untouched, more extreme ethical nightmares could result and it could, potentially, mean a field teetering on the edge of respectability, become sullied forever.

There are a large number of individuals, groups and organisations around the world that regularly conduct investigations of reportedly haunted sites. In the UK alone the number of amateur groups operating is in excess of a thousand. Currently the procedure for procuring a case is either through word of mouth, a media report or, more commonly, an experient who is then (in some cases) interviewed for verification or interest purposes. A group would then often be granted full access to the premises under investigation with consequences rarely discussed and no recourse for the experient should any difficulties arise.

Due to the number of investigations provided by individuals, groups and organisations into haunting experiences and the lack of any governing body, there is a need for a set of guidelines to provide investigators and members of the public with an outline for how such investigations should be conducted ethically. Though guidelines exist which refer to ethics in comparable areas of parapsychology (e.g. Parapsychological Association, 2005) and psychology (e.g., British Psychological Society, 2006) there is a definite need to apply, to haunting investigations, ethical intentions and regulations learnt within the sciences. A recent published set of guidelines goes some way to providing this, but it is only through discussion and dissemination, of the dangers *and* recommendations, that an ethical ethos will eventually be adopted (Baker & O'Keeffe, 2007).

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4. Simon Sherwood - **FIELDWORK INVESTIGATIONS OF HAUNTINGS: PERSONAL REFLECTIONS**

ABSTRACT

A childhood apparitional experience inititated my interest in parapsychology however it is only in recent years that I have become actively involved with the investigation of cases of alleged hauntings. I have worked with a number of different investigation groups and organizations around the country. Fieldwork investigations can be both rewarding and frustrating from an investigator's perspective but they are certainly challenging in terms of trying to adapt the ideals of laboratory-based protocols to the constraints of real-world situations. One needs to distinguish between private personal dwelling versus public or commercial premises cases as these can involve different issues for consideration. In some cases there can be a potential conflict of interest in terms of the clients' needs and desires and those of the investigator (and parapsychology as a discipline) and both parties need to be clear in advance what the implications of an investigation might be, as well as what the agreed terms and conditions are. Fieldwork investigations ideally require interdisciplinary knowledge and skills e.g., psychology, technical expertise in the measurement of environmental variables, photographic, videographic and sound recording skills. Unless the alleged phenomena are recurrent and regular then the phenomena can be rather elusive and not amenable to study, particularly if there is only a limited 'one-of' opportunity to investigate; longitudinal investigations are more desirable.

The First Report of the Society for Psychical Research's Committee on Haunted Houses (1882, pp. 114-115) indicated that:

> We have been asked more than once why we do not bring a dozen disbelievers together into a haunted house, and leave them for a night with the ghost, in order to settle the matter decisively…[U]nless the incidents related occurred frequently or at fixed periods—a case which we have no grounds for believing at all common—it is very improbable that any result will be obtained by a single night's experiment. Ghosts…seem to be no respecters of persons ; and no amount of scientific watchfulness will make them come to order.

In the absence of recurrent phenomena and specific detailed knowledge regarding the location and nature of reported phenomena, exploratory 'fishing' protocols are often used. However, I feel there is a greater need for more active theory- and hypothesis-driven approaches to fieldwork investigations rather than more passive 'vigil'types. At the very least one ought to try and focus the use of appropriate and limited resources (i.e. time, team members and equipment). There seems to be a growing public perception that haunting investigations always need to be carried out at night and in complete darkness – but, whenever possible, one should investigate at the same times and under the same conditions under which phenomena have been reported previously. Haunting phenomena are not restricted to night-time and darkness. In my fieldwork experience thus far, strong evidence of potentially paranormal phenomena has been elusive. I think there is scope for greater consideration of normal psychological and physiological phenomena and environmental conditions so that we can gain a greater understanding of how clients as well as investigators react to and interpret certain situations and conditions. This will lead hopefully to a greater scientific output from fieldwork investigations.

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Established in 1882

SPR ABSTRACTS OF PAPERS

BROKEN THREADS IN THE FABRIC OF REALITY

Mary Rose Barrington

ABSTRACT

Some aspects of the paranormal might plausibly one day be reconciled with a scientific model not vastly different from ideas currently received. But when it comes to the more extreme effects (such as materialisation) then any reconciliation seems improbable. So if such effects do not fit within a conceivable scientific model then perhaps it is the other way round, and the scientific model fits into a larger paranormal framework. What sort of cosmos could that be?

Richet, Nobel prize-winning physiologist, testifies to materialisation of limbs under his eyes and touch; this should surely be regarded as a reliable source data. Osty reports being scrutinised and even kissed by materialised heads. There are acceptable reports of even stranger manifestations, including phantom figures that walk and talk, making appropriate conversation. This is surely something that cannot happen in the world as it is generally believed to be.

However, these séance room phenomena are ephemeral; they can be thought of as composed of substances not known outside the private space in which they came and went.

A different sort phenomenon is the arrival of so-called apports. These are ordinary material objects that, once they have arrived, remain in existence. The evidence for apports is less copious, but not dismissible. Alfred Russel Wallace testifies to the unaccountable arrival of improbable snowballs and sunflowers dripping clods of earth. In our own time large sprays of flowers were often found in the hearth at the conclusion of séances at the Harrison home circle, though there was no way the door or window could have been opened during the sitting.

Related to séance room apports are the phenomena of jott, the difference being that articles disappear and re-appear, often in entirely the wrong place, in the ordinary course of life, and many people, including SPR members, testify to these incidents in circumstances that seem to exclude faulty memory or malobservation. But ontologically the article does not disappear; it seemingly goes out of existence at one location and comes back into existence at a different location. This is in some degree more radical than the materialisation of phantom figures, because we are talking about articles that belong in our everyday world, not ephemera.

We can of course dispose of the problems raised by disposing of the testimony; but this way one can eliminate all the evidence for the paranormal, just reserving a few effects that seem not too controversial. And yet it is more rational in principle to believe that sane and reasonable people are telling the truth about what they have witnessed than to assume that they are not.

The evidence points to is an idealist or monist world held in place by a network of minds supporting an orderly and co-ordinated system. But in the closed community of a séance room, events may respond locally to the will and imagination of people holding beliefs and expectations; and in ordinary life items can slip through the net (i.e. fail to be maintained in existence) through inattention or subconscious manipulation. These ideas will be put forward.

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HOW STANDS THE ROSENHEIM RSPK CASE AFTER 40 YEARS?

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ABSTRACT

Various documentations of the Rosenheim RSPK case played a prominent role at the Freiburg PA Convention 1968. The principal investigator, Prof Hans Bender, presented a summary of his investigations into these spectacular phenomena which took place in a law office in the Bavarian town of Rosenheim mostly between summer 1967 and January 1968 while reaching a peak in November and December 1967. In short, the events included registration of telephone calls never made, strong deflections appearing on a continuously operated mains voltage recorder and current recorder, sharp bangs in the air, automatic fuses blowing without cause, bursting of light bulbs, and suspended lamps swinging as high as the ceiling. The strange occurrences appeared to happen only in the presence of A. S., a 19-year-old female employee of the lawyer. In Bender's words: "When this young girl walked through the hall [of the office], the lamps behind her began to swing, light fixtures began to explode, and the fragments flew towards her."

Of great importance regarding the paranormality of the phenomena in question was a series of physical measurements in the lawyer's office conducted by two Munich physicists F. Karger und G. Zicha who checked possible physical explanations for the anomalous deflections occurring in the voltage recorder. They summarized their findings as follows: (1) Although recorded with the facilities available to experimental physics, the phenomena defy explanation with the means available to theoretical physics; (2) the phenomena seem to be the result of non-periodic, short-duration forces; (3) the phenomena (including the telephone incidents) do not seem to involve pure electrodynamic effects; (4) not only do simple events of an explosive type take place, but also complicated motions (e.g., recorder curves, moving pictures); (5) these movements seem to be performed by intelligently controlled forces (e.g., the telephone incidents) that have a tendency to evade investigation.

Other documentations of the Rosenheim case include a detailed technical report written by P. Brunner, the engineer in charge of the city's department of works, and the files of the criminal police Rosenheim containing a lot of witness reports.

Despite this impressive evidential basis, the case attracted nevertheless in the following years a series of criticisms, especially after the transmission of a documentary on German TV in 1975. The main criticisms included: (1) fraudulent manipulations on the part of the lawyer or his collaborators to produce the anomalous deflections in the voltage recorders with the help of a rectifier; (2) the existence of a faulty X-ray equipment in the office of a dentist in the floor above the lawyer's office producing high frequent waves of high voltages which were responsible for the electrical anomalies observed; (3) ideological bias and gullibility on the part of the investigators.

It can be shown that such criticisms were pseudo-criticisms made post hoc; they cannot explain away the anomalous nature of the Rosenheim phenomena which still give good evidence for the reality of spontaneous macro PK phenomena.

A THEORY TO DIE FOR!

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ABSTRACT

In the past several decades, rapid advances have been made in developing evidence for the reality of paranormal phenomena. Of the various forms of the paranormal, evidence verifying some form of afterlife have been the most startling. From research on NDEs to mediums and on to reincarnation, it would seem that consciousness, at the very least, survives death of the human body. However, it is also quite evident that science, as it now defines itself, will ***never*** accept the paranormal and related phenomena, especially those phenomena that deal with the afterlife, ***no matter how much evidence is gathered and no matter how convincing that evidence is***, because science has never developed the conceptual and intellectual tools to even discuss such possibilities. This seeming paradox, the fact that science seems happy with ignoring evidence for the possibility of the paranormal and an afterlife, is actually a historical artifact dating from the Scientific Revolution. It was once necessary to protect science from religion and the supernatural, but that necessity has long ago evaporated as science became more and more successful. In fact, science has finally reached a point in its own development, maturity and understanding of nature where it is ready to tackle the most difficult of the questions dealing with the paranormal world: the survival of consciousness. However, doing so would necessitate that science redefine itself and its scope and that would be truly revolutionary.

On the other hand, current events in science imply that a new scientific revolution in physics is about to occur. A comparison of scientific advances over the past few decades with scientific events in the last decades of the nineteenth century show a very large number of parallels, which seems to indicate a much broader scientific revolution in the making than one that just affects physics. This new revolution will be as much about mind and consciousness as it is about matter and physics. For example, the SPR, founded in 1881, was an integral part of the last pre-revolutionary period of science, while the PA, legitimized when it became a member of the AAAS in 1969, is an integral part of this new pre-revolutionary period. Both of these events offer evidence for the considerable scientific growth and interest in human consciousness that developed during the specific time periods before the last and the next revolutions. It is therefore safe to conclude that any new revolution will bring both a new theory of physical reality and a new theory of the consciousness that senses, interprets and interacts with physical reality. It is also logical to conclude that a new theory of consciousness that explains how consciousness and matter interact with each other at the most fundamental level of physical reality will lead to explanatory models of the paranormal as well as explain how consciousness survives death of the material body. This prediction does not represent an optimistic 'pipe dream', but a very real probability. In fact, such a theory has already been developed. It is based upon a five-dimensional Einstein-Kaluza model of the space-time continuum. Called the 'single field theory' or SOFT, it can easily account for many varieties of paranormal phenomena as well as the survival of consciousness. This particular theory may or may not prove completely valid, only time will tell, but whatever theory finally succeeds in bridging the gap between mind and matter, indications are that it will have many of the characteristics of SOFT. Whatever the case may be, a valid theory that combines physical reality and consciousness is truly a theory to die for!

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MARK TWAIN AND 'MENTAL TELEGRAPHY'

Chris Bratcher

ABSTRACT

The paper takes us through Mark Twain's two articles on 'mental telegraphy', his term for the assumed paranormal mental prompting that produces action at a distance that matches one that the other party was doing or was minded to make. The classic example is unanticipated letters that "cross", particularly when they provide information requested (or vice versa). We are liable to attribute isolated incidents to mere co-incidence. Twain was persuaded that there had to be more to it than that; to the point that he wrote letters and on completion destroyed or did not post them, in anticipation that the mechanism would be operative, either by the impulse of his own composition, or that of his correspondent, and advised others, in crisis situations, to do the same. He thought that the same phenomenon, better known as Thought transference, underlay apparently normally unprompted scientific and engineering discoveries. He bases his case on anecdotes from his own everyday life, told with his trademark easy wit that graces his novels, that were apparently written up from records that he kept following a seminal experience in 1874/5.

'Mental telegraphy' was written, bar a postscript, in May 1878, and hence covers some three and a half years of such incidents. It was intended for *The North American Review*, but the editor refused to publish it anonymously, and S. L. Clemens/Twain would not consent otherwise, "as it would be the surest thing to defeat my desire that the public should receive the thing seriously".

He based his letter of application to Sir Wm Barrett of Oct 4 1884 to be made a member of the S.P.R on his interest in the phenomenon: "'Mental telegraphy .. has been a very strong interest with me for the past nine or ten years. I have grown so accustomed to considering that all my powerful impulses come to me from somebody else, that I often feel like a mere amanuensis.. And I consider that when the other person does not supply me with the thoughts, he has supplied me with the impulse anyway.. Still may be I get even by unconsciously furnishing other people with impulses.." He was duly made a member (as, of course, S. L. Clemens), and eagerly anticipated his copy of the *Proceedings* until (I assume) his well known financial distress caused his membership to lapse in 1894.

The articles ('mental telegraphy' and 'mental telegraphy again') were, nevertheless, first published under the nom de plume Mark Twain, in *Harper's monthly magazine* in December 1891, and September 1895, and can be downloaded from Cornell University's *Making of America* website. The former is the more substantial. Twain later published it himself in 'The £1,000,000 bank note and other new stories' [Webster & co, 1893], and the latter is reproduced in facsimile in the Oxford Mark Twain volume of that name in 1996.

I hope that in the time available, as well as sampling his evidence, we might broaden matters, probably in discussion, as to whether a *prima facie* case has been made for such thought transference, and/or what could count as such, and how we might pick up, in the age of e-mail, where he left off.

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WHAT MIGHT SURVIVE PHYSICAL DEATH?

David Fontana

ABSTRACT

For many of those familiar with the extensive evidence published over the last century and a quarter, survival of physical death is viewed as at least a plausible working hypothesis. Rather less attention has been given to an associated question, namely what aspects of the individual's consciousness and personality might survive death, and what might be the nature of the post-mortem experiences that await the survivor? Physical science has nothing to say on these questions, since death implies coming to an end in the space-time continuum that constitutes physical reality. We must therefore turn our attention to reports arising from direct human experiences. These experiences include deathbed visions (both of the dying and of those at the bedside), Near Death Experiences and Out of the Body Experiences, reports by mental and physical mediums (whether or not in trance), of contacts with the deceased, and reports of After Death Communications other than through mediums. Also of relevance are the mystical experiences and teachings that are a prominent feature of all the great psycho-spiritual traditions.

The proposed presentation will briefly survey samples of this evidence and draw attention to such elements as the consistency between many of the reports, the clear implication that memory, sensory awareness and personal characteristics and concerns endure at least for a time, the numerous reports of a past-life review and of periods of atonement or purgatory, the presence of some for of 'body' and of a recognisable quasi-physical environment, the possibility of reincarnation, the presence of Hades-like conditions, the emphasis upon the mental nature of the next world, and the concept of levels of development and of continuing spiritual progress.

The paper will conclude by stressing that the founders of the SPR were drawn to psychical research by their interest in survival and the aftermath of survival, and it is incumbent upon the Society to continue this interest. The emphasis of the last half-century upon scientific laboratory-based research, valuable and revealing as this research has undoubtedly been, should not divert us from this interest. It appears clear that it is a similar interest that draws the attention of the public to psychical research, and that those who know of the existence of the Society expect it to contribute towards the satisfaction of this interest, and to provide some of the information that may enable individuals draw their own conclusions on the important issues involved.

A NEW SURVEY OF PSYCHIC EXPERIENCES IN ICELAND

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ABSTRACT

In 1974 the author conducted in Iceland (Haraldsson, 1985) a large-scale (N = 902) representative survey of psychic and religious experiences, and beliefs in such pheomena and various aspects of Icelandic "folk-beliefs" some of which may stem from pre-Christian times . Among the findings was that 64% of the sample reported at least one of 12 different psychic experiences, 59% of the men and 70% of the women. Experiences of psychic dreams topped the list with 36% reporting them, and next came unexpectedly experiences of apparitions of the dead with 31%. Up to 17% reported experiences of the specific Icelandic phenomena, such as of elves (or hidden folks), "spelled spots" and "followers" (fylgjur). Some of these experiences can be found in some areas of Ireland and may hence be of Celtic origin. Iceland was settled primarely from Norway but a one-fourth to one-third of the settlers came from Ireland and Scotland.

Considerable changes have taken place in Icelandic society since 1974 (such as higher level of education), and it seemed time to replicate the 1974 survey and examine what differences might have taken place.

This time Haraldsson was joined by Terry Gunnell, a British born folklorist at the Univeristy of Iceland. In 1974 the 1132 strong sample was randomly obtained from the National Registry. The survey closed with the exceptionally high return rate of 80%, or 902 responses.

National surveys were rare in 1974 but common at the present time so the return rate was only 44%, returned questionnaires were 660. 36% of the males responded and 52% of the females. It is likely that those interested and believing in psychic pheomena are more likely to have answered than those who do not. The results may thus be somewhat higher than they would be in a more representative sample. It was hence decided to extend the sample in 2007. Each student in a class on folklore got 10 members of their family and friends of various ages to fill out the questionnaire. We obtained 366 further respondants, thus a total of 1026. Since substantially more women responded, this was corrected for by giving men and women equal weights in the final results. The difference in the reported experiences was only very slight to none between the two samples in this survey giving some support for the representativeness of the results.

Not much had changed from 1974. The figures tended to be slightly higher in the new survey, psychis dreams e, g, were now reported by 39% but by 36% in 1974. Waking ESP experiences (telepathy and clairvoyance) were reported by substantially more respondants than in 1974, namely 54%, and more reported having lived in a haunted house (35%) and having past-life memories, 10%. As before, women reported more experiences than men.

Percentage of respondents claiming various kind of psychic experiences in the surveys in 2006, 2007 and 1974:

	2006	2007	1974
Waking ESP experience	54	55	27
Psychic dream	39	40	36
Apparition/encounter with a deceased person	38	42	31
Lived in a haunted house	32	35	18
Experience of poltergeist	12	12	9
Out-of-body experience	19	23	8
Visual experience of a dead person	17	21	-
Experience of a deceased animal	9	11	-
Remember a past life	10	10	2
Specific Icelandic folk-beliefs:			
Experience of "fylgja"	16	17	17
Seen elves or "hidden folks"	5	5	5
Experience of "spelled spots"	3	5	2

The results will also be viewed in the light of surveys conducted in other countries, in particular the Multinational Human Values Survey.

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THE PRESENTATION AND RECEPTION OF ANOMALOUS PHENOMENA IN BRITAIN PRIOR TO THE EMERGENCE OF PSYCHICAL RESEARCH

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ABSTRACT

This paper explores the discourse surrounding demonstrations of anomalous phenomena in nineteenth century Britain prior to the emergence of psychical research. It considers how such demonstrations were presented and received, and how they were discussed in relation to contemporary orthodox science. In doing so, it focuses in particular on two case studies: the demonstrations of ostensible clairvoyance by mesmeric performers such as W. J. Vernon; and William Crookes' experiments with Daniel Dunglas Home. Whilst the latter is a well-known figure in the history of psychical research, the former has received little attention.

William John Vernon was a phrenologist and mesmerist who became one of the best known of early Victorian mesmeric performers. His many public lectures, which featured demonstrations of a variety of mesmeric phenomena, were both well attended and highly controversial. In 1844, his attempt to demonstrate insensibility to pain and phreno-mesmerism at the Greenwich Literary and Scientific Institute resulted in violent arguments and physical assault. His subsequent attempt to demonstrate eyeless vision, which was foiled by the introduction of a special mask by a physician, was discussed at the London Medical Society and debated in the Medical Times. His performances with Adolphe Didier, brother of Alexis, were reported favourably in sections of the press, and led to formal tests of Vernon's subjects by John Forbes, editor of the British and Foreign Medical Review. These tests were described in several medical journals and later cited on a regular basis by critics of mesmerism. An examination of the arguments surrounding Vernon's demonstrations illustrates how disputes over mesmeric phenomena established specific discursive themes that would be repeated in subsequent disputes about spiritualist and psychic phenomena.

First, exhibitors of mesmeric phenomena deployed the language of science, in particular in appealing to the primacy of facts over theory, in order to emphasise the need for further scientific investigation into what were unexplained anomalous phenomena. This, of course, was entirely in line with contemporary views of science. Second, such demonstrations were met with hostile criticism by those who, on the one hand, complained of public credulity over unexplained facts whilst, on the other hand, failing to provide adequate alternative explanations for these facts. This included appealing to the expertise of conjurors as a means of dismissing such phenomena without the need to provide an alternative explanation, yet (rather oddly) without referring to those conjuring performances that most resembled the phenomena in dispute. Third, both belief and disbelief in such phenomena were warranted in ways that have continued to be deployed since, including proponents' use of avowals of prior scepticism and critics' use of avowals of open-mindedness. Fourth, the debunking of such phenomena by orthodox scientists was used by debunkers as an opportunity to construct scientific expertise and authority not only over proponents of such phenomena but also over the general public. This included arguments over what amounted to proper scientific expertise in observation and appeals to certain scientific credentials. Meanwhile, proponents argued for their own competence in observation and also appealed to the scientific credentials of those proponents who had already established themselves within orthodox areas of science.

The paper shows how these discursive themes were prominent in the dispute surrounding Crookes' well-known experiments with Home (and, indeed, have continued ever since), and briefly discusses the relevance of such recurrent themes to ongoing debates about beliefs relating to the paranormal and the scientific status of parapsychology.

A CONFERENCE ATTEMPT TO WIN THE NATIONAL LOTTERY JACKPOT PSYCHICALLY

Mick O'Neill

ABSTRACT

This is a very short session involving a psychical experiment. Delegates will be asked to close their eyes and relax. Then after a short period of positive thinking they will be asked to psychically predict the winning numbers in Saturday's National Lottery lotto draw. They should write down any numbers between one and forty-nine that come into their mind's eye. Any total can be written and they may include repeated numbers. These numbers are then processed by a computer program which eliminates expected number bias and so produces a list of the numbers in order of popularity as chosen by the delegates. Tickets are then bought based on this list. About 50 one-pound tickets will be bought, dependent on the number of participants. It is free to take part, but any winnings will be shared amongst participants and the SPR. The experiment was first done at the 2001 SPR conference as part of Mick 0'Neill's bi-weekly on-going Psychic Lottery Project. That no longer continues but the tradition of the SPR conference attempts continues.

Full instructions will be given before the experiment and an instruction sheet, along with slip to be filled in with the predictions, will be distributed.

The project was set up to try to find any correlations that suggest that lottery numbers could be predicted psychically. Then assuming that any such findings could be used to improve lottery chances, it was planned to try and win the lottery in that way.

The principal bases of the research are the work of Mark Zilberman (1995) and the PEAR precognitive Ganzfeld results (1989). Zilberman 's research suggested that the number of people who win lottery prizes varies dependent on season, national events and most importantly, geomagnetic disturbance.

Other factors considered by the project are lunar variations and the finding by James Spottiswoode (1997) that during a Local Sidereal time (LST) window around 13h 30m LST a much higher rate of success was found in thousands of psychical trials. This result featured in the last SPR-PA joint conference as it had been published only a short while before that conference.

This is a free, easy and fun opportunity to test your psychic abilities with lottery prediction, help psychical research and possibly win a lot of money. Please take part.

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THE 1935 OSLO INTERNATIONAL PARAPSYCHOLOGY CONGRESS AND THE TELEKINESIS OF CLEIO

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ABSTRACT

The present work draws upon the telekinetic phenomena connected with a 25 year old Greek lady, Cleio, who lived in Athens some seventy years ago. Angelos Tanagras (1877-1973) attended the 1935 International parapsychology congress in Oslo in his identity as the president of the Hellenic Society for '*Psychophysiology'*. He founded the Greek SPR in 1923 after resigning from his profession as the doctor of the Navy at the rank of Admiral. Tanagras met Cleio (a pseudonym he had given to her), the sister of a mathematician university professor, when she called to report poltergeist phenomena that occurred in their house. The phenomena had begun when Cleio suffered an emotional crisis after the simultaneous death of both her father & sister. Her family assumed that it was the spirits of the deceased relatives causing these unusual disturbing domestic incidents. Tanagras, however, realized that Cleio was directly responsible for the phenomena and gave her a nautical compass to attempt to influence telekinetically.

Cleio was soon able to move as well as stop the compass needle at will. As Tanagras was in favour of the scientific approaches to the study of psi phenomena, he arranged that professors at the physics laboratory of Athens University could test Cleio thoroughly. At the end of these tests the physics laboratory issued a certificate, endorsing the telekinetic abilities of Cleio. Tanagras was convinced that Cleio's telekinetic abilities were genuine. He reports on these tests at the fifth international parapsychology congress that took place in Oslo and documents the whole meeting in his yet unpublished autobiography [1], which he forwarded in the early 70s to the Elliot Garrett Parapsychology Foundation Library, in New York, USA. Tanagras gave two talks at the Oslo congress; the first referred to the telekinesis of Cleio and the other to his theory of *Psychobolie*. According to his theory, the soul emanated a substance which impregnated objects and the minds of other people alike. It was, thus, influencing the physical state of objects and the mental state of people. The lady sensitives of Angelos Tanagras were trained to detect this 'soul substance' as repeated experiments evidenced. Tanagras filmed the telekinetic activity of Cleio with the compass needle and showed it at Oslo.

The inspiring soul behind the Oslo International Congress was Carl Christian Vett, from Denmark (1871-1956). Vett was a wealthy businessman who used his fortune to finance a series of five international parapsychology congresses. The first one took place in Copenhagen (1921), the next in Warsaw (1923), then in Paris (1927), Athens (1930) and finally in Oslo (1935). Vett was strongly criticized by some parapsychologists that his enthusiasm with the congresses was lacking the necessary scientific rigor regarding the content of the presented papers. That disagreement was the main source of a lot of conflict among the parapsychologists in the 1920's [2].

On the first congress in Stockholm in 1921, there was great optimism among the participants regarding the progress in the field. Soon, however, the threat of a schism in the parapsychology world made its appearance. It had to do with the diverse views regarding what should be the subject of psychical research and the quality of work presented at the congresses. Carl Vett himself was accused to be quite naïve in loosely allowing the participation of everyone without strict discrimination [2].

It took five years after the 4th congress in Athens to announce the call for papers for the next parapsychology congress in Oslo [3]. Tanagras trip from Athens to Oslo took the route: Athens-Belgrade-Vienna-Stockholm from where he went on a boat to Oslo. Tanagras hoped that his talk and film presentation of Cleio's telekinesis would alert the scientific community to further independently investigate Cleio's effect and explore the nature of psychic performance. At Oslo Tanagras met for the first time Dr. Gerda Walther, the secretary of von Schrenck-Notzing, the Munich psychiatrist and physician. Dr. Walther was going to play, some thirty years later, a very important role to the rescue of the Cleio film.

The Oslo congress was co-organized by the president of the Norwegian SPR, Professor Thorstein Wereide. The venue on the first day was the main Oslo University Hall. Wereide and Vett elected on that day Tanagras as the president of the Oslo congress. There were over seventy people attending it, representing all

nations except Spain and Russia. It was the rule at these congresses that only the officially elected representatives of each country were allowed to present a paper. Some of the other parapsychologists presenting papers were Charles Richet from France, Ferdinando Cazzamalli from Italy, Carl Tenhaeff from Netherlands, Kenneth Richmond from England. Professor Carl Tenhaeff announced the opening of two chairs of psychical research, one at his University of Utrecht, the other one in Leyden and a third psychical research laboratory in Amsterdam under Professor Frans Roels.

There is some mystery surrounding the Cleio film and its four copies that Tanagras prepared one of which he showed at Oslo. In 1972 Benson Herbert published a very detailed analysis of the Cleio film [4] that he got from Dr. Walther who had rescued it from Tanagras with the help of a Greek acquaintance of hers. Some thirty three years later in Athens Tanagras last surviving sensitive, Mrs Eleni Kikidou, was contacted by a Greek ex-mentalist who claimed that Tanagras has given him the Cleio films before his death. Two 16mm film reels were then sent to Mrs Kikidou. On the metal frame of the one reel Tanagras had engraved the name Cleio in Greek. The film was, however, in a very bad state, broken discontinuously in many parts of various lengths, such that it was not possible to be reproduced by a suitable projector. Some surviving pieces, however, were showing Cleio performing telekinesis with the compass, exactly as Herbert had described it: filmed on a rooftop on a windy day. Kikidou was later informed that this was not the proper Cleio film sent to her and that the ex-mentalist was going to forward the proper one soon. All that took place some three years ago, but to this date no other of Tanagras films were forwarded, to the best of my knowledge.

According to Benson Herbert's published description of the film, Tanagras is shown to first bring Cleio with suggestion into a trance state. The camera shows that there are no hidden devices attached above, below and from all sides of the folding table where the nautical compass is placed. The needle is shown first to react to a bar magnet. When Cleio first attempts to influence the compass with two hands linked together by the thumbs and with palms facing down, the needle shows no response. As the linked hands continue to swing around and above the compass, the needle starts to move, but only by a very small angle not necessarily following the direction of the hands. Soon that pattern of reaction changes and the needle turns by a small angle to follow Cleio's hands.

Occasionally, the needle aligns opposite to the position of the hands. That is considered as evidence that Cleio does not have hidden magnets in her hands. The hands appear sometimes to repel and sometimes to attract the needle. There are even times where the needle moves although the hands are stationary above it. Eventually, there comes a time when the previously gentle swing of the needle becomes a violent oscillation at quite wide angles as the hands move anti-clockwise around the compass and the needle completes a full circle. After three such free revolutions of the needle the filmed telekinetic session ends [4].

Benson Herbert, in his publication of the detailed analysis of the film frames, agrees that Tanagras was not the kind of person who would have faked the filmed presentation and also that the frames themselves did not give any evidence that the movement of the compass needle was forged. As Cleio passed away at a young age there were no more testing opportunities for further scientific study of her effects. Her filmed telekinetic phenomena, however, have later inspired physiologist Dr. Leonid Vasiliev at Leningrad University to start Nina Kulagina on the telekinesis of small objects [5].

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IN SEARCH OF THE UNIVERSAL CHARACTER OF MICRO-PSYCHOKINESIS

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ABSTRACT

The scientific investigation of natural phenomena constantly searches for universal patterns in their behaviour. The study of micro-psychokinesis (microPK) has engaged a good number of scientists for many years that have gathered a large number of data in order to establish it as a genuine natural phenomenon [1]. In microPK, the frequency of outcomes of a random process is said to be consciously modulated by the state of the brain. Thus, the average of this random variable gets shifted beyond chance expectation in the desired direction, in coherence with the mental state. This implies that a microPK mechanism exists, one that obeys precise rules to which all past as well as future evidence must comply with. If this mechanism initiates a mean-shift in randomly varying quantities, as its definition dictates, its effect must be observable not only microscopically but also macroscopically. In other words, macro-PK or telekinesis must be also accounted for.

The scientific community considers that psi phenomena, such as microPK or telepathy, have no scientific grounds. These terms have recently attracted attention in the world of orthodox science, yet under a different context. It is now understood that telekinesis and telepathy may indeed be feasible in the foreseeable future, yet not through unknown and inexplicable forces, but through the application of the known laws of physics. Such applications, it is believed, would require the development of appropriate interface technologies to couple the brain activity of one person directly with its physical environment (psychokinesis-telekinesis), or with the brain activity of another person (telepathy) and such applications have already shown to be promising [2]. Parapsychology, on the other hand, holds that there already exists plenty of evidence for remote interaction through the mind alone [3]. That would require a clear-cut mechanism underway. The question is therefore, how does this universal microPK mechanism operate? Or, what is the set of rules that it obeys according to the current evidence?

The evidence in support of the traditional microPK definition has been summed up in a meta-analysis and graphically represented through the funnel plot [4, 5]. In the funnel plot the size of each study is drawn against the proportion of hits in it. In large databases, such as this one, the shape of the funnel plot is expected to look like an inverted funnel symmetrically centred about its peak. The position of its peak represents the effect's true size. The funnel plot of micro-PK data is, however, not symmetric and most importantly its peak is not shifted from chance as expected, but centred at 50%.

There is also another controversial feature on this funnel plot, just as important as the lack of an overall mean shift: The funnel plot is strangely broadened in comparison with what it should be if its data points were independent from each other. What the expected breath of the funnel plot of independent data should be is statistically estimated by the so-called *confidence intervals*. For instance, the 95% confidence interval should envelope the 95% of the data points in this large database, yet it envelopes considerably less data points. That inconsistency alone suggests that the entire micro-PK database is *biased* by a yet *unknown* biasing mechanism. Can there be a universal process to account not only for this broadening of variance, but also for the other important characteristics of the entire microPK database, the absence of an overall mean shift in the proportion of hits and the substantial deviation from chance of some individual scores?

The answer is yes, if the microPK is as a Markovian memory process. In this way, microPK data across all studies can be combined as a pool of records generated by one and the same mechanism. The mechanism is termed 'memory' since each microPK outcome depends on the previous ones. This work describes this simple Markovian model that can exactly replicate the three basic features that generate the entire microPK database: (a) its absence of overall mean shift, (b) its systematic broadening of variance and the (c) possibility for individual scores to substantially deviate from chance.

The model considers that the probability for a hit or a miss in a microPK test depends on what the last outcome was. Thus, a test outcome is determined by four probabilities: p11 to yield another hit after a hit,

p22 to yield a miss after a miss, p12 for a miss after a hit, etc. The entire microPK database could have been generated by the Markovian biasing mechanism in the following way:

(a) It biases binary states, successes & failures, equally by boosting up the degree by which they cluster naturally in a series of trials.
(b) It does not distinguish between binary states, even if the initial mental task is opting for successes.
(c) As the clustering is affecting both binary states equally, in the long run its result will be balanced yielding no overall mean shift.
(d) The peak of the associated funnel plot will be then properly positioned at 50%. That is, the microPK biasing mechanism *will imitate a random process*, as far as the statistical average of hits is concerned.
(e) The entire current microPK database with all its features can be replicated by approximate self-transition probabilities: p11=p22=0.88.

In a nutshell, if one micro-PK mechanism exists across all studies, the frequency of runs of two same binary outcomes must be approximately 88%. Admittedly, no such evidence is currently available, to the best of the author's knowledge. Research into this direction would need to be carried out before it is concluded that there exists no universal micropsychokinesis mechanism.

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WAS THERE SOMETHING IN THE CELLAR?

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ABSTRACT

In recent years, infrasound (normally defined as acoustic energy with a frequency below that of normal human hearing i.e., 20Hz) has increasingly been suggested, although primarily anecdotally, as a causal factor in some reports of personal paranormal experiences. The seminal studies conducted by the late Vic Tandy at Coventry University (Tandy & Lawrence 1998; Tandy 2000), suggested that a frequency of around 19Hz may be a key frequency in the production of a range of physiological effects. These include eyeball oscillation which could lead to a smearing of vision which has been suggested as the cause of people experiencing apparitions.

In May 2006, the authors were invited to conduct large scale field experiments within Mary King's Close, Edinburgh (Mary King's Close forms part of Edinburgh's Underground City and this well known tourist attraction has a documented record of alleged paranormal and supernatural incidents going back to the 16th Century). After consultation with Mary King's Close, an experiment was devised that was to expose members of the public to a significant level (>55 dB(SPL)) of infrasound at a frequency of 19Hz. The experiment was designed as double blind with neither the experimenters nor the participants (and tour guides) knowing whether the infrasound was applied or not. Members of the public signed up for tours giving informed consent of their participation in an experiment. Participants were taken on a standard guided tour of the Close (groups of approx. 20), unaware of the presence or absence of applied infrasound. At the end of the tour, the participants were asked to fill in a questionnaire about their experiences during the tour.

The infrasound was applied using the ARIA system (Acoustic Research Infrasound Array), designed specifically to generate large amplitudes of infrasound at required frequencies between 12 and 25Hz at Sound Pressure levels (SPL) of up to 100dB(SPL). ARIA was positioned out of sight of participants in an area of the Close not accessed during the public tours. Measurements of infrasound levels at significant locations within Mary King's Close were measured prior to the participant's admittance using ARID (Acoustic Research Infrasound Detector) and found to be within the range 50-80dB (SPL). Ambient infrasound i.e., the infrasound normally present within the Close, was also measured, and found to be less than 40dB(SPL) throughout the Close at peak frequencies of less than 12Hz. This was caused by a mixture of local environmental noise i.e., road traffic, and an air conditioning unit located at the bottom end of the Close which supplied warmed air to the City Chambers building directly above the Close.

A total of 439 questionnaires were analysed, with 249 people experiencing both ambient and generated infrasound, and 190 people experiencing only ambient infrasound. From the preliminary results of the experiment, it would appear that a significant number of people reported experiences, regardless of the infrasound state (approximately one third of participants in the "on" condition, and in the "off" condition). However, in the "off" condition, people were more likely to report a single experience during their tour, whereas when infrasound at 19Hz was applied, significantly more people (36% compared to 16%) reported multiple (up to 4) experiences.

Of those reporting experiences, these included feelings of being watched, discomfort, anxiety and nausea. Perhaps the most interesting result was that when the infrasound was applied, 20% of people on the tour reported a perceived rise in temperature as opposed to just 5% of people reporting a perceived temperature rise when only ambient infrasound was present. No participant reported a drop in temperature, a phenomenon commonly associated with apparent paranormal experiences. However, out of 249 participants who received the generated 19Hz infrasound, only one reported any form of visual experience. This would suggest to the authors that the supposition put forward by Tandy in his two papers that 19Hz is a significant factor in the production of visual disturbances leading to apparitional experiences, is questionable. However, it is apparent from the results that whilst infrasound at around 19Hz is unlikely to create the visual field disturbances and thus apparitional encounters suggested by Tandy, it remains one of several possible causal factors in the production of a range of psychophysical experiences that may lead to a number of people

reporting haunting experiences. This large scale experiment forms part of a larger series of field measurements of infrasound, partially funded by a generous grant from the SPR.

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THE WHITEMAN-STEVENSON CORRESPONDENCE ON REINCARNATION

John Poynton

ABSTRACT

A collection of archive material pertaining to the late Professor Michael Whiteman, polymath and honorary member of the SPR, has been sorted, packed and dispatched from his home in Cape Town to the Society by his daughter Sibyl. The material includes lecture notes given to various groups, diaries containing records of out-of-body and mystical experiences, studies of various kinds (e.g. of Freud, Jung, Plotinos, Swedenborg, classical Eastern texts), drafts of papers and book chapters, unpublished material, reviews, five DVD transfers of video recordings of interviews, and correspondence. Whiteman kept most letters written to him together with copies of his replies, providing an invaluable resource not only regarding Whiteman's views but also the views of his correspondents. He did not have email access, so all the material is hand-written or in typescript. Among the 127 correspondents are Bastin, Blackmore, Beloff, Carr, Chari, Crookall, Ducasse, Dale, Ellison, Garrett, Green, Heisenberg, Hart, Heywood, Krippner, Lester Smith, Margenau, Morris, Neppe, Osis, Polkinghorne, H.H. Price, Rogo, Stevenson, Tehhaeff, Thouless, White, and Wolman.

After suitable cataloguing the material will join other SPR archive material held in the Cambridge University Library. I have a substantial amount of material sent by Whiteman to me over some forty years; that which is not duplicated in the material dispatched from Cape Town will join the archive.

This presentation will focus on the correspondence, giving special attention to exchanges with the late Professor Stevenson, since his views in particular are currently being explored. Agreement is shown on a multi-world conception; Stevenson (1986) became "more and more convinced that a further understanding of the existence of two spaces, or perhaps multiple spaces, is necessary for our understanding of the relationship between minds and brains and also for the solution of many problems in parapsychology." Whiteman (1987) stated that "everything hinges for me on the admission of 'other spaces', which I classify along with other kinds of mental control by which one can become 'open' to them or 'enter' them. I was delighted to read that you are coming to a view of this kind." But it seems that Whiteman was only partly correct in this assessment: Stevenson evidently had reservations about an individual being able consciously to enter nonphysical spaces, even though Whiteman believed that out-of-body experience is exactly this.

Given this agreement in multi-world thinking, there nevertheless remained a fundamental difference of opinion between Stevenson and Whiteman over processes involved in reincarnation. An understanding of personality structure, of exactly what it is that reincarnates or survives physical death, seemed crucial to Whiteman, who discerned that physical personality is composite, and that on dissolution after physical death only a fraction of one personality may carry memories into the composition of a new physical personality. What enters a new life may be the core of a past composite personality, or it may be less central, a co-mind. Memories brought in by co-minds he termed 'loose reincarnation' in contrast to 'strict reincarnation' in which the core of one personality re-enters physical life as the core of a new personality. Stevenson wrote in 1963, "So far as the empirical evidence available to me goes, the evidence seems rather to support the beads on a string idea of the theosophists." He evidently saw an earthly personality to be a discrete unit, connected by a discrete link between one incarnation and the next. He did admit "that there are few cases which are not also open to the other idea of a partial incarnation of members of a group. The cases which, it seems to me, can only be explained by strict reincarnation are those in which birthmarks occur... In these birthmark and deformity cases, the link between one personality and another seems quite clear, assuming authenticity for the cases." Whiteman replied that co-minds may constitute the personality of a neonate "almost entirely if the individual in charge is not fully awake, so to speak." Then, "naturally one would expect traumatic events in the life of those co-minds to be manifested in the physical body of the baby."

It seems that Stevenson found Whiteman's account of the great complexities of personality structure and its vicissitudes after physical death to be simply unnecessary, not having had experience of such things; he must have felt he had enough complexity to deal with as it was. On the other hand Whiteman believed the complexities of personality structure to be of cardinal importance because it was a part of his direct experience. He also referred to the claimed direct experience of Swedenborg, also the early Buddhist and Upanishad texts (*contra* theosophists). The extent of personal experience governs almost completely one's view of what counts as legitimate and useful knowledge, and where direct knowledge is lacking, the device

often used is of setting up theoretical entities, which may help to focus thinking. Yet they tend to create a "cloak of ideas", as Husserl put it in his phenomenology, which can compromise clear perception. Stevenson in his last work (2007) did sense a "need to imagine a vehicle for memories between lives", and proposed the term 'psychophore' for this "intermediate vehicle". This is in line with his 'string of beads' idea. Such imaginative theorising is widespread in parapsychology, and in science as a whole. Whiteman was acutely aware of this danger especially in dealing with nonphysical events, and did his best to adhere to phenomenological principles that require definition of terms to be conducted "ostensively in terms of actual observation", not as hypothetical or imaginative entities.

While showing great cordiality, the available correspondence between Stevenson and Whiteman exposes fundamental differences in experience and approach. The minimal impact of Whiteman's views on Stevenson's final work on reincarnation need not then seem surprising.

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PARANORMAL BELIEF AND SUSCEPTIBILITY TO MISPERCEPTIONS OF VISUAL NOISE

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ABSTRACT

Previous studies suggest paranormal believers are especially prone to visual illusions (e.g. Blackmore & Moore, 1994) and to misperceiving randomness (e.g. Brugger, Landis & Regard, 1990). The present study builds upon these separate theories by examining the extent to which believers misperceive objects in random, dynamic visual 'noise'. The impact a paranormal versus non-paranormal context has on these misperceptions was also investigated (cf. Lange & Houran, 2002). An opportunity sample of 120 university students (50% female; age range 18-55 years; M=22.9 years; SD=5.5 years) completed psychometrically sound measures of both paranormal belief (Tobyack, 1988) and visual imagery ability (Marks, 1973). Participants also read a brief vignette in which a hypothetical hospital is described as either a disused psychiatric unit which has featured on several paranormal TV shows (paranormal context) or as a modern cosmetic surgery which has won awards for its technical excellence (non-paranormal context). Having read one of the two vignettes participants then watched three short DVD clips in which artificial smoke gradually disperses to reveal either a woman, a lamp or a blank background (i.e. no object). These were presented in a counterbalanced order. Participants were then asked to report anything they saw in the smoke (visual noise) as soon as they saw it. Thus, the number of objects correctly identified ('hits') and speed of judgements served as two dependent measures.

Several predictions were made. First, paranormal believers were expected to score fewer visual hits than non-believers, especially given the blank/no object condition. Second, believers were also expected to make faster judgements regardless of their accuracy, again particularly when exposed to the blank/no object condition. In other words, believers were expected to falsely 'see' more non-existent objects, more quickly, than non-believers. Third, these biases were expected to be more pronounced when believers were presented with the paranormal context.

A 2 paranormal belief (believer vs. non-believer) x 2 context type (paranormal vs. non-paranormal) x 3 clip type (woman vs. lamp vs. blank) mixed Analysis of Covariance (ANCOVA) - controlling for respondents' visual imagery ability – was performed, with preliminary results offering partial support for hypotheses. As expected, paranormal believers scored fewer visual hits and generally made quicker judgements than non-believers. In addition, participants exposed to the paranormal context scored fewer visual hits than given the non-paranormal context. Finally, (near) significant belief x context interactions were found for both accuracy and time scores. Subsequent post hoc comparisons confirmed (a) that believers exposed to the paranormal context scored fewer hits that believers exposed to the non-paranormal context and (b) that compared to non-believers, believers scored fewer hits and made quicker judgements when exposed to both context types. Findings are discussed in relation to paranormal believers' susceptibility to misperceive, and seek meaning in, random visual noise. It is speculated that such biases may offer a partial explanation for at least some apparitional experiences (cf. Irwin & Watt, 2007). Methodological issues and ideas for future research are also considered.

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NEW LIGHT ON THE "GHOST-WRITTEN" POEMS FROM QUEEN'S HOUSE, CAMBRIDGESHIRE

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ABSTRACT

Around Easter 1971, a significant poltergeist outbreak occurred in the home of the Manning family in Linton, Cambridgeshire. This included raps, smells, apparitions, object teleportations, writing appearing on the walls, and automatic writing by the young Matthew Manning. The writings on the walls amounted to more than 600 signatures and seven short literary passages. Several "identities" were apparently behind the manifestations, with the dominant "source" claiming to be "Robert Webbe", apparently a reference to a previous owner of the house (Robert Webbe, Junior (1686-1736)).

The events were later documented by Matthew Manning in three popular books (1), and a 1994 Proceedings of the SPR (2). The SPR investigation was conducted by Vernon Harrison, an eminent expert on handwriting analysis. Harrison ascribed 85% of the signatures to "Robert Webbe" and none to Matthew Manning.

The seven literary passages varied in length from 5 to 26 words, and were all signed by "Robert Webbe". Harrison could not trace the true origin of any of the passages (which he called "poetic aphorisms"), but considered six of them to be in the handwriting of "Robert Webbe" and one (the "Zeno script") to be in a different one. The Zeno script also showed considerably worse spelling than the other scripts. Both Harrison (and Matthew Manning before him) thought it unlikely that "Robert Webbe" composed these passages.

The broad sentiment contained in the Zeno script was later (1998) traced by Pamela Huby to classical sources (3), but the form of expression was mismatched.

I have recently managed to identify the true authorship of all seven literary passages (including matching the forms). The new information independently supports, in several ways, the idea that the six "Webbe" scripts are related in a way that sets them apart from the Zeno script.

Firstly, the six "Webbe"scripts are all extracts from *poems* by five *English* authors who were all prominent poets, and who lived between 1618 and 1721 (4), i.e. in the period immediately prior to the death of Robert Webbe in 1736. Against this the Zeno script comes from a non-poetic work (an Italian Grammar), by an *Italian* author, not a poet, and dates from 1828, nearly a century after the death of Robert Webbe.

Secondly, the five English authors were all restoration-period Royalists (some with very close connections to the Monarchy), whereas the Italian author lived well after the Civil War.

Thirdly, the meanings of the "Webbe" scripts, when interpreted in the light of the poems they were taken from, is consistent with the attitude and situation of "Robert Webbe" as revealed through the automatic writings of Matthew Manning (5). Such a case cannot readily be made for the Zeno script.

As a further development, the new information about the excerpts' contexts also suggests ways of interpreting them that were not available to Harrison (or Matthew Manning before him). These richer meanings not only add to the interest of the case but also reinforce the survivalist conclusions that Harrison came to in his overall assessment of the case.

Overall the new information supports Harrison's conclusions, both in the attribution of the scripts and in the assessment of the nature of "Robert Webbe". This not only raises the importance of this case as evidence relating to survival, but should also increases our esteem for Harrison as an investigator and handwriting analyst.

NOTES

1. The Link (1974), In the Minds of Millions (1977), The Strangers (1978)
2. Harrison, V. (1994) 'The Signatures on the Walls of Queen's House, Lipton, Cambridgeshire.' Proceedings of the SPR, 58(218).
3. Huby, P. 'Zeno in the Manning Scripts' Journal of the SPR, vol. 63(853) p 48.

4. Four of them are buried in Westminster Abbey. One was Poet Laureate, and one triggered the founding of the Royal Society.
5. This includes awareness (sometimes) of his post-mortem state. Harrison considered "Robert Webbe" to be a self-aware revived fragment of the historical Robert Webbe, and not a sub-personality of Matthew Manning.

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GENETIC STUDY OF ANOMALOUS EXPERIENCES

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ABSTRACT

The parapsychological literature reports few studies about the possible relationship between genotype and spontaneous psi experiences, in spite of the fact that it has been widely demonstrated that genes are a contributing factor to the variability of behavior and psychopathology, as well as to personality and cognitive capacities (e.g. Plomin et al, 1980; Strickberger, 1976). In recent research, Cohn (1999) explored the genetics of subjective psi experiences. She found second sight (a psychic ability that has for centuries been accepted as real in Scotland and other countries) to be hereditary. The assessment was based upon questionnaire and interview material. Specifically, a person was labeled as having second sight if they reported any experiences falling into certain categories, such as having visions of a funeral procession or death shroud; having visions of a person shortly before, at the moment of, or after death; having visions of a person not recognized but later met or precognitive visions which involve sound, light, scent or physical sensation (Cohn, 1999 pp 355). In her sample of 130 families from Scotland second sight may have been associated with a dominant autosomal gene, particularly if the family was small, this means the behavior was related to the inheritance of at least one (of two) gene that always manifests in the behavioral phenotype (i.e. second sight). Nevertheless, Cohn also had some families where second sight seemed to be associated with a recessive autosomal gene, which implies that there must be two identical alleles in the genotype, one from the mother and one from the father, so the second sight will be realized. This hypothesis of the relation between genes and psi is not new. Authors such as Randall (1975) and Levin (1996) have argued both for and against the relevance of genetics to psi phenomena. On the other hand, Johnson (1982) and Lepes (1992, 1994) have tried to demonstrate this relationship empirically, though without clear results.

The aim of our research is to study the possible relationship between spontaneous anomalous experiences and related people's genotypes. In order to achieve this goal we have chosen the segregation analysis technique over nuclear family data (Neel and Schull, 1954). This is a probabilistic method that tests whether an observed family pattern of phenotypes is compatible with an explicit model of inheritance, like dominant autosomal, recessive autosomal, or other. It is also a statistical test to evaluate the hypothesis of a specific pattern of inheritance for a trait.

Our results support the hypothesis of at least one hereditary factor, autosomal and recessive, that contributes to inter-individual psi differences. Also, it is possible that telepathy, clairvoyance, and premonition are different manifestations of the same psi trait. The reasons that support this psi communality are that that these three variables show (1) the highest intercorrelations and (2) the best conformance with the inheritance model.

The recessive autosomal gene hypothesis has two interesting implications: (1) It is possible that a father and mother with no psi experiences might produce offspring who do have psi experiences. (2) If both parents show psi, all their children will as well, because the family lacks the dominant gene that makes psi impossible.

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SPONTANEOUS CASES IN PARAPSYCHOLOGY: AN ANALYSIS OF THE ITALIAN LITERATURE.

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ABSTRACT

It has sometimes been observed that the analysis of spontaneous cases (SCs) could help to design models for psi, define testable hypotheses and construct experiments to be conducted in the laboratory. Some work in this direction has been carried out by Schouten (1979, 1981a,b), who performed a phenomenological analysis of three famous collections of cases: the "Phantasms of the Living", Louisa Rhine's collection and the Sannwald collection. Moreover, he built statistical indicators based on this analysis. As another source of inspiration, we considered Persinger (1974), who used the cases of a popular American magazine to obtain statistical data.

In Italy we don't have "ready-to-use" collections like those used by Schouten, so we decided to start from cases, regarding Italian people, that had been published in newspapers, magazines and books, collect their abstracts and prepare short sheets that would be suitable for statistical analysis. We found that Persinger's format for data sheets was a good starting point, even if in a lot of cases we could not fill all items.

As our sources are not homogeneous, also the quality and richness of data differ greatly from one case to the other. We decided to discard only those that 1) contain so little data that almost all categories could not be scored or 2) could not be defined spontaneous but descriptions of some kind of experiment or 3) did not have any paranormal content in any agreed sense, however strange they could be as human experiences or 4) did not fall in one of a few phenomenological categories, namely: telepathy, clairvoyance, precognition, psychometry, crisis-related (especially death-related) apparitions and other events, PK, RSPK and hauntings.

Among the data we collected, we quote: the kind of phenomenon (dream, apparition, ..., raps, etc.), information about the time and the place of occurrences, characteristics of the subjects involved and their relationships, what were they doing before, during and after the paranormal episode, the kind of content of esp (private/family matters or public/social ones etc.) .

Moreover we considered three more points that are less usual in this kind of analysis, in order to test some specific hypotheses that have been advanced in order to shed light on psi phenomena.

1. Experimental work is often carried out with unselected subjects, that is with people who didn't have any specific paranormal experience before. On the contrary, some authors suggested that successful psi research should employ mainly gifted people; see e.g. Tart (2007) for a clear summary of this concept and its relationship with some open problems in psi research. We asked whether SCs could tell us anything about this point, so we noted how many people said that they never had any psi experience before and how many said it was just an example of a lot that had already occurred to them (so they could be considered "talented" in some psi tasks).
2. Sometimes it has been hypothesized that every psi cognitive experience could be explained in terms of precognition: if nothing else, precognition of the moment when the subject will know that his feelings were correct (e.g. O'Donnel 2007). So we kept track of some data about the confirmation to the subject: if it actually took place, how long after the psi episode, etc.
3. Sometimes it is theorised that psi could be an evolutionary advantage (e.g. in the famous PMIR theory). Although this is in general intended as an unconscious or subliminal mechanism that would direct attention toward useful things and away from harmful ones, we scored SCs according to the extent they were of some usefulness for people that experienced them, so to represent a direct advantage.

This first Italian inquiry on SCs is currently in progress. Some results of statistical analyses and comparisons with other collections, regarding ESP cases, will be presented during the SPR meeting, together with a preliminary discussion of the three new topics listed above.

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THE IMPORTANCE OF SUBJECT FEEDBACK IN ESP EXPERIMENTS

Jon Taylor

ABSTRACT

The meta-analyses carried out on precognition experiments (e.g. Honorton and Ferrari, 1989) provide outstanding evidence for extrasensory contacts with the future. However, problems of repeatability have frequently been encountered in the individual experiments. This paper suggests that the problems may have been due to a fundamental misinterpretation of what the experiments were actually measuring.

In the early days of telepathy experiments, it was found that on removing the "sender", no appreciable change was produced in the results. This led to the assumption that the extrasensory contacts were being made directly with the targets, and not with the sender. The same interpretation was applied to the precognition experiments, in which it was assumed that the contacts were being made directly with the targets generated in the future.

However, the idea of such a "clairvoyant" contact would seem illogical, because an inanimate target cannot collect and encode information about itself in a form that would be directly intelligible to the subject's brain. However, if the subject is allowed to observe the target when it is generated in the future, then he (or she) does possess the information in a suitably encoded form. Thus, all that is required for the extrasensory contact is that the subject's brain, in the present, communicates with itself, in the future.

This interpretation can easily be accommodated within the noncausal theories for ESP, which propose that influences (rather than signals) are propagated through space and time, thus overcoming the problem of "reverse causation" implied in precognition. For example, Bohm's interpretation of quantum mechanics suggests that if similar structures are created at different locations in space and time, the structures "resonate" with a tendency to replicate one another.

The principles can be applied to the neuronal spatiotemporal patterns that are activated in the brain. The subject activates alternative patterns in the present (i.e. at the moment of the trial) until one of them matches the pattern that he will later activate when he receives feedback of the target information. This enables a resonance to occur and the replication effect indicates that the pattern activated in the present is the one that corresponds to the target (Taylor, 2007).

The basic form of extrasensory contact would therefore be that of precognition of the subject's own future knowledge of the target information. Telepathy would require a contact with the brain of the sender, and although this might be possible, such a contact would be far more difficult to obtain. The associations between the neuronal networks activated in the different brains are quite different from one another. A poorer matching and weaker resonance would be produced. This may explain why direct telepathic contacts between sender and subject are probably not being detected under normal laboratory conditions. What might have happened in these experiments is that on some occasions, the subjects later received feedback of the target information, and this would enable them to use precognition to obtain the information at the moment of the trial.

The implications of this proposal are that feedback of the target information may be have to be given to subjects in all ESP experiments, in order for significant results to be produced.

The question of feedback has often been ignored in the past. The reports on some well-known experiments do, however, specifically state that feedback was given, and the experiments produced positive results. Examples are to be found in the Maimonides dream laboratory experiments in telepathy (Ullman et al., 1989) and the automated ganzfeld experiments (Honorton et al., 1990). Subject feedback was also given in the remote viewing experiments carried out at the Stanford Research Institute, by later taking the subjects to the target locations. At the time, however, the significance in the results was attributed to "psi-training" (Targ and Puthoff, 1978).

In fact, the Honorton and Ferrari meta-analysis (1989) includes the study of a sub-set of experiments in which information is provided about the degree of feedback given to the subjects. The study shows that when no feedback is given, the significance of the results falls to chance-expectation.

However, in order to confirm these findings, further experiments are needed in which subject feedback is systematically controlled. If such confirmation is obtained, the "clairvoyant" interpretation can be

eliminated, and ESP research will be simplified considerably. Furthermore, if improved repeatability can be achieved, this should contribute towards a better acceptance of ESP within mainstream science.

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FINDING MEANING IN NEAR-DEATH EXPERIENCES: AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

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ABSTRACT

Near-Death Experiences (NDEs) have been reported by people who are verifiably near-death (e.g. after cardiac arrest) and people who perceive themselves to be near-death (e.g. during traumatic experiences) (Greyson, 2000). They have become a topic of increasing research interest over the last 35 years. The majority of this research has been nomothetic in nature. This approach has provided a wealth of data about how the *average* experient integrates their NDE, modifies their attitudes and values, and undergoes spiritual transformation and growth. However, it has been argued in psychology (e.g. De Waele, 1986; Flick, 2002) that the averaged data obtained from such studies relate only to the average person, if such a person exists. Also missing from this method is the power to specify any detail about the particular nuances of a person's transformative processes. For example, when someone is said to have acquired a *'greater interest in spiritual matters'* after an NDE, what exactly does that mean or entail for them?

Whilst quantitative research work has added substantially to our understanding of the NDE, there remains a need for a closer examination of the longitudinal after-effects experienced by people who have them, the nature of those after-effects, and the temporal, social and psychological factors that may impinge on the integration process, and in particular, the person's sense of self or identity. The present research aimed to address these issues by taking a phenomenological, idiographic approach. To date there has been no in-depth examination of the lived experience of having an NDE and what meaning NDErs attribute to that experience.

In order to gain access and insight to the world of people who have had NDEs a qualitative methodology was adopted using Interpretative Phenomenological Analysis (IPA). Sampling in IPA research is purposive; that is, it seeks the experiences and opinions of the most appropriate persons for the particular research issue being addressed. The intense analysis of individual accounts and the examination of shared meaning, along with any nuances in these meanings, are reflective of the idiographic characteristic of IPA which is generally characterized by small and homogeneous samples (Smith & Osborn, 2003). To meet these requirements, three women were recruited to take part in face-to-face, semi-structured interviews. The interviews were audio recorded, transcribed, and subjected to IPA.

Three interconnected themes emerged when considering participants' NDEs; 1) the NDE in a biographical context, 2) new understandings: the roots of development & growth, and 3) being and becoming: life after near-death.

The analysis showed that life for the experient post-NDE is socially, affectively and psychologically complex. Participant's described a variety of attitudinal and behavioural changes since their NDE, as well as an array of barriers and facilitators to sharing the experience with others. The idiographic, phenomenological stance taken in this research was also instrumental in highlighting the subtle, yet powerful personal, social and spiritual mediating factors that influenced how the NDE was managed and integrated.

By examining the experience and meaning of the NDE, psychologists and health care professionals will be better equipped to understand their clients' experiences and to help them with any potential personality transformations or psycho-spiritual crises that may arise after the event.

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HAVE THE LUNATICS TAKEN OVER THE (HAUNTED) ASYLUM?

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ABSTRACT

Investigation of spontaneous paranormal phenomena including ghosts, apparitions and poltergeists (paranormal investigating), has been undertaken since the late 19th century by private individuals and organisations. At various times throughout the past 120 years, the general public's interest in the paranormal has waxed and waned. During the 1920's and 30's, Harry Price became a nationally recognised figure within the media as a "ghost hunter". Later, in the 1960's and 70's, Peter Underwood and others continued to maintain and cultivate this public demand for ghost investigations.

In the 1990's there was a large resurgence of interest in many aspects of paranormal and supernatural experiences, fuelled by media programs such as Strange But True. A defining factor in these programmes was the seriousness with which the subject was treated, and most programming at this time was fronted by respectable presenters (e.g., Michael Aspel). This coincided with the formation of a small but significant number of amateur paranormal investigation groups throughout the UK whose members wanted to experience for themselves a ghostly encounter.

In 2002 Living TV aired the first series of Most Haunted, which stated it was the first serious televised investigation of spontaneous cases. It has grown through 10 series to become a cult TV show with a large mass following and various spin-off or copycat paranormal shows. A quick scan of the internet reveals more than 500 websites and interactive forums dedicated to discussing the show and its claimed results. The influence of these types of shows on spontaneous case research is frightening.

In recent years, there has been an explosion in the number of ordinary members of the public participating in vigils and other ghost hunting activities. For example, in 1995 there were less than 100 amateur paranormal investigation groups – in 2006 a count using the internet revealed this number to now be in excess of 1200 such groups in the UK alone. Additionally, a number of organisations have been established selling ghost hunting experiences to members of the public. The internet itself must share some of the blame in this explosion – where once one had to study and undertake many years of field investigation to become an "expert" in the field, nowadays with the advent of forums, chatrooms and Wikipedia, everyone has become an instant "expert". At the same time, modern technology has permitted amateur ghost hunters to avail themselves of high tech video recording equipment capable of use in the dark and also more esoteric equipment such as EMF meters and digital thermometers are now readily and cheaply available. For these reasons, ghost hunting has now become, for the first time in over 100 years, a "mass participation hobby". Within Para.Science (formed in 1995), the first two authors have noticed that within the last 4-5 years there has been an unprecedented reduction in the number of spontaneous cases that are reported to us, and furthermore there has been a significant loss of suitable locations in which to conduct spontaneous case investigations. From 1995-2001 we received around 2-3 requests per week for assistance from home owners and factory owners reporting paranormal activity. From 2002 onwards this number has fallen month on month until the present at which time we receive around 1-2 such requests per year. Locations reputed to be haunted which previously could be visited for perhaps a few pounds, are now routinely charging several hundred pounds for a single night visit and annually many more locations are trading on the flimsiest of claimed paranormal associations in order to cash in on this mass frenzy for ghost hunting.

In the current climate, what therefore is the future for serious spontaneous case investigation to continue? We have observed that the expectations of both client and investigator have changed dramatically in recent years. Clients now expect and are indeed disappointed, if an investigation does not immediately include the use of a medium or sensitive. Investigators, armed with the latest gadgets, now fully expect to capture "scientific evidence" of paranormal encounters. The use of equipment has become perhaps one of the most contentious issues within contemporary paranormal investigation, one example being the use of a basic EMF meter as a "ghost detector" and also, the advent of new paranormal phenomena such as the "orb", which has

only come about following the widespread introduction of digital still photography. Whilst both of the previous assumptions have been demonstrated on a number of occasions to be misguided (Persinger 2000, Para.Science 2004), the widespread dissemination of these ideas throughout both the amateur investigation groups and more generally, the public, continue unabated.

It would now appear that spontaneous case investigation undertaken in a scientific manner and with serious aims of trying to understand more about the mechanisms and processes by which such encounters may be generated, are at serious risk of being permanently and irrevocably undermined by this new wave of pseudoscientific, amateur thrill seekers whose primary intention might be more accurately described as wanting to spend a scary night in a spooky building. This trend, which shows no sign of abating, must be a serious concern to established organisations such as the SPR and serious researchers, who increasingly are finding that they are unable to find suitable cases for their research and study. Moreover, the ethical considerations and implications of this large number of amateur groups must be of great concern to those of us who are committed to undertaking genuine research. We have encountered several cases in recent years where the home owners claiming originally quite minor paranormal disturbances have, following a visit from the local ghostbusters, become greatly disturbed by the applied quasi-scientific and sometimes near occult practices employed by some. In one case in which all authors were directly involved, this ultimately led to both experiences requiring external professional counselling and a move of house following the many lurid and disturbing phantoms that they were told were infesting their property. Perhaps the time has come for those of us both in academic fields such as parapsychology and groups aimed at conducting serious spontaneous case investigation to unite and call for some form of regulation and the implementation of ethical and scientific considerations to this area of study. Despite all of the problems that currently exist, the field remains a worthy and worthwhile area of research that perhaps, if appropriate steps can be taken, could answer the many interesting questions relating to the productions of ghosts, apparitions, poltergeists and even survival of bodily death.

The authors will expand on these topics and discuss possible solutions to the problems facing spontaneous case research today.

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