The Parapsychological Association

46th Annual Convention

Proceedings of Presented Papers

Program Chair:

Stuart Wilson, PhD.
Queen Margaret University College, Edinburgh

August 2-4 2003
Metropolitan Hotel
Vancouver, Canada

Feather

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Acknowledgements

It was an unexpected, but welcome, honour to be asked to act as Program Chair for this convention. Although slightly smaller than some previous conventions, the program for 2003 contains many interesting and innovative papers.

As always, there are a number of people who have helped me throughout, and I would like to take this opportunity to thank them.

Firstly, I am grateful to my Program Committee, all of whom kindly gave up their time to act as referees, and all of whom made my life easier through their diligence. I must also thank the special advisors Ciaran O'Keefe, Carl Williams and Douglas M. Stokes, who assisted me when the need arose, often at very short notice.

My thanks also go to Caroline Watt, Nancy Zingrone and Carlos Alvarado, who patiently answered all of my (sometimes naïve) questions, and helped me as much as they possibly could.

I must also thank the Psychology Department at Queen Margaret University College, Edinburgh, who allowed me the time I needed to organise this year's program.

The arrangements committee also deserve a special mention for all their hard work, so thanks to Murphy F. Knipe

Finally, thanks to all the researchers who submitted papers. It is your invaluable contributions that promise to make this years convention a great success.

Stuart Wilson, Program Chair.

PROGRAM

FRIDAY AUGUST 1ST, 2003

19:00 to 21:00 Early Check-in/Advance Registration

SATURDAY, AUGUST 2ND, 2003

08:00 on: **Breakfast/Registration**

9.00 Opening Remarks (Carlos Alvarado, Stuart Wilson)

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Ganzfeld and non- Ganzfeld: Testing the efficiency of the technique in itself and in relation to the other psi conductive factors in an exploratory research

9.35 –10.05 Robert Morris*, Jill Summers and Stephanie Yim
Evidence of anomalous information transfer with a creative population in ganzfeld stimulation

10.05-10.35 Chris A. Roe, Simon J. Sherwood*and Nicola J. Holt
Interpersonal psi: Exploring the role of the sender in Ganzfeld GESP tasks

10.35 – 11.05 Coffee Break

11.05 Psi and the Brain

11.05-11.35 Dean I. Radin
EEG correlations between isolated human subjects

11.35 – 12.05 Vernon M. Neppe
Parapsychological approaches to interpreting anomalous brain function and subjective paranormal experience: The out-of-body experience as an example.

12.05 – 13.50 Lunch Break

13.50 Psychological Factors

13.50-14.20 Joop M. Houtkooper
A forced-choice ESP experiment with natural and simulated sferics: Displacement scores and psychological variables

14.20-14.50 Ruth Reinsel
Dissociation and Mental Health in Mediums and Sensitives: A Pilot Survey

14.50-15.20 Coffee Break

15.20-16.05 Invited Address
Peter Suedfeld
Some Effects of Profound Stimulus Reduction on Thinking, Emotion, Health, and Behaviour

16.05-16.50 Presidential Address
Carlos S. Alvarado

20.00 – 23.00 Presidential Reception

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9.10-9.20	John Palmer
9.20-9.30	Robert L. Morris
9.30-9.40	Rosemary Pilkington
9.40-9.50	Stanley Krippner
9.50-10.00	Discussion

10.00 Research Briefs I

10.00-10.10 Carlos S. Alvarado and Nancy L. Zingrone
Interrelationships of Psychic Experiences, Dream Recall and Lucid Dreams in a Survey with Spanish Participants

10.10-10.20 John Palmer*, Colleen Rae, Robert L. Bourgeois, Maggie Blackman, Lynette Minnich, Sally R. Feather and Robert L Morris.
A controlled study of intuitive medical assessment

10.20-10.30 Discussion

10.30-11.00 Coffee Break

11.00 Qualitative Methodologies

11.00-12.00 Robin Wooffitt
Conversation analysis and parapsychology: experimenter-subject interaction in ganzfeld experiments

12.00-12.30 Robin Wooffitt
The organization of demonstrations of paranormal cognition in psychic-sitter interaction

12.00-13.30 Lunch Break

13.30 Theoretical / Philosophical Issues.

13.30-14.00 Chris A. Roe* Russell Davey and Paul Stevens
Are ESP and PK aspects of a unitary phenomenon? A further test of the relationship between ESP and PK

14.00-14.30 Evan Harris Walker
Dualism, Causal Loops in Time, and the Quantum Observer Theory of Paraphysical Phenomena

14.30-15.00 Fiona Steinkamp
Telepathy: Or, how do I know that this thought is mine?

15.00-15.30 Coffee Break

15.30 Research in Non-Western cultures

15.30-16.00 Hoyt Edge*, Luh Ketut Suryani, Niko Tiliopoulos and Robert Morris
A DMILS Study in aNon-EuroAmerican Culture

16.00 Research Briefs II

16.00-16.10 Dick J. Bierman and Evan Harris Walker*
Consciousness collapse of the state vector as direct support for the quantum observational theory

16.10-16.20 Hideyuki Kokubo*and Mikio Yamamoto
Tomiki-cho Incident - Analysis of Electromagnetic Data for a Poltergeist Incident in Japan

16.20-16.30 Jody A. Long
Dreams, Near-Death Experiences, and Reality

16.30-16.50 Discussion

18.00-22.00 Banquet

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19.35-19.50 PA awards
19.50-20.00 Banquet Speaker Introduction
20.00-20.50 Banquet Speaker - Dr. Antonia Mills

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9.10-9.20 Human Personality and Its Survival of Bodily Death: An Overview (Jeffrey Mishlove)

9.20-9.30 The Reception of Human Personality and Its Survival of Bodily Death (Nancy L. Zingrone and Carlos S. Alvarado)

9.30-9.40 Myers and Modern Parapsychology (John Palmer)
9.40-9.50 F.W.H. Myers and the Future of Psychology (Robert L. Morris)

9.50-10.00 Discussion

10.00-10.30 Coffee Break

10.30 Intuition and Practical Psi

10.30-11.00 Robert L. Bourgeois & John Palmer*
Is intuition an example of practical ESP? Further explorations of a tool for identifying intuitive talent for practical decision making.

11.00-11.30 Christian J. Hallman
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14.00-14.30	Fiona Steinkamp *Does Precognition Foresee the Future? Series 5: A Laboratory Replication. Series 6: A WWW Replication.*
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Precognitive Habituation: Replicable Evidence for a Process of Anomalous Cognition

Daryl J. Bem

Cornell University

Abstract

Precognitive Habituation (PH) is a phenomenon that has emerged from a search for a straightforward laboratory demonstration of psi that could: (a) be observed using participants from the general population; (b) be conducted with no instrumentation beyond a desktop computer; (c) be evaluated by simple statistical tests; and, (d) be replicated by any competent experimenter—including a skeptical one.

The PH procedure is based on a well established psychological phenomenon known as the Mere Exposure Effect: Across a wide range of contexts, the more frequently humans or other animals are exposed to a particular stimulus, the more they come to like it.

The PH procedure tests for precognition by, in effect, running a Mere Exposure study backwards. Instead of exposing a participant to repeated exposures of a stimulus and then assessing his or her liking for it, the PH procedure reverses the sequence: On each trial, the participant is first shown a pair of photographs on a computer screen and asked to indicate which picture he or she prefers. The computer then randomly selects one of the two pictures to serve as the "habituation target" and displays it subliminally several times. If the participant prefers the picture subsequently designated as the target, the trial is defined as a "hit." Accordingly, the hit rate expected by chance is 50%.

The PH hypothesis is that the repeated exposures of the target can reach back in time to diminish the arousal it would otherwise produce, thereby rendering negatively arousing targets less negative and positively arousing targets less positive. Because the two pictures in each pair are matched for valence and arousal, participants are predicted to prefer the target-to-be on trials with negatively arousing pictures but the non-target on trials with positively arousing pictures (erotic pictures). Preferences on trials with non-arousing ("low-affect") pictures were not expected to differ from chance.

To date, more than 400 men and women have participated in 9 variations of the PH experiment, including an independent replication by a skeptical investigator. Collectively the studies provide strong support for the two predicted effects. Across the six basic studies, the hit rate was significantly above 50% on negative trials (52.6%, $t(259) = 3.17$, $p = .0008$) and significantly below 50% on erotic trials (48.0%, $t(149) = -1.88$, $p = .031$).

When targets were exposed supraliminally, the PH effect was replicated on negative targets but not on erotic ones. Supraliminal exposures also made the experiment more aversive and triggered conscious cognitive processing.

When the number of target exposures on each trial increased beyond 8, participants significantly preferred the non-target picture on the low-affect trials. This serendipitous finding appears to reflect "precognitive boredom." Like a too frequent TV commercial, the repeated exposures (precognitively) render the target boring, or even aversive, and hence less attractive than its matched non-target. Individuals scoring above the median on either Absorption or Openness to Experience show the precognitive boredom effect.

The holy grail for many psi researchers has long been a straightforward, transparent laboratory demonstration of psi that could be replicated by any competent experimenter—including a skeptical one—using participants drawn from the general population. Discovering such a replicable psi effect and developing a protocol for demonstrating it was the primary goal of the research program described in this article. As a further inducement to replication, I sought to develop a procedure that would require no instrumentation beyond a desktop computer, would take no more than 20 minutes to complete, and could be analyzed with statistics no more complex than a t test across subjects or a binomial test across binary choices. The result of this effort is the Precognitive Habituation (PH) effect.

Many psi researchers have advocated the use of physiological or implicit response measures on the grounds that psi probably operates at an unconscious level, and researchers in cognitive and social psychology have recently developed several implicit measures of cognitive and affective functioning that can be adapted for exploring psi. The Precognitive Habituation procedure uses an indirect measure of psi performance that derives from a well-established phenomenon known as the Mere Exposure (ME) Effect.

The Mere Exposure Effect

Across a wide range of contexts, the more frequently humans or other animals are exposed to a particular stimulus, the more they come to like it. This robust psychological phenomenon has been known for over a century, but it was the 1968 publication of Zajonc's monograph, "Attitudinal Effects of Mere Exposure," that spurred its intensive empirical investigation. By 1987, more than 200 experimental studies of the effect had been published.

The ME effect is very general. For example, after rats were exposed to musical selections by either Mozart or Schönberg, they showed a preference for new selections by the composer with whom they had become familiar. When tones of two different frequencies were played to two sets of fertile chicken eggs, the hatched chicks preferred the tones they had heard prenatally (Rajecki, 1974).

In human studies, individuals exposed differing numbers of times to irregular polygons, nonsense words, Chinese ideographs, photographs of faces, or real people came to like better those to which they had been exposed more frequently; that is, liking was a positively increasing function of exposure frequency. A meta-analysis of 208 such studies by Bornstein (1989) yielded a combined effect size (r) of .26, with a combined z of 20.80 ($p < .0000001$).

Zajonc (2001) has proposed that the ME effect reflects a form of classical conditioning that occurs when a novel stimulus is encountered repeatedly in the absence of aversive consequences; it is that absence which plays the role of the unconditioned stimulus. I prefer to interpret the effect as simply reflecting the extinction or habituation of negative arousal that an unfamiliar stimulus would be likely to elicit. Either explanation, however, suggests that the effect would be most likely to occur with stimuli that are negatively valenced and highly arousing. Thus it is puzzling that ME studies typically use affectively neutral stimuli such as polygons or nonsense words. From the few studies that used mildly negative or mildly positive stimuli, Bornstein (1989) concluded that the ME effect is not a function of stimulus valence. There are, however, no studies that have used strongly valenced or highly arousing stimuli, precisely the kinds of stimuli that are hypothesized to be important for the precognitive habituation effect.

One of the conclusions emerging from the meta-analysis is that the ME effect is stronger when the stimuli are exposed subliminally, that is, at such short exposure times that they cannot be identified. This is interpreted as showing that the ME effect works at an unconscious level and that conscious cognitive processes actually interfere with the primitive affective process presumably responsible for the effect.

The idea of using the ME effect as a vehicle for testing psi was first conceived by Moulton (2000) in an undergraduate honors thesis at Harvard. Using a procedure designed to test for telepathy between a sender and receiver, Moulton showed the sender 10 irregular polygons with the instruction to try transmitting them to the remote receiver who was undergoing ganzfeld stimulation, a form of reduced sensory input. After the 30-minute sending period, the receiver was shown ten pairs of polygons in which one polygon of each pair was one that had been seen by the sender. The receiver was asked to indicate which of the two polygons he or she liked better. As predicted, receivers significantly preferred the polygons seen by the sender.

The Precognitive Habituation Procedure

The Precognitive Habituation procedure tests for precognition by, in effect, running a Mere Exposure study backwards. Instead of exposing a participant to repeated exposures of a stimulus and then assessing his or her liking for it, the PH procedure reverses the sequence: On each trial, the participant is first shown a pair of photographs on a computer screen and asked to indicate which picture he or she prefers. The computer then randomly selects one of the two pictures to serve as the "habituation target" and displays it subliminally several times. If the participant prefers the picture subsequently designated as the target, the trial is defined as a "hit." Accordingly, the hit rate expected by chance is 50%.

The Precognitive Habituation hypothesis is that the repeated exposures of the target can reach back in time to diminish the arousal it would otherwise produce, thereby rendering negatively arousing targets less negative and positively arousing targets less positive. Because the two pictures in each pair are matched for valence and arousal, participants are predicted to prefer the target-to-be on trials with negatively arousing pictures but the non-target on trials with positively arousing pictures (erotic pictures). Preferences on trials with non-arousing ("low-affect") pictures were not expected to differ from chance.

These predictions are consistent with a recent demonstration that individuals subliminally exposed to extremely positive and extremely negative words subsequently rate those words as less extreme than words that had not been presented, an effect that was replicated using an implicit measure of liking (Dijksterhuis & Smith, 2002).

The precognitive habituation effect also complements the "presentiment" effect recently reported by Bierman and Radin (Bierman & Radin, 1997; Radin, 1997). In their studies, participants show an anticipatory electrodermal response just prior to the presentation of negatively arousing or erotic pictures but not prior to the presentation of neutral or low arousing pictures. If the PH effect reflects the precognitive extinction of arousal, then we can think of the presentiment effect as the precognitive elicitation of arousal. One advantage of the PH procedure is that it makes opposite predictions for the two kinds of stimuli, whereas the presentiment procedure does not.

This article reports eight PH experiments done in my psi laboratory at Cornell University and one external replication by a skeptical investigator. Additional external replications are currently in progress.

Method

Overall Experimental Procedure

During the course of this project, several variations of the experiment were explored. The separate studies differed primarily in the exact instructions given the participant, the number of trials of different types (negative, erotic, and low-affect or "control" trials), the number of exposures of the target, and the specific pictures used. Except where noted, all the experiments used the following general procedure.

Upon entering the laboratory, the participant was told:

> In this experiment, we are interested in measuring emotional reactions to a wide variety of visual images in a procedure that tests for ESP (Extrasensory Perception). The experiment is run completely by a computer and takes about 20–25 minutes.
>
> Each trial of the experiment involves a pair of pictures. First you will be shown the two pictures side by side and asked to indicate which one you like better. You will then be asked to watch passively as those pictures are flashed rapidly on the screen. The way in which this procedure tests for ESP will be explained at the end of the session.
>
> Most of the pictures range from very pleasant to mildly unpleasant, but in order to investigate a wide range of emotional content, some of the pictures contain very unpleasant images (e.g., snakes and bodily injuries), and some contain nonviolent but explicit sexual content (e.g., couples engaged in explicit sexual activity).

The participant then signed a consent form which repeated the warning about the nature of the stimuli. Next, the experimenter seated the participant in front of the computer and withdrew from the cubicle. The cubicle was dimly lit by a floor lamp positioned so that there were no reflections on the computer screen. Overhead fluorescent lights were turned off.

The computer program then proceeded to administer the procedure as outlined above, displaying a pair of pictures on each trial, recording the participant's preference (indicated by pressing one of two keys on the computer keyboard), and then subliminally displaying the randomly selected target several times. At the end of the session, the computer displayed the percent of hits achieved on the different types of trials, and the experimenter interpreted this feedback as part of the post-experiment explanation of the study.

Experimental Materials

The pictures used in the studies 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. For the PH studies, the pictures were divided into six categories defined by crossing 3 levels of valence (negative, neutral, positive) with 2 levels of arousal (low, high). The negative pictures were drawn from the negative/high arousal category. Although some of the erotic pictures were drawn from the positive/high arousal category, the erotic pictures in the IAPS are quite mild. Accordingly, we supplemented them with more graphic erotic pictures downloaded from the Internet. The remaining pictures were drawn from the other categories of pictures and are henceforth referred to as the low-affect pictures. The pictures in each pair were matched for valence and arousal using the ratings supplied with the IAPS set; they were also matched for content. As the experimental program proceeded, we were increasingly able to match the pictures within pairs for their popularity as well.

In most of the PH studies, the targets were exposed subliminally. To qualify as subliminal, a stimulus must normally be flashed with an exposure time of approximately 4 milliseconds. This is not easily achieved on a computer screen, however, because the screen itself is refreshed much more slowly (1/60 second or about 17 ms on slower monitors). Unless the exposure is synchronized with the screen refresh—a difficult programming task—it may not appear on the screen at all.

There are two common strategies for overcoming this problem: Backward masking and parafoveal exposure. In backward masking, a masking stimulus is flashed immediately after the image appears, effectively "erasing" the image from the retina. In parafoveal exposure, the participant focuses on a spot in the center of the screen while the images are presented randomly on either the left or the right side of the screen (and, hence, to the side of the fovea). Using both these procedures, we were able to expose the images for 17 ms without the participant's being able to identify them more than occasionally.

It should be noted, however, that the validity of the PH effect as a psi phenomenon is not jeopardized by the possibility that participants might be able to identify the target because the computer does not select it until after the participant makes the preference judgment. In fact, experimental Series 300, reported below, used clearly identifiable exposures of 500 ms duration.

Randomization

For the studies described in this article, the pseudo random number generator (PRNG) contained within the programming language (True BASIC) was used to select the picture pair for each trial, the left/right placement of the two pictures, the picture to be the target, and the left/right placement of each subliminal exposure.

Such PRNG's are not very good, however, and they fail many of the mathematical tests used to assess the randomness of a set of numbers (L'Ecuyer, 2001). Fortunately, most PRNG's do an adequate job of producing equal frequencies of 0's and 1's for binary decisions of the kind required by the PH protocol. Moreover, it is easy to inspect the data themselves to check these frequencies—and we did: In all the studies reported in this article, neither the selection of the target pictures nor their left/right placements on the screen departed significantly from chance.

A more subtle possibility is that a flawed PRNG might produce recurring patterns within a run of numbers. This could create corresponding patterns in the left/right placement of the target that might coincide with a participant's pre-existing biases (e.g., excessive alternations of left/right placement). This problem is avoided in the PH procedure because successive decisions of the same kind are not made by successive calls to the PRNG. For example, between successive selections of a target or picture placement, the PRNG is called upon to select the picture pair for the trial. Because it does this by repeatedly generating random numbers until an unused pair is located, the number of intervening calls to the PRNG varies from trial to trial, thereby destroying any systematic patterns that might be generated by the PRNG itself.

Nevertheless, we have now replaced the internal PRNG with an algorithm proposed by PRNG expert George Marsaglia in a post to the mailing list *sci.stat.math* on September 29, 1997. The algorithm passes Marsaglia's own famous "Die-Hard Battery" of tests for randomness, considered to be the most rigorous suite of tests currently available. Most known PRNG's and even many genuine hardware-based RNG's fail one or more of the Die-Hard tests.

Response Measures and Individual Difference Variables

The major dependent variable of a PH study is the percent of times a participant selects the habituation target for each type of trial. The program also records trial-by-trial data, including the identity of the target, its left/right placement, the left/right position of the participant's preferred picture, and his or her response time.

We also explored several individual difference variables, both to learn more about the PH effect by discovering its psychological correlates and, more pragmatically, to develop a screening test that could be used to select potentially successful participants.

All potential participants filled out a questionnaire in their classes at the beginning of the academic semester or filled it out online from their home computers. Any participant who arrived at the laboratory without having taken the questionnaire filled it out at the beginning of the session on the computer that administered the experiment.

The questionnaire assessed variables found in previous research to predict psi performance: Belief in ESP, prior ESP experiences, practice in meditation or other disciplines requiring an internal focus of attention, and whether the individual was a serious musician. Because the experiment involved affective responses to negatively arousing pictures, all potential participants also rated themselves on the following two questions: "In general, how intense are your emotional reactions to movies, videos, or photographs that are violent, scary, or gruesome?" and "In general, to what degree are you aware of, attuned to, or in touch with your emotional reactions to images that are violent, scary, or gruesome?" Responses could range from 1, "*Not at all Intense[Aware],*" to 5, "*Very Intense[Aware].*" For purposes of analysis, anybody who scored above the midpoint on both scales was defined as "Negatively Reactive"; all others were defined as "Negatively Nonreactive." Other individual difference measures explored in the course of the program are discussed below.

Transparency and Security

One goal of the research program was a procedure that could overcome the major obstacle to replication in psi: experimenter effects. For this reason, the role of the experimenter is deliberately minimized in the PH procedure, and it is hoped that the effect might be relatively independent of the investigator's attitudes toward psi. At the least, it is hoped that even skeptics will be able to satisfy themselves that the protocol is free of artifacts.

To this end, every effort has been made to make the computer program as transparent and as accessible to inspection as possible. First, it has been written in BASIC and is extensively documented so that even investigators with little or no programming experience can read the source code and understand what the computer is doing at each step. In particular they can confirm that the program does not "peek" at the participant's preferences before selecting the target and that it is recording hits and misses correctly.

The integrity of the program can also be checked in vivo by running a test session with the masking stimulus turned off. This permits the investigator to see the target on every trial, to record the data by hand, and to compare the handwritten record with the program output. As an additional control, entering a systematic or random pattern of responses should produce no psi effects.

The computer in Cornell's psi laboratory is networked to both my home and office computers. As soon as a session was completed, the output file was uploaded to my personal computers, thus preventing any tampering with the output by participants or experimenters. For purposes of external replication, the primary data are recorded in the output file in both plain and encrypted form, thereby providing security against anyone's altering the data prior to sending me the raw output files. (The encryption formula does not appear in the source-code listing.)

Participants and Experimenters

Virtually all the participants were volunteers recruited from psychology courses at Cornell University. They either received $5 or credit in their courses for participating. Although we explicitly informed them that they were participating in a study of ESP, there is nothing in the experimental protocol that requires participants to know this. It can simply be presented as a "picture preference test designed to explore unconscious visual processes."

The experimental sessions were conducted by 12 different undergraduate research assistants. This was a deliberate strategy and not just a matter of convenience and cheap labor costs. As mentioned above, the goal was to design a protocol that could be successfully replicated by a variety of experimenters, not just veteran psi researchers with pro-psi beliefs and "golden hands." Secondarily, it seemed likely that undergraduate participants might be more comfortable viewing erotic materials if the experimenters were their peers.

Experimental Series 100

The first experimental series consisted of three experiments. The first, Experiment 101, was designed to see if the PH procedure would yield a significant psi effect on any kind of target. Accordingly, the 6 kinds of picture pairs composed by crossing 3 levels of valence (negative, neutral, positive) with 2 levels of arousal (low, high) were equally represented across the 48 trials of the session, 8 of each kind. (No erotic pictures were included in this study.) On each trial, there were 4 subliminal presentations of the target at 1-second intervals. The number of participants was preset at 50; 34 female and 16 male Cornell students participated.

Results

The results were clear cut: Only the negative/high arousal pictures produced a significant psi effect, with an overall hit rate of 55.2% ($t(49) = 2.41$, $p = .010$, two-tailed). This was also significantly higher than the chance hit rate observed on the 5 other valence/arousal categories (49.8%, $t_{\mathrm{diff}}(49)= 2.28$, $p = .027$, two-tailed). After the fact, then, this experiment can be conceptualized as comprising 8 negative trials and 40 low-affect ("control") trials.

These results are consistent with those from the "presentiment" studies, cited above, in which participants show an anticipatory electrodermal response just prior to the presentation of negatively arousing pictures from the IAPS set but not prior to neutral pictures (Bierman & Radin, 1997; Radin, 1997). The finding also makes sense from an evolutionary perspective because the ability to anticipate danger would be distinctively advantageous for survival.

The absence of a PH effect on the low-affect pictures is not necessarily inconsistent with the fact that the Mere Exposure effect routinely occurs with neutral, non-arousing stimuli. Bornstein's meta-analysis (1989) reveals that ME effects occur only when there is a time interval of at least several minutes between the exposures and the preference judgments. In the PH procedure, the two events occur together within the same trial and are separated by only a few seconds.

Experiments 102 ($n = 60$) and 103 ($n = 50$) were designed both to replicate Experiment 101 and to try out variations in stimulus pairs, instructions to participants, and experimental procedures. Each session in Experiment 102 comprised 60 trials: 15 negative and 45 low-affect trials. Experiment 103 was the first to include erotic pictures; each session comprised 16 negative, 16 erotic, and 16 low-affect trials. Different erotic pictures were used for men and women under the assumption that men would require more graphically explicit pictures than the women. Also in Experiment 103, the number of subliminal target exposures was increased from 4 to 6.

Collectively, the three studies included 107 women and 53 men participants. As predicted, the hit rate for negative trials was significantly above 50% (53.0%, $t(159) = 2.86$, $p = .002$, one-tailed), and the hit rate for erotic trials was significantly below 50% (47.1%, $t(49) = -1.88$, $p = .033$, one-tailed). The hit rate on low-affect trials did not differ from chance (50.3%, $t(159) = 0.42$, *ns*).

Sex Differences and Individual Differences

There were strong sex differences in the first three studies. In fact, the psi effects were due entirely to the women: Their hit rate for negative trials was 53.8% , $t(106) = 3.23$, $p = .0008$, one-tailed, and their hit rate for erotic trials was 45.9% $t(34) = -2.20$, $p = .017$, one-tailed. The hit rates for the men were at chance level for both negative trials (51.4%, $t(52) = 0.65$, *ns*) and erotic trials (50.0%, $t(14) = 0.00$, *ns*).

Because the psi literature does not reveal any systematic sex differences in psi ability, this finding is probably due to the fact that the men were less aroused by both the negative and erotic pictures than the women. The ratings supplied with the IAPS pictures reveal that male raters rated every one of the negative pictures in the set as less negative and less arousing than did female raters. Also, a recent fMRI study using IAPS pictures found that men had significantly fewer brain regions than women where activation correlated with concurrent ratings of their emotional experience (Canli, Desmond, Zhao, & Gabrieli, 2002).

The clinching argument for this interpretation, however, comes from our Negative Reactivity measure. Of the 53 men who participated in Series 100, 16 were defined as Negatively Reactive by our 2-item scale. Despite their small numbers, this subsample of male participants achieved significant psi performance on the negative trials (59.2%, $t(15) = 2.78$, $p = .007$, one-tailed). Table 1 displays the hit rates on the negative trials as a function of Negative Reactivity and sex. As can be seen, only negatively reactive participants achieve a significant psi effect on the negative trials. The Table also shows that a higher proportion of women than men are classified as negatively reactive.

Table 1Series 100: Hit Rates on Negative Trials as a Function of Negative Reactivity and Sex (Chance Expectation is 50%)

	Negatively Reactive			**Negatively Nonreactive**		
Trial Type	**Women** ($n = 62$)	**Men** ($n = 16$)	**Combined** ($n = 78$)	**Women** ($n = 42$)	**Men** ($n = 33$)	**Combined** ($n = 75$)
Negative	**55.1****	**59.2***	**55.9*****	**51.6**	**50.0**	**50.9**
Low Affect	**50.4**	**51.0**	**50.6**	**49.1**	**52.4**	**50.6**

Note. Negative Reactivity scores were not available for 3 women and 4 men. Significance levels are one-tailed and are based on one-sample t tests across subjects.
$*p < .01$. $**p < .001$. $***p < .0001$.

Experimental Series 200

Series 200 (Experiments 201, 202, and 203) was undertaken to see if we could strengthen the PH effect—especially for male participants. First, we continued to increase the number of target exposures per trial, to 8 in Experiments 201 and 202, and then to 10 in Experiment 203.

Second, we rematched pictures on the basis of the preference data obtained in Series 100 to better balance the popularity of the two pictures within each pair. In a few cases, new pictures from the IAPS set were substituted. In Experiments 202 and 203, we composed different sets of pictures for men and women, selecting more gruesome negative pictures for the men in an attempt to elicit more arousal. Two additional sets of erotic pictures were also added so that men could choose the option of seeing male-male erotic pictures and women could choose the option of seeing female-female erotic pictures.

Third, we constructed an Erotic Reactivity scale to parallel the Negative Reactivity scale by adapting two relevant items from the Sensation Seeking Scale (Zuckerman, 1974): "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." Participants who endorsed both statements were defined as Erotically Reactive; all others were defined as Erotically Nonreactive.

Finally, we attempted to increase the proportion of men who participated. Because fewer men than women enroll in psychology courses, this required active recruitment and selection. The number of participants for the entire series was preset at 100; 52 women and 48 men participated. Unfortunately, however, only 6 of the men turned out to be negatively reactive.

Results

Table 2a shows that the patterns found for the negative trials in Series 100 were successfully replicated in Series 200. Table 2b shows that Erotic Reactivity successfully predicts psi performance on erotic trials in the same way that Negative Reactivity predicts performance on negative trials.

Table 2a: Series 200: Hit Rates on Negative Trials as a Function of Negative Reactivity and Sex (Chance Expectation is 50%)

	Negatively Reactive			**Negatively Nonreactive**		
Trial Type	**Women** (n = 32)	**Men** (n = 6)	**Combined** (n = 38)	**Women** (n = 20)	**Men** (n = 42)	**Combined** (n = 62)
Negative	**54.3***	**58.8***	**55.0***	**45.5**	**52.1**	**50.0**
Low Affect	**47.9**	**49.4**	**48.1**	**51.3**	**47.4**	**48.7**

Note. Significance levels are one-tailed and are based on one-sample t tests across subjects. *$p < .05$.

Table 2b: Series 200: Hit Rates on Erotic Trials as a Function of Erotic Reactivity and Sex (Chance Expectation is 50%)

	Erotically Reactive			Erotically Nonreactive		
Trial Type	Women (n = 16)	Men (n = 16)	Combined (n = 32)	Women (n = 36)	Men (n = 32)	Combined (n = 68)
Erotic	**40.8%****	**44.8***	**42.8*****	**50.9**	**51.5**	**51.2**
Low Affect	**52.9**	**45.5**	**49.6**	**47.6**	**48.1**	**47.8**

Note. Significance levels are one-tailed and are based on one-sample t tests across subjects.
$^*p < .05$. $^{**}p < .005$. $^{***}p < .001$.

In sum, both of the predicted PH effects appear to be real and replicable. Across all six studies of Series 100 and 200, the hit rate is significantly above 50% on negative trials (52.6%, $t(259) = 3.17$, $p = .0008$) and significantly below 50% on erotic trials (48.0%, $t(149) = -1.88$, $p = .031$). Low-affect trials do not differ from chance. These results also imply that researchers seeking to replicate the PH effect can save time and effort by screening out nonreactive individuals ahead of time.

Series 300: Supraliminal Exposures

As noted in the introduction, the Mere Exposure Effect is strongest when the stimuli are presented subliminally, implying that the effect operates at an unconscious level. Accordingly, I decided to use subliminal exposures for the PH procedure. Series 300 was designed to see if supraliminal exposures would also produce the PH effects.

Series 300 included 62 participants in 2 experiments using supraliminal exposures (500 ms at interstimulus intervals of 500 ms), where the number of exposures was either 12 or 15. The results affirmed the original wisdom of using subliminal exposures. First, there was no psi effect on the erotic trials, even for erotically reactive participants. More importantly, however, supraliminal exposures produced two unanticipated consequences.

First, because supraliminal exposures provide explicit trial-by-trial feedback, it changed the nature of the task. Participants became involved in anticipating which picture would appear; for some, it even became an explicit "ESP" challenge to guess the target. In short, supraliminal exposures triggered conscious cognitive processing, undermining the very rationale for using an indirect implicit response measure of psi in the first place.

Second, supraliminal exposures made the experiment much more aversive, especially for the negatively reactive women. The research assistants began to pick up clues that some of the women were closing or averting their eyes when the more gruesome negative pictures were being flashed. This showed up in the data as a reversal of the relationship of psi performance to Negative Reactivity: Negatively reactive women now scored at chance level on the negative trials (49.3%,

$t(19) = -0.28$, *ns*), but negatively nonreactive women showed a strong PH effect, 56.3%, $t(17) = 2.52$, $p = .022$, two-tailed. The difference between them approaches significance ($t_{diff}(36) = 1.90$, $p = .07$, two-tailed).

At this point, I asked a skeptical colleague at Williams College, Professor Kenneth Savitsky, to try replicating the PH effect using supraliminal exposures. But I made two critical changes: First, the on-screen directions explicitly instructed the participant to "keep your eyes on the picture as it is flashed—even if it is one of the unpleasant pictures." Second, participants were given the option of participating in the study without the negative pictures. (There were no erotic trials in the Williams replication.)

Savitsky conducted the experiment as a class exercise in a laboratory course in experimental social psychology. Serving as the experimenter, he ran himself and the 17 students in the experiment; each student was then instructed to run 4 of their friends. This produced a total of 87 participants, 84 of whom experienced the negative trials. Collectively they obtained a hit rate of 52.5% ($t(83) = 1.57$, $p = .061$) on the negative trials. More importantly, the positive correlation between hit rate and Negative Reactivity was restored: The 32 negatively reactive participants obtained a hit rate of 56.0%, $t(31) = 2.66$, $p = .006$, including the 12 negatively reactive men in the sample, who achieved a very high hit rate of 59.7%, $t(11) = 3.02$, $p = .006$. The hit rate on the low-affect trials was at chance.

In sum, supraliminal exposures do not eliminate the PH effect for negative pictures, but they do appear to eliminate it for erotic pictures. They also convert the experimental task into a conscious guessing game and make the experiment much more aversive. For all these reasons, future investigators are urged to use subliminal exposures. Finally, it is worth noting that the Williams study constitutes the first replication attempt of the PH effect by a skeptical experimenter.

Precognitive Boredom: A Serendipitous Finding

Before our research program had begun, 8 psi researchers visiting the Institute of Noetic Sciences in Petaluma, California tried out an early version of the PH protocol. Collectively, they showed the predicted patterns: 53% hit rate on negative trials and 47% on erotic trials. The striking finding, however, was that they scored so far below 50% on the low-affect trials (37.5%) that they actually achieved a significant z score of -2.55 ($p = .01$, two-tailed). We joked about it—"maybe it was the beer"—but did not take it seriously. It now appears, however, that the finding was not a fluke.

As noted above, our first study used only 4 subliminal exposures on each trial. In an attempt to strengthen the PH effect, we kept increasing the number of exposures, moving from 4 to 6, 8, 10, 12, and 15 across the successive experiments. The hit rate on the low-affect trials remained essentially at chance until we reached 10 exposures in Experiment 203, at which point the hit rate on these trials dropped to 46.8% ($t(39) = -2.12$, $p = .04$, two-tailed).

This effect can be interpreted as precognitive boredom. Like a too frequent TV commercial, the many repeated exposures (precognitively) render the target picture boring, or even aversive, and hence less attractive than its matched non-target. This is also consistent with the meta-analytic finding that the Mere Exposure effect itself levels off (with neutral, low-affect targets) after about 8–10 exposures (Bornstein, 1989), as boredom presumably sets in.

Because this was an unanticipated finding, we looked to see if any of the individual difference measures we were exploring in Series 200 might correlate with it. We discovered that participants who scored above the median on Absorption, the tendency to become deeply absorbed in tasks and sensory experiences (Tellegen & Atkinson, 1974), obtained a hit rate on low-affect trials of 46.8%, $t(52) = -2.22$, $p = .03$, two-tailed, whereas the rest of the sample scored at chance level.

Because this correlate emerged from a fishing expedition among our individual difference measures, we sought to replicate it conceptually in Series 300, the supraliminal series described above. In place of Absorption, we substituted Openness to Experience, which is significantly correlated with Absorption (Church, 1994), but has the advantage of being one of the standard "Big 5" personality variables. Moreover, it has been shown to correlate with reported psi experiences (Zingrone, Alvarado, & Dalton, 1998-1999). The precognitive boredom effect was successfully replicated: Those who scored above the median on Openness to Experience obtained a hit rate on the low-affect trials of 47.0%, $t(47) = -2.87$, $p = .006$, two-tailed, significantly lower than those below the median, who scored at chance level (52.1%, $t_{\text{diff}}(92) = -2.75$, $p = .007$, two-tailed).

The precognitive boredom effect appears to be the same phenomenon as the PH effect with erotic stimuli in which the repeatedly exposed target loses its erotic appeal and hence becomes boring relative to its matched non-target. The effect on low-affect trials simply has a higher boredom threshold—i.e., needs more exposures before it appears—than it has on erotic trials. In fact, the measure of Erotic Reactivity that predicts psi performance on the erotic trials in Series 200 also predicts psi performance on the low-affect trials in Series 300: Those above the midpoint on the 5-point scale item "I enjoy watching many of the erotic scenes in movies" score significantly lower on the low-affect trials than other participants: (44.4% vs 51.8%, $t_{\text{diff}}(82) = -2.75$, $p = .005$, two-tailed), which is also significantly below chance, $t(36) = -3.35$, $p = .002$, two-tailed. Although this particular item is not itself on the Openness to Experience scale, conceptually it would seem to be an exemplar of that construct.

If the precognitive boredom effect on low-affect trials turns out to be robust, then investigators might prefer to replicate the PH effect without the use of erotic materials.

Future Studies

If the PH effect continues to replicate with different investigators and subject samples, then several interesting conceptual questions would be worth exploring.

Mere Exposure. As noted in the introduction, there are no Mere Exposure experiments that use strongly affective stimuli. Would a Mere Exposure experiment using the PH procedure and stimulus materials (in other words, a PH study run "forward") show the same two complementary effects that we obtain precognitively? Professor Dick Bierman at the University of Amsterdam is actively pursuing this question.

A second question that arises from the Mere Exposure literature is the question of timing. As noted above, the Mere Exposure effect typically emerges only if there is an interval of time between the exposures and the preference ratings. In the PH protocol, they both occur within each trial and there is no delay between them. One intriguing possibility is that the erotic or low-affect pictures—which become less preferred immediately—might reverse and become more preferred after a period of delay, that is, would show the Mere Exposure effect.

Genuine Randomness. A pseudo random number generator (PRNG) produces numbers that are random only in the sense that they satisfy (or should satisfy) mathematical tests of randomness. The stream of numbers, however, is produced by a mathematical algorithm and, hence, is completely determined once the initial seed is designated. (The seed is usually based on the system clock, such as the number of milliseconds since the computer was turned on.) In principle, the future state of the system is completely specifiable from knowledge of its present state. In contrast, a genuine random generator is based on a random physical process, such as radioactive decay or diode noise, which is indeterminate in the quantum mechanical sense: the future cannot be inferred from knowledge of the present.

The conceptual advantage of using a PRNG in PH studies is that, barring artifacts, it virtually ensures that we are seeing precognition rather than psychokinesis, that participants are anticipating rather than influencing the target selection. But from a physics standpoint, it would be important to know whether the PH effect can occur when the target cannot be predicted even in principle.

* * *

If the holy grail is a straightforward laboratory demonstration of psi that can be replicated by any competent experimenter, then the PH protocol appears to be a promising candidate for achieving that elusive goal.

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Is Intuition an Example of Practical ESP? Further Explorations of a Tool for Identifying Intuitive Talent for Practical Decision-Making

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Abstract

In recent years intuition has become a topic of considerable discussion in the business community. It is not difficult to find classes being offered that claim to instruct individuals in how to improve their intuition both in their work and home environments. One question that arises from the sudden interest in the subject is whether there is an ESP component of intuition, in addition to the processes that psychology already recognizes as being part of this ability. The current paper reports a replication of a previous study trying to answer that question. A tool called the Intuitive Market Trader (IMT) was developed to examine ESP in a situation where businessmen feel most comfortable, trying to create a monetary gain. In the current application, they do so using a computer program that simulates trading in the stock market. Inspired by decision augmentation theory, the game is set up such that to obtain a high score the participant must intercept a random bit stream at specific points that allow them to successfully implement a "buy low – sell high" strategy. Data were obtained from 75 participants, 26 male and 49 female, who were employed in a wide variety of occupations, with special attention being paid to individuals who filled managerial positions. Overall results produced a positive mean z score of 0.33, $t(74) = 4.15$. However, a possible bias was discovered due to the way the pseudorandom number generator was accessed for the generation of bits, and thus a correction was applied to the t test that yielded a reduced $t(74) = 3.32$, $p = .001$, one-tailed. Based on findings reported in 1974 by Douglas Dean and colleagues, a secondary analysis was performed to examine individual differences based on the reported occupations of the participants. A total of 14 participants who were considered to have a management background scored higher than other participants (mean z scores of 0.54 vs 0.28), but the difference between the groups was not significant ($p = .10$, one-tailed). As in the previous study, participants were given, prior to the psi task, the Personal Styles Inventory (PSI) in an effort to identify persons with high intuitive ability. Consistent with the previous study, no significant correlations between individual psi scores and PSI scores were observed. Nonetheless, the IMT shows considerable promise as a psi-conducive test procedure.

The use of intuition in the decision-making process is widely recognized in modern business (Andersen, 2000; Harvey & Novicevic, 2002; Khatri & Ng, 2000). It is often thought that individuals who utilize intuition may perform more effectively in their organization. The business world is full of anecdotal stories demonstrating this possibility (Dean, Mihalasky, Ostrander, & Schroeder, 1974). When successful businessmen are asked why they made an illogical decision, quite often the reply is something like 'I had a gut-feeling and over time I have learned to trust that feeling.'

Evidence for the role of intuition in business is provided by a number of studies. Andersen (2000) examined 200 managers from eight companies for intuitiveness using the Myers-Briggs Type Indicator, or MBTI (Briggs-Myers, 1962) and the Keegan Type Indicator (Keegan, 1982) in relation to their problem-solving and decision-making styles. It was determined that 25% of them primarily used intuition in their work environment. In addition, Andersen examined 33 other managers to determine if intuition is related to organizational effectiveness. He found that 23% of these managers use what is called a "creative-innovative" decision-making style. People who fit into this category typically employ new and innovative methods to solve problems, often examining the issue at hand in a manner that most would find strange or illogical. Based on his research, Andersen suggests that intuition appears to be related to organizational effectiveness, though more research on this topic is required to make any definitive statements.

Khatri and Ng (2000) came to the same conclusion based on their study of senior management in companies representing the computer, banking, and utility industries. In their study, it was shown that use of intuition by senior management in an unstable environment is positively related to organizational performance. However, the same use of intuition was found to relate negatively to performance in a stable environment.

Harvey & Novicevic (2002) examined the use of intuition and creativity by expatriate managers in a hypercompetitive global marketplace. The authors found that candidates for managerial positions in foreign offices who solved problems creatively and quickly, without all of the relevant information, were better suited for the position than those who did not. Such marketplaces typically present an unstable environment, which might explain this observation. Managers able to correctly base decisions on intuition versus a strictly analytical approach were found to develop locally effective actions and strategies while still maintaining an appropriate level of global coordination.

A possible explanation for these observations is offered by Agor (1991), who states that intuitive managers tend to be more creative and innovative with their solutions to problems than do their analytical counterparts. When a manager is presented with less information, such as in an unstable environment, creative ways of thinking often allow examination of avenues that the more analytical thinker would overlook completely.

Furthermore, Agor (1989) states that highly intuitive people "have the potential to function best in occupations that are characterized by crisis or rapid change and where [they] are asked to chart new, emerging trends from data including many unknowns" (p. 141). He notes that the higher up a person is in the management structure, the more likely they are to use intuitive capabilities. This may be possible because the culture supports risk at strategic levels within the organization while it does not support risk at lower levels.

The Parapsychology Connection

Could intuition be a way that ESP shows itself in peoples' daily lives? Based on the anecdotal evidence from the business world and years of parapsychological research, this possibility has to be considered.

Perhaps the best parapsychological examination of intuition in connection with the business community was done by Dean, Mihalasky, Ostrander, and Schroeder. (1974). Their study of businessmen was sparked by the huge number of anecdotal accounts in the business world. Specifically, the authors examined the link between "hunches" and success in business. Over a period of six years, they compared hundreds of groups of top executives, managers, and non-managers. Participants were asked to guess a series of 100 numbers in a precognition experiment. They found that executives and managers generally performed better than other research participants at the task. They also used Schmeidler's (1964) "time metaphor" test and found that those whose view of time was "dynamic" did better than those whose view of time was "oceanic."

In more recent years, presentiment studies have been conducted (Radin, 1997; Bierman & Radin, 1997) examining participants' pre-stimulus responses to emotional images. In these experiments, a participant's autonomic nervous activity is monitored in response to a set of emotional versus calming images. A series of arousal reactions was observed just prior to the emotionally charged images but not prior to calming images. Using this experimental design, these researchers have demonstrated that people may have a physiological reaction prior to emotional events. It has previously been speculated (Broughton & Bourgeois, 2001) that this emotional reaction may be the same as what is often described in the business world as "hunches" or "gut knowledge" (Harper, 1988; Harvey & Novicevic, 2002; Sujan, 1999;), a skill that often differentiates excellent from average managers. Quite often, business managers will say they get a "feeling" in their gut that signals such intuitive experiences. Perhaps this "feeling" is the same response measured in the presentiment studies.

Based on these observations, it may be possible to explain intuition as a practical example of how ESP leaks into our daily lives. In a previous study, Broughton and Bourgeois (2001) examined a tool to identify intuitive talent. Based on earlier research by Broughton (Beloff, Broughton, & Wilson, 1978), a tool that simulated the stock market was created and used in a simple precognition format to examine the use of intuition in decision-making processes. The overall results for the study were $z = 2.39$, $p = .017$, two-tailed. When using a t-test for a subject-based analysis, the overall result was $t(76) = 1.83$, $p = .071$, two-tailed. The authors were able to identify two individuals (one being a stock market day-trader and the other the owner of a thriving small business) that performed significantly above chance It is encouraging that these two high scorers both had business backgrounds (and one actually trades stocks), but the number is exactly what one would expect by chance.

The authors also used a psychological scale, the Psychological Style Inventory (PSI) (Taggart and Taggart-Hausladen, 1993), as a predictor of how participants would perform in the psi task. The scale measures whether a person adopts a rational or intuitive style of cognitive processing, and it was expected that the more intuitive types would be more successful with the IMT. The PSI scales correlate highly with the corresponding scales of the MBTI (Taggart & Valenzi, 1990); the PSI was selected over the MBTI because it is more relevant to the business context of this experiment. However, the PSI was not found to correlate with results of the psi task. Although participants classified as intuitive on the scale did perform better than chance would predict, $t(55) = 2.072$, p(2-tailed) = .043, there was no significant difference on the psi task between those classified as Intuitive and those classified as rational. Despite these less than stellar results, they were in the predicted direction, so we decided to give the PSI one more try to see if a significant difference could be obtained, leading to significance for the two studies combined.

Broughton also developed a hybrid analysis that combines psi information with normal information and more closely approximates how decisions are made in real world situations. However, since this analysis is subject to the statistical problem of optional stopping, it could not be used as a display of pure psi.

The current research project represents a second look at the IMT as a vehicle for "practical intuition". Following Broughton and Bourgeois (2001), "we define 'practical intuition' as the ability to come to a correct (or beneficial or useful) decision or to solve a problem without conscious access to the information normally required for such a decision or solution, and without awareness of using normal logical deductive steps" (p.26).

Method

The Intuitive Market Trader

The Intuitive Market Trader (IMT)[1] was reported on in detail at the 2001 Parapsychological Association Convention (Broughton & Bourgeois, 2001). As described at that time, it is a simple stock market trading simulation. The program was installed on a Gateway Solo laptop running Windows 98 for the operating system. This allowed for data collection to occur at participants' home and offices as well as at the laboratory.

Designed to examine precognition, the IMT generates 200,000 binary bits using a pseudo-random number generator (PRNG) to create feedback for the participant. The algorithm used in the PRNG was originally developed by Marsaglia and Zaman (1987), who performed a number of sophisticated tests on it to demonstrate its randomness. Further tests were conducted by Dr. Richard Broughton, who then rewrote the sequence into Visual Basic 6.0 code (Broughton & Bourgeois, 2001). The bits are displayed on the IMT screen as a line containing 200 segments of 1,000 trials each. As the experiment progresses, this line moves across the screen graphing the progress of the bits by moving in an up and down fashion. In this experiment, the entry point into the PRNG sequence was the same for each participant.

Participants are asked to use a simple "buy low – sell high" strategy with the hope of maximizing their monetary gain. They are told simply to go with their gut reaction in deciding when to buy and sell their stocks. Participants can buy shares at any point within the generation of bits but the selling of

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[1] Patent applied for.

stocks only occurs at the end of a segment. Therefore, participants select when to begin successive segments. The number of binary "1"s that occur in the trials between buy and sell decisions determine the participant's score.

Because these buy and sell decisions are represented by keyboard button presses, the IMT is considered to be a test of ESP as reflected in decision augmentation theory, or DAT (May, Utts, & Spottiswoode, 1995). DAT postulates that success in PK-like experiments occurs because participants enter a random bit stream at times when by chance there is an excess of the desired targets. Participant's button presses in the IMT game represent such entries.

Participants are also presented with the option of selecting from up to five different stocks, which they can change over the course of the study. However, only one stock may be used at any given moment and participants must complete any transactions prior to changing their current stock. To simulate the stock market more closely, each stock has a different volatility level, which is shown on the display by using a simple multiplying factor on the generated trials. Participants can view past market performance but have no way of determining future market activity except through precognition. The total time a run takes depends on the participant, since they can buy and sell at their leisure. Generally, a single run takes 10-15 minutes.

Psychological Instrument

In keeping with the procedure of the previous experiment (Broughton & Bourgeois, 2001), participants were administered the PSI developed by Taggart and Taggart-Hausladen (1993). The PSI measures six information-processing modes using 30 items. Three of these modes (analysis, planning, control) reflect a *rational* processing style and the other three (insight, vision, sharing) reflect an *intuitive* processing style. Final items were selected from a logically derived pool of 90 by factor analysis, and convergent, discriminant, and construct validity were demonstrated by confirming predicted correlations between the PSI and the MBTI, the Kolb Learning Style Inventory, and the Torrance-Taggert Human Information Processing (HIP) Survey. Chronbach's alpha for the six PSI scales ranged from .53 to .83 (Taggart & Valenzi, 1990). At the time data collection started the PSI was undergoing revision (Taggart, 2000), but it was not completed in time for us to use the new version of the scale.

Participants

Similar to the previous study, participants were selected from a wide range of interested persons with special attention given to business professionals. Participants were gathered by word of mouth and were selected based on expression of interest. A total of 75 participants took part in the current study. Of the total, 26 were male and 49 were female.

Procedure

Data were collected at participants' homes, in their offices, and at the Rhine Research Center. They began the session by filling out the PSI. Next, they were introduced to the IMT by a short demonstration using the practice mode feature. During this time, the experimenter explained how the IMT works and how to play the game, and then answered any questions the participant had.

After the demonstration, each participant was given the opportunity to use the practice mode if they so desired. Once again, the participants were asked if they had any questions regarding the IMT or what they were being asked to do. If there were no further questions, the participant "played" the game to completion, while the experimenter scored the PSI.

Once the game was completed, the experimenter displayed the results screen and gave the participant an explanation of their performance, including an explanation of their PSI results. Finally, the data were stored in password-protected Access database files and the game reset for the next participant.

Results

Main Results

Each participant selected 200 trials of 1000 bits each. The software then computed the total number of hits per subject as well as the points where the participant entered and exited the PRNG bit sequence. These totals were converted to z scores for the participants by the following formula,

$$z = (H_O - H_E) / (npq)^{1/2},$$

where H_O is the number of observed hits, H_E is the number of expected hits (100,000), n is the number of trials (200,000), p is the probability of a hit (.5), and q is the probability of a miss (.5) The mean z score for all 75 participants was +0.33, compared to an MCE of 0.

Because each participant worked from the same PRNG bit stream, the statistical test of this outcome required that a correction be applied for the degree of overlap between the subsequences selected by the 75 participants. A computer program was written that compared the proportion of overlapping trials selected by every participant with those of every other participant. The average proportion of overlapping trials was .22. This value was then entered into a correction formula suggested by Dr. Donald Burdick, Professor Emeritus of Statistics at Duke University:

$$(1-r)^{1/2} / [1+(n-1)(r/n)]^{1/2},$$

where r is the average degree of overlap (.22) and n is the number of participants (75). The formula gave a correction factor of .80. Without the correction, the single-mean t comparing the mean z score to MCE was quite large, $t(74) = 4.15$. Multiplying this t by the correction factor gave a reduced $t(74) = 3.32$, $p = .001$, one-tailed. The effect size, using $z/N^{1/2}$ for a participant-based analysis, is .37.

Unlike the previous study into the IMT (Broughton & Bourgeois, 2001), none of the 75 participants obtained a significant z score. The overall significance was due to the fact that a large majority of the participants (71%) scored in the positive direction. Only 22 of them obtained a negative z score, compared to a mean chance expectancy of 37.5, $z = 3.58$, $p = 3.4 \times 10^{-4}$, two-tailed.

PRNG Test

It is possible that the positive results described above could have been achieved by an excess of "1"s in the subsection that was selected for this experiment. This subsection was chosen by inserting two arbitrarily selected seed numbers into the supporting software, a process that in theory is susceptible to "decision augmentation" (cf., May et al., 1995). To address this possibility, we examined the actual subsection used, starting with the first trial and ending with the highest-numbered last trial selected by any of the 75 participants. This resulted in 14,861 trials of 1000 bits each. The mean of these trials was 500.025 with a standard error of .128, $t(14680) = 0.20$, $p = .85$, two-tailed. Thus, the parent sequence of trials used for the experiment is unbiased.

Secondary Analyses

Occupation. Based on research by Dean et al. (1974), who found that business executives showed more evidence of ESP than a control group, participants with management backgrounds were compared separately to other participants. Individuals were identified as business-specific personnel based on their self-reported occupation description. This group included small business owners, CEOs, management staff, and office directors. The classification was made prior to inspection of the data. The 14 participants in this group did in fact score higher ($M = 0.54$, $SD = 0.70$) than the other participants ($M = 0.28$, $SD = 0.68$), but the difference is not significant, $t(73) = 1.29$, $p = .10$, one-tailed.

Personal Styles Inventory. Consistent with the findings of the earlier study (Broughton & Bourgeois, 2001), there were no significant correlations between the IMT z scores and the total score of the PSI, $r(74) = .003$, or the scores of any of the six information-processing modes (range: .17 to -.09).

Discussion

This experiment successfully replicated the findings of the previous study (Broughton & Bourgeois, 2001) in that volunteer participants from a wide range of backgrounds produced significantly positive ESP scores on the IMT as a group. In fact, the effect size was substantially greater in the second study than in the first (.37 vs. .20), using $z/N^{1/2}$, z being derived from the participant scores. Thus, the IMT shows considerable promise as a psi-conducive test procedure.

However, unlike the previous study, none of the participants in the present experiment were singled out as demonstrating individual talent, as compared to two in the first experiment. These low values may reflect the need to collect more data from each participant, as recommended in the previous study. In the present study there were eight participants, three of whom specifically being business persons, who scored moderately well (*z* scores ranging from 1.27 to 1.53). Perhaps by increasing the number of trials each participant generates, thereby increasing the statistical power of the task, we would be able to better detect a genuine psi effect in individual participants using the IMT.

An issue arises concerning the wisdom of using a single parent target sequence for all participants. Although not reported, in the earlier study (Broughton & Bourgeois, 2001) this procedure was used for some participants whereas others had their own parent sequences. A correction was applied for those with the uniform sequence. The results from the two subsamples were not significantly different. A possible disadvantage of individualized parent sequences concerns the fact that they are determined by the timing of button presses made by the experimenter prior to the session. Thus, there is more opportunity for experimenter decision augmentation (DA) to operate with multiple parent sequences (cf., May et al., 1995). As we are interested in participant psi, minimizing the potential for experimenter psi is desirable. On the other hand, individualized sequences are much cleaner statistically, and less "random" methods of seeding individualized parent sequences can be employed to at least minimize experimenter DA.

The hybrid analysis used in the previous study to measure ESP plus normal trading savvy as an estimate of trading talent has not yet been completed, although we intend to perform it at a later date.

It is also noted that the PSI gave consistent results with the previous study, that is, no significant relation to IMT scores. Based on both sets of studies, the PSI is being eliminated from future testing with the IMT. However, that is not to say that all questionnaires are useless to help identify successful participants for this project. One may find that a questionnaire like the MBTI produces better results. It measures similar constructs to the PSI and has been a successful predictor of ESP scores in previous research (e.g., Honorton, 1997.)

Another question for future research is how does performance using the IMT compare with an employee's actual workplace performance? In order to answer such a question, one has to gain critical input from a company willing to share what is often considered critical operating information with the research organization. One benefit of this sort of collaboration would be to provide a successful tool which identifies some of the characteristics in employees that the company may find useful.

Another question that is not addressed by the current study is the role of risk. Although the IMT allows for participants to choose from a number of stocks varying in volatility, which stocks were used in comparison to how well each participant performed was not examined. It may be that the participants who perform best also optimize this by the way they select their stocks. By selecting more volatile stocks at opportune moments, participants can maximize the profit (or loss, at inopportune moments) in each transaction.

In order to better examine the use of the IMT to predict intuitive talent, one needs to make the alterations to the program as recommended in the previous report. Most importantly the IMT needs to allow for additional data to be collected from each participant by adding time to each run. These alterations are currently being made to the IMT, and in time we feel that it will prove to be a useful tool for screening the ESP aspect of intuitive talent in individuals.

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Ganzfeld vs. No Ganzfeld: An Exploratory Study of the Effects of Ganzfeld Conditions on ESP *

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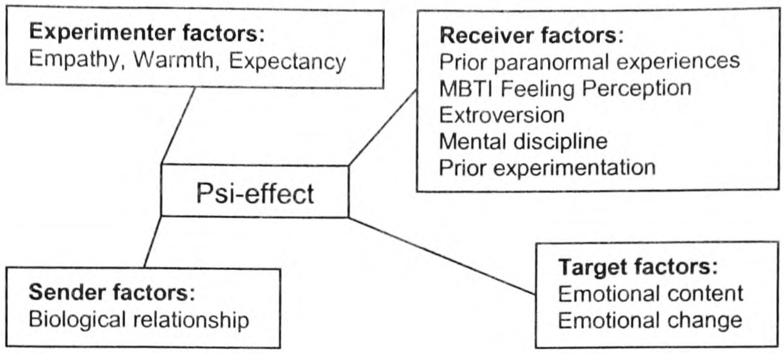
Abstract

In this double-blind exploratory study 74 subjects participated forming 37 couples (sender/receiver). The sender watched a video and tried to send it to the receiver, who was located 120 meters away. At the end of the sending/receiving period (28 min.) the receiver watched four videos and tried to identify which one had been sent. There were two experimental conditions. In the Ganzfeld (GZ) condition the researchers and subjects heard a 20-minute relaxation induction. The receiver's eyes were covered with halved Ping-Pong balls, upon which two red lights were projected, and they listened to "white noise" during the experimental session. In the non-Ganzfeld (NGZ) condition, neither the Ping-Pong balls nor the "white noise" were used and there was no relaxation induction. From July of 2001 to March of 2002, 108 trials (54 GZ and 54 NGZ) were carried out. There was no overall significance (hit rate 25,93%), $Z=0.11$, $\pi=0.51$. The NGZ and GZ hits (18,52%, $Z=-0.94$, $\pi=0.41$ and 33,33%, $Z=1.26$, $\pi=0.60$ respectively) did not reach significance. However the GZ hits were in the direction of the findings reported in the Ganzfeld meta-analysis by Bem and Honorton (1994). The difference between the GZ and NGZ hits was significant, $p=.0228$ one-tailed. We also found that the targets that were hit were evaluated by receivers (in terms of personal preference and personal meaning) higher than the targets that were not hit. Analysis of the qualitative content of hits and misses suggested that in future studies the qualitative results should be considered along with the conventional methodology of hits vs. misses. These results seem to be similar to the qualitative findings found by Parker.

Research using the Ganzfeld technique has produced a considerable data base and is an important instrument for the development of parapsychology as a science. However, the research has generated some controversy (Bem, 1994; Bem & Honorton, 1994; Bem, Palmer, Broughton, 2001; Honorton, 1977, 1978, 1985; Honorton, et. al.1990; Hyman, 1985, 1994; Hyman & Honorton, 1986; Milton, 1999; Milton & Wiseman, 1997, 1999, 2001; Palmer & Broughton, 2000; Radin, 1997; Schmeidler & Edge, 1999; Storm & Ertel, 2001, 2002).

Can the Ganzfeld provide us with a reliable technique to obtain ESP under controlled conditions? Would the results obtained be due to the technique, or from an interaction of the Ganzfeld and other factors also considered to be psi conductive? If altered states of consciousness are important for psi performance in the laboratory, why does this performance seems to be satisfactory in experiments that do not use procedures related to the creation of those states? It seems that there is no consensus about these questions among the parapsychologists, or between them and the skeptics. The first question seems to be the main one, that is, to reach an acceptable level of replication. The second and third questions point to the difficulty of knowing what conditions would be ideal to obtain positive experimental results. Several factors have been identified as related to the facilitation of ESP in the laboratory (Bierman, 1995;



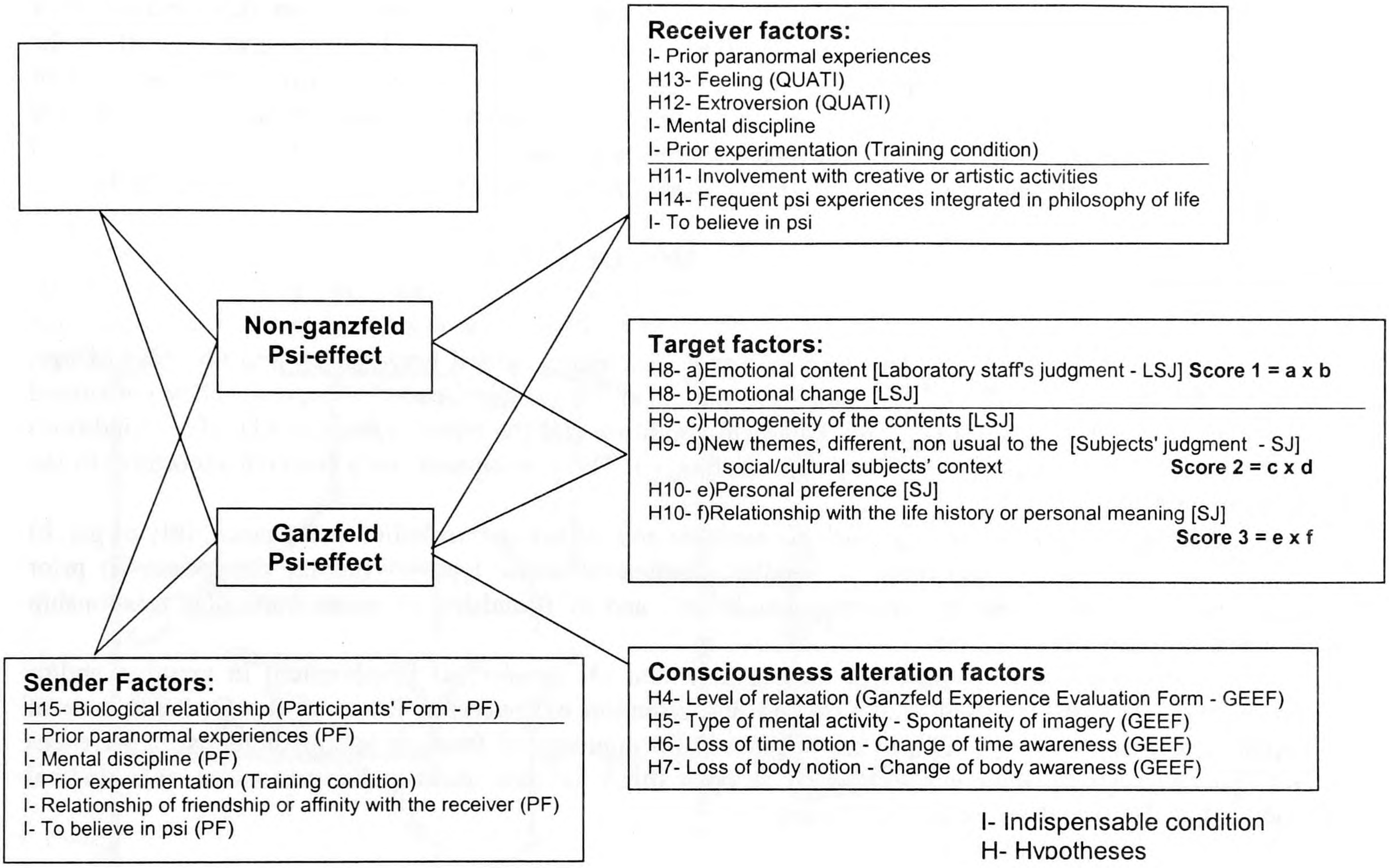
Broughton et al.,1989; Dalton, 1997a, 1997b; Delanoy, 1988; Honorton, 1992; Honorton & Schechter,1986; Lindmeir, 2000; Parker, Grams, Pettersson, 1998; Schlitz & Honorton, 1992). A model that summarizes some of the better supported variables was proposed by Parker (2000, p.11):

An important variable that seems to be related to the experimental ESP performance is altered states of consciousness (ASCs). This is supported by anecdotal and experimental evidence (Honorton, 1977; Parker, 1975; Palmer, Khamashta & Israelson, 1979)

Unfortunately, for the most part contemporary Ganzfeld research has not evaluated alteration of consciousness as a predictor of ESP performance (Alvarado, 2000). Without actual measurements of state of consciousness independent of the Ganzfeld we cannot state that the Ganzfeld technique alters consciousness nor that consciousness is altered it the same manner for all the subjects. If there is not a measure of changes of state of consciousness and specific analyses relating this to ESP scores it is not possible to affirm that the ESP results are due to an alteration of consciousness (Alvarado, 1998, 2000).

In an attempt to contribute to the solution of this problem we designed an exploratory study to asses the efficiency of the Ganzfeld technique and of a possible alteration of consciousness generated by it. We compared GESP scores in two experimental conditions, a Ganzfeld and a non Ganzfeld condition and examined ESP scores in terms of ratings of relaxation and loss of time and body awareness. We also considered other variables related to the targets, the researchers, the senders, the receivers and the experimental environment. The present study was based on Parker's model (2000), but also includes others potentially important variables which are considered by other researchers.

The model tested



The search of psi conductive factors seems to be a current concern in parapsychology (Perez Navarro, 2003). New ways of analyzing the data may also contribute to the understanding and replication of ESP test results. Based on repeated hits and of their impressive quality, Parker and Persson (1999) and Parker, Persson and Haler (2000) performed qualitative analyses of their data. In the majority of the sessions, the reports of the subjects were recorded in real time over the copies of the clips that were made simultaneously. In an analysis of these films it was found that occasionally the mentation involved accurate perception of the target, that is, in a direct manner and not associative or symbolic. However, both associative and erroneous perceptions also took place. The general theme was correctly identified frequently, but sometimes the details were wrong. Multi-modals effects also occurred. For example, ESP information mediated by auditory imagery. It seemed that interpretation of the images was affected by perceptual defenses that may distort or delay some of the images. *Top Down* processes seem to be also involved, perceptions that occurred in non ideal conditions, probably influenced by expectations. Clairvoyant, telepathic and precognitive effects have also been observed. The receivers, sometimes, focused on the target itself, but in other occasions the focus was the sender's activities or happenings of personal significance. The most controversial results were the significant holistic effects mediated by

ESP occurring out of experimental control. The judgement process was difficult due to apparent mixes of more than one target content. The receivers obtain correct information from more than one target or source and not only from the correct target. Another interesting result was that many, but not all, of the good hits seemed to show repeated themes in the mentation. These were general correspondences or correspondences with parts of the target. This suggests that ESP seems to occur as an intact psychological process, instead of as a synchronous or anomalistic correspondence. The present study has also evaluated these factors, some of which have been reported by other researchers (Kreiman, 2001; Dalton, 2002)

METHODOLOGY

Participants

We had 74 participants. The ages of these participants ranged between 14 and 66 years of age, with an average of 38 (SD = 12). They were paired in 37 groups (sender, receiver). They performed between two and four trials (one in the Ganzfeld condition and the other in the non-Ganzfeld condition) and the roles of sending and receiving were exchanged. The participants were selected according to the following aspects:

I. Indispensable factors, for both the receiver and the sender: a) belief in the possibility of psi; b) prior spontaneous psi experiences; c) regular practice of some type of mental discipline; d) prior experience in a psi experiment (training condition); and e) friendship or some particular relationship between the members of the pair.

II. Preferred factors, for both the receiver and the sender: a) involvement in creative and/or artistic activities; b) classified in the *feeling* and attention extroversion factor in the Questionnaire of Typological Evaluation (QUATI, in the original in Portuguese); c) frequent spontaneous psi experiences and their inclusion in their worldview; d) an open mind for new ideas and experiences; e) biological relationship between the members of the pair.

Procedure

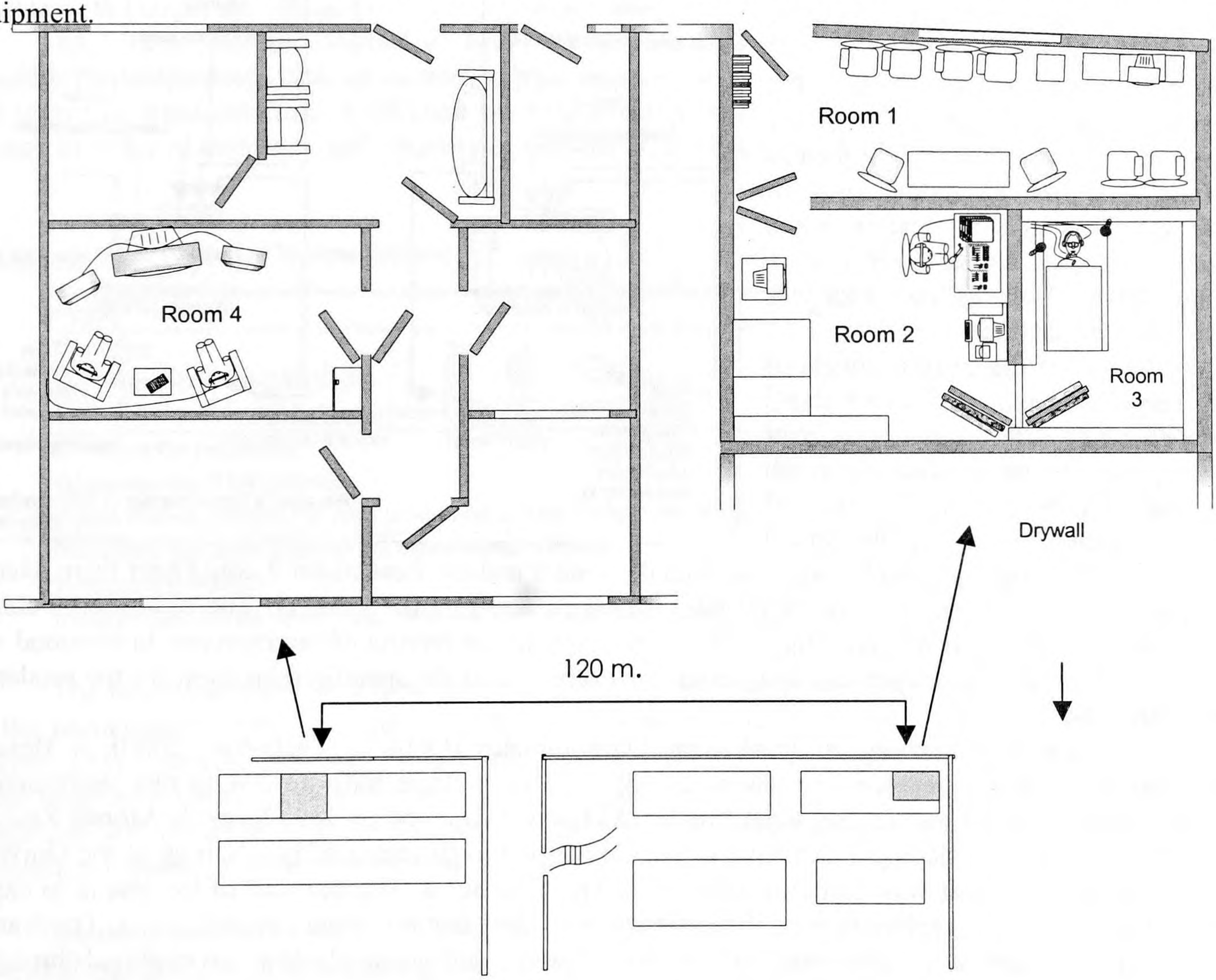
There was a training session in which the participants were shown the laboratory facilities, were given general information about the research, participated in an informal clairvoyance test using static targets, and answered a participant information intake form and a personality test.

The experimental sessions had two researchers. As was used by Parker and Wersterlund (1998) one worked controlling the receiver's activities (Researcher 1) while the other directed the sender's activities (Researcher 2). Three other assistants also participated. One of them was in charge of external security. Another was in charge of making the targets available for each experiment and the third took care of target randomization. The targets were randomized 15 days before the study started. To accomplish the task the assistant used 90 tables of random numbers (RAND, 1955).

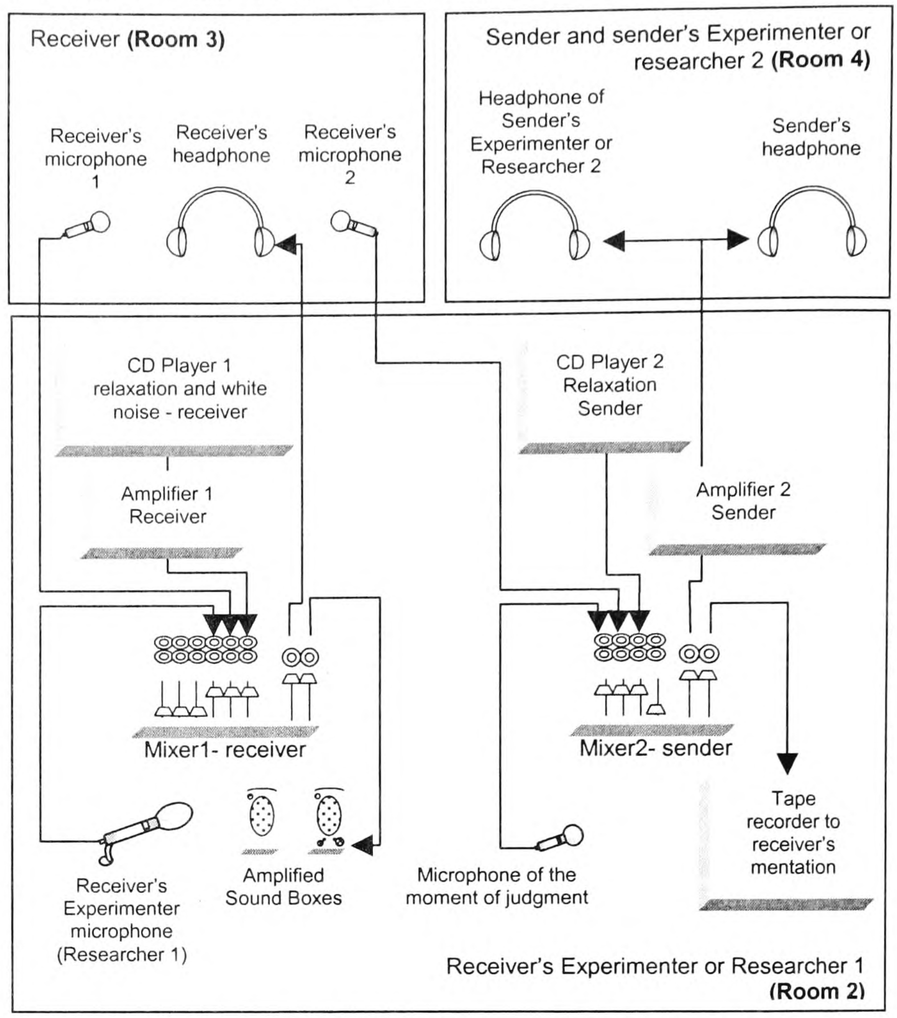
To evaluate hypotheses 16-20 (as can be seen ahead) we used evaluations from the experimenters. The data for hypotheses 16-19 were recorded before the beginning of the trials. These hypotheses were about variables related to the experimenters: motivation, expectation of success, mood and how they were feeling physically. For hypothesis 20 the experimenters answered the questions after the judging but before the targets were presented, that is, before anyone knew the target identity. These evaluations could be done by the participants, but we think they could be shy or constrained in evaluating negatively the experimental social environment.

Laboratory and Instruments

The Ganzfeld Laboratory has four rooms. Three of them are in the same building and the other around 120 meters away (see diagram below). We welcomed the participants in one of them (Room 1). The non-Ganzfeld tests were performed here because the second room had too much equipment (stimulus) and third room was not appropriated for vigil activities. The other room (Room 2) was separated from Room 1 by a double door. It contains the equipment used in the study. Room 2 was separated from the receiver room (Room 3) by a double door lined with cork and acoustic foam. It was lined with *Drywall* which produces an acoustic reduction of 40 dB. This room had a stretcher where the receiver lied down to try to relax and obtain the target information. The sender and targets room (Room 4) is 120 m. away from the others to avoid possible sensory leakage. It also had a double door. We had in this room two comfortable chairs and a center table with art material, a 33" TV, and a VCR with stereo equipment.



As the illustration shows, two mixers were used. The receiver's mixer integrated the communication between the receiver and his researcher. One of the entry channels had the lapel microphone of the receiver connected (microphone 1), which has the output in the right channel to the earphone (or amplified sound boxes) of the researcher (Researcher 1). In another channel there was the microphone of the Researcher 1, which went to the left channel to the receiver, allowing communication between them. The CD player, that played the CD with the relaxation and the white noise to the receiver, was connected to a third entry channel and had an output in both channels. This allowed that both the receiver as well as Researcher 1 to relax. However, the white noise was only heard by the receiver.



In one of the entry channels of the sender's mixer a second lapel microphone of the receiver (microphone 2) was connected, which has output in both channels. The left output channel reproduced the sound of the receiver's reports in such a way that both the sender and the Researcher 2 could hear them. Hearing these reports, the sender knew the target information received by the receiver. The right output channel was connected to a recorder that registered in a K7 tape all the reports of the receiver. In a second entry channel the second CD Player was connected. This reproduced the specific relaxation for the sender and the Researcher 2.

We used the Typological Evaluation Questionnaire (QUATI; Zacharias, 2000), a Brazilian inventory of Jungian orientation similar to the Myers Briggs Type Indicator. With this instrument we measured extroversion and feeling-type. The QUATI was developed by José Jorge de Morais Zacharias from the Instituto de Psicologia da Universidade de São Paulo (Institute of Psychology of the University of Sao Paulo). The test was designed to be used with Brazilians. The purpose of the test is to explore areas of personality through questions about situational issues that represent opposite poles. There are six different topics, such as parties, work, travel, study, leisure and personal), that are explored through 93 questions. Through these questions researchers can identify the participant's approach or attitude (extroversion and introversion) in its four versions: reception of information-perceptual functions (intuition and sensation), decision making-evaluation functions (thought and feeling). Following Jungian theory the QUATI presents these functions as Main, Auxiliary and Inferior, obtaining 16 different types (Zacharias, 1999, 2000).

We created other questions to measure emotional aspects of the targets, target homogeneity, and preference and meaning, as well as experimenter moods. These questions had scales ranging from 1 to 5.

Procedure

Targets. The targets were video clips with an approximate duration of one minute each. The total set of targets contained eighty video clips organized into twenty groups of four clips. Each set of four clips was recorded on two VHS tapes. The sender tape was used by the sender and contained the four recorded clips randomly arranged, separated by three minute intervals without recording. The receiver tape was used by the receiver for judging and contained the same four targets of the sender tape, also randomized, but with 10 second intervals between them. Each tape was sealed within an opaque envelope. These two envelopes were closed within a bigger envelope, also opaque, that contained the number of the target set - 00 to 19.

Each target set was formed of four film clips as different as possible from one another. We consider content aspects such as human beings, animals, nature, human constructions (e.g., buildings), and means of transportation. In addition we paid attention to emotions, shapes, time (past, present and future), quantity of elements, and intensity of movement, among other factors.

The targets were evaluated in three factors:

Factors	Scale	Judges	Score
Emotional	1-25		S1 = a x b
a) Emotion expressed in the targets	1-5	Researchers	
b) Sudden change in the emotional content, sudden, surprising events	1-5	Researchers	
Of help to the judgement	1-25		S2 = c x d
c) Homogeneity of the contents	1-5	Researchers	
D)New themes, different, not usual to the social cultural context of the subjects	1-5	Subjects	
Preference and Importance for the experimental subjects	1-25		S3 = e x f
e) Personal preference	1-5	Subjects	
f) Relationship with the current history/moment of life or personal meaning	1-5	Subjects	

The target variables were measures using ratings done by the experimenters (topics a, b and c) and by the participants (topics d, e and f). Each variable score was the product of two separate ratings as follows: (S1) *emotional content* (emotion in targets x sudden change in emotional content), (S2) *helping to the judgement* (homogeneity of content, or how much a single topic predominates x appearance of new topics that are not usual in the participant's experience), and (S3) *preference and meaning* (participant preference x special significance for participants).

Experimental technique. The *Ganzfeld condition* had nine parts as follows.

1 Initial preparation without the participants (40 min.). The researchers filled their forms and a checklist related to their activities to check if the material and equipment was in order.

2 Initial preparation of the participants (20 min.). The participants were received and prepared for the experiment. In Room 3 Researcher 1, with the help of the sender, instructed and prepared the

receiver, who must lie on the stretcher. Using a porous adhesive tape, he set the halves of the ping-pong balls on the receiver's eyes, placing also the earphones and the two lapel microphones.

3 Preparation for relaxation (15 min.). Researcher 1 tested the equipment and verified if the volume of the receiver's earphones was comfortable. Researcher 2 went to Room 4 with the sender. He opened the envelope with the target and prepared the video, placing it in the correct position without showing any image. Both the researcher and the sender put on their earphones.

4 Relaxation - sender (19:22) receiver (20:38). Researcher 1 puts the relaxation CDs on, so that all the participants and researchers started relaxing.

5 Transmission and reception - white noise (28:06). Researcher 1 put the recorder into motion to tape the receiver's reports and took notes. Researcher 2 puts the video clip in and, after showing it for the first time, rewinded it without showing it on the TV screen, waited three minutes and showed the clip again. He repeated this operation six times for a period of 28 minutes. During the intervals of the clips, he suggested to the sender to engage in activities such as drawing, dramatization, or visualization.

6 Narrative of the reports (15 min.). After the white noise Researcher 1 told the receiver through his microphone the content of his notes.

7 Judgment and personal evaluation of the targets (40 min.). Researcher 1 informed the receiver when the trial had ended. He went back with him to Room 2 and explained the judging procedure. He showed the tape to the participant (receiver) so as to give him a general idea of the targets and he read the reports of the mentation back to him asking if each sentence read was related or not to the target. The participant was told again the statements he made about each target. After this the participant was then asked to rate the mentation against four possible targets. After the judging Researcher 1 conducted the receiver's evaluation of the targets. The sender could listen through the lapel microphone while trying to influence the receiver to choose the correct target. After this he also evaluated the transmitted target.

8 Presentation of the target (10 min.). Researcher 1 called the Researcher 2 and the sender through the microphone and asked them to go back to Room 2 and to reveal the target.

9 Conclusion (15 min.). After the target was presented, the researchers asked the subjects to talk about their experiences during the experiment. After this, they were offered cookies, candy bars, juice or water.

Non-Ganzfeld condition. This was divided into 6 phases: 1) Initial preparation without the subjects (40 min.), 2) Preparation of the participants (20 min.), 3) Transmission and reception (35 min.), 4) Judging (20 min.), 5) Presentation of the target (10 min.), 6) Conclusion (15 min.) This was similar to the Ganzfeld condition, except for the lack of induction, relaxation and sensory deprivation procedures.

PREPLANNED HYPOTHESES

Hypotheses about the experimental conditions

H1. The total number of hits will be significantly higher than chance expectation.
H2. The hits obtained in the Ganzfeld condition will be significantly higher than chance expectation.
H3. The hits obtained in the Ganzfeld condition will be significantly higher than the ones obtained in the non Ganzfeld condition.

Hypotheses about the evaluations of the consciousness state in the Ganzfeld condition

H4. The average relaxation scores will be significantly higher for the subjects who hit the targets than for the ones who miss it. (Self-report data from the subjects, collected at the end of the induction to relaxation and during the white noise)
H5. The average mental activity scores (if more structured, rational, objective or totally spontaneous, strange, dreamlike) will be significantly higher for the subjects who hit the target than for the ones who miss it.*
H6. The average scores of loosing the notion of time will be significantly higher for the subjects who hit the target than for the ones who miss it.*
H7. The average scores of loosing a sense of the body or body sensations will be significantly higher for the subjects who hit the target than for the ones who miss it. *

* Self-report data from the subjects collected at the end of the white noise

Hypotheses about the target factors

H8. The average scores (S1) of target emotional content (emotional content x change in the emotional content, as evaluated by the experimenters) will be significantly higher for the targets that are hits than for the ones that are misses.
H9. The average of the scores (S2) of target homogeneity (homogeneity [evaluated by the experimenters] x new themes [evaluated by participants]) will be significantly higher for the targets that are hits than for the targets that are misses. **
H10. The average of the scores (S3) of preference and meaning (personal preference [evaluated by participants] x personal meaning [evaluated by participants]) will be significantly higher for the targets that are hit than for the targets that were misses. **

** The evaluations from participants were collected at the end of the Judgement period and before the revelation of the correct target.

Hypotheses about the experimental subjects' factors***

H11. Proportionally there will be more hits among participants who were involved with creative and/or artistic activities than those that were not.
H12. Those classified as extroverts will obtain proportionally higher ESP scores than those classified as introverts.
H13. Those classified as *feeling* in the main function will obtain higher ESP scores than those without such that classification.
H14. There will be higher ESP scores in those participants who had a high frequency of spontaneous psi experiences and had integrated these phenomena into their worldview than in those without such that characteristic.

H15. There will be higher ESP scores in those participants (sender and receiver) who have biological relationship than in those without such relationships.
*** The data from subjects were collected during the training condition.

Hypotheses about the experimenters factors

H16. There will be proportionally higher ESP scores in those experiments evaluated on the question about experimenter's motivation with higher scores**** as compared to those with lower scores.

H17. There will be proportionally higher ESP scores in those experiments evaluated on the question about experimenter's expectation with higher scores**** as compared to those with lower scores.

H18. There will be proportionally higher ESP scores in those experiments evaluated on the question about experimenter's mood with higher scores**** as compared to those with lower scores.

H19. There will be proportionally higher ESP scores in those experiments evaluated on the question about experimenter's physical state with higher scores**** (being physically well) as compared to those with lower scores.

H20. There will be proportionally higher ESP scores in those experiments evaluated on the question about the experimental social environment with higher scores**** (good environments) as compared to those with lower scores (poor environments).
**** Evaluated by the experimenter.

Because this study was considered to be an exploratory one, we did not applied corrections for multiple analyses. Instead we hope that any significant effects will be replicated in future studies.

RESULTS

Ganzfeld and Non-Ganzfeld Conditions

There was no overall statistical significance (see Table 1). Neither the Ganzfeld (GZ) or the non-Ganzfeld conditions obtained statistical significance. We failed to confirm hypotheses 1 and 2. The difference between the two conditions was significant, confirming the third hypothesis.

Table 1. Hits for condition and the difference between the two conditions

Condition	N tries	N Hits (X)	% Hits	Effect Size π	Effect Size h	Z	p	Significance
Overall score	108	28	25,93	0,51	0,01	0,11	<0.05	ns
Ganzfeld	54	18	33,33	0,60	0,17	1,26	<0.05	ns
Non Ganzfeld	54	10	18,52	0,41	-0,13	-0,94	<0.05	ns
Difference Gz x NGZ	108				RC dif=	**2,00**	0.0228	**s**

s - significant
ns - non-significant

State of Consciousness in the Ganzfeld and Other Variables

We did not find the predicted positive relations between relaxation (hypotheses 4), mental activity (hypotheses 5), and the loss of the notion of time and body awareness (hypotheses 6 and 7) (see Table 2). Mood ratings (a non preplanned variable) were significantly higher for the senders who had hits in their experiments than to those who had misses (N=54, t test Dif= 3,82, p<0,01 - two-tailed).

Table 2. Difference between the averages (*t student)* of the variables evaluated for misses (N=36) x hits (N=18) in the Ganzfeld condition for the receiver and sender's data

Variables - Receiver (scale 1-7)	Average for hits GZ - N=18	Average for misses GZ - N=36	t Dif	Significance
Mood	5,50	5,86	-1,15	ns
Level of relaxation at the end of the relaxation	6,56	6,47	0,37	ns
Level of relaxation during White Noise	5,61	5,92	-1,11	ns
Level of relaxation at the end of the White Noise	5,28	5,64	-1,00	ns
Type of mental activity	5,33	5,69	-1,03	ns
Loss of the notion of time	5,78	6,03	-0,62	ns
Loss of the notion of body	4,17	5,17	-2,06	ns
Variables - sender (scale 1-7)				
Mood	6,50	5,39	**3,82**	**s**
Level of relaxation at the end of the relaxation	6,50	6,28	0,93	ns
Level of relaxation after the 1st exhibition	6,17	5,39	2,13	ns
Level of relaxation after the 4th exhibition	5,06	4,92	0,31	ns
Type of mental activity	4,83	4,25	0,96	ns
Loss of the notion of time	5,50	5,64	-0,24	ns
Loss of the notion of body	4,11	3,83	0,45	ns

Target Variables

The comparison of the target information was inspired in the Dr. Parker's work (PARKER, GRAMS, PETTERSSON, 1998), considering as *Hit Targets* those that were hit once or twice in two utilizations or that were hit three times in three utilizations. The *Missed Targets* were so considered when they presented two misses in two utilizations, three misses in three utilizations or four misses in four utilizations.

Tables 3 and 4 show the analyses related to target variables. Only one of the hypothesis was confirmed, but only for the receiver's data (hypotheses 10, see Table 4, item f).

Table 3. Difference between the averages (*t student*) of the variables for the hit targets vs. missed targets - for the receiver's, sender's and laboratory judges' data

Variables (scale 1-5) - (Judges) N	Average for hit targets	Average for missed targets	t Dif	Significance
a)Emotion expressed in the targets (Researchers) N=31	3,10	2,76	0,88	ns
b)Change in the targets emotional content (Researchers) N=31	2,60	2,19	0,80	ns
(scale 1-25) **Score 1 =** a x b (Researchers) N=31	9,10	6,38	1,32	ns
c)Homogeneity content targets (Researchers) N=31	3,50	3,62	-0,38	ns
d)New themes, different from the life context (receiver s) N=64	2,65	3,04	-0,94	ns
d)New themes, different from life context (senders) N=64	2,12	2,28	-0,42	ns
(scale 1-25) **Score 2** = c x d (receiver s) N=64	7,94	8,26	-0,20	ns
(scale 1-25) **Score 2** = c x d (senders) N=64	9,88	11,04	-0,47	ns

Table 4. Difference between the averages (*t student*) of the variables evaluated for the hit targets (N=17) x missed targets (N=47) for Receiver's and sender's data

Variables - receiver's judgment (scale 1-5)	Average for hit targets - N=17	Average for missed targets - N=47	t Dif	Signifi-cance
e) Personal preference N=64	3,94	3,68	0,83	ns
f) Relation with history/current moment of life or special meaning N=64	3,65	2,91	**2,78**	s
(scale 1-25) **Score 3** = e x f N=64	14,88	11,06	**2,32**	s
Variables - sender's judgment (scale 1-5)				
e) Personal preference N=64	4,00	3,79	0,62	ns
f) Relation with history/current moment of life or special meaning N=64	3,00	3,26	-0,84	ns
(scale 1-25) **Score 3** = e x f N=64	12,06	13,17	-0,57	ns

However this result could be an artifact, because the targets that have higher scores in *Personal preference and/or Relation with history/current moment of life or special meaning (that compose Score 3)* could be chosen more often than those with lower scores, regardless of whether or not they were the correct target. To verify this possibility we conducted a comparison between percentages of Hit targets vs. Missed targets among the targets with high and low Scores 3. This division considered the average among all of Score 3, which was 12,078. Table 5 presents these comparisons, that produced a X^{2*}=4,00, p=0,046 (one-tailed), apparently confirming the result.

Table 5. Comparison between the % of the Hit Targets and Missed Targets with high and low score 3

	Hit Targets	**Missed Targets**	N
High score 3	10 (43,5%)	13 (56,5 %)	23
Low score 3	7 (17,1%)	34 (82,9%)	41
N	17	47	64

* *THE YATES CORRECTION WAS USED FOR SMALL SAMPLES.*

The fact of having more Missed Targets than Hit Targets among the targets evaluated with High score 3 doesn't invalidate that result, because the general percentage of mistakes (75%) was much larger than the percentage of hits (25%).

Other Participant Variables

Table 6 shows the relevant analyses. Neither of the hypotheses about creativity (hypotheses 11), extraversion (hypotheses 12), feeling (hypotheses 13) or biological relations (hypotheses 15) were confirmed.

The hypothesis 14 relative to the frequency of spontaneous psi phenomena and their positive integration in the worldview of the participant could not be evaluated due to the low frequency of responses.

Table 6. Factors of the experimental subjects - difference of the hits (X2) from the evaluated variables

Variable	Hypothesis	N	Hits	%	X^2	Significance
N creative	H11	60	15	25,00	0,06	ns
Y creative		48	13	27,08		
Extroverted (profiles 1 to 8)	H12	28	7	25,00	0,01 *	ns
Introverted (profiles 9 to 16)		76	20	26,32		
Main Function *Feeling* (1,2,9,10)	H13	66	19	28,79	0,40 *	ns
Other Main Functions (3,5,6,7,8,13,14,15)		38	8	21,05		
Subjects with consanguinity	H15	8	1	12,50	0,23 *	ns
Subjects without consanguinity		100	27	27,00		

* THE YATES CORRECTION WAS USED FOR SMALL SAMPLES.

Experimenters' Variables

Table 7 presents the analyses with experimenter-related variables. None of the hypotheses (hypotheses 16-20) were confirmed.

Table 7. Experimenter's factors - difference of the hits (X2) for all the evaluated variables

Variable	Hypothesis	N	Hits	% hits	X^2	Significance
High motivation	H16	70	19	27,14	0,03 *	ns
Low/average motivation		38	9	23,68		
High expectation of success	H17	71	18	25,35	0,00 *	ns
Low/average expectation of success		37	10	27,03		
High level of mood	H18	62	18	29,03	0,73	ns
Low/average level of mood		46	10	21,74		
Very good or superior physical state	H19	45	12	26,67	0,02	ns
Good or inferior physical state		63	16	25,40		
Very good or superior social environment	H20	97	27	27,84	0,96 *	ns
Good or inferior social environment		11	1	9,09		

* THE YATES CORRECTION WAS USED FOR SMALL SAMPLES.

Qualitative Analyses

We found unexpected qualitative information in the participant's mentation. There were different patterns of responses in the hits and misses. We called *quality hit* those that showed a strong correlation, that is, those in which the contents of the report had a clear relation to the characteristics of the target. In this case the subject chose the correct target and had a hit. On the other hand, we call a *quality miss* those instances in which the mentation content is also accurate, but in relation to one or more unintended targets. In these trials the participant selected an incorrect target and obtained a miss. Regardless of methodological differences, our findings were similar to the qualitative results found by Parker (Parker, Persson, 1999; Parker, Persson, Haler, 2000)

DISCUSSION

We would like to acknowledge that this is an exploratory study and that, as such, we did not correct for multiple analyses. Neither the GZ or the NGZ conditions obtained statistical significance. However, the GZ results are comparable with those reported and predicted by Bem and Honorton (1994), that is, a percentage of hits between 33% and 35% and an effect size between 0.53 and 0.64. The significant difference between the GZ and the NGZ conditions may mean that, in relation to the NGZ condition, the GZ performed in this study a significant role. Parra (2002) reported similar results in Argentina. But, this result could be influenced by the "ritual" involved in the Ganzfeld technique. Future studies could continue exploring the control conditions, trying to confirm and investigate better this result.

Our analyses do not support the idea that alterations of consciousness affected ESP performance in this study. We infer this from the lack of significance of the analyses done with the degree of relaxation and awareness of time and of the physical body, as shown on Table 2. Nonetheless, we recognize that there are other ways of measuring alterations of consciousness that deserve to be further explored in future studies.

The significant effect with sender's mood suggests that this variable affects the dynamics of the experimental situation. But this also needs to be studied further in future studies.

Our analyses about the target variables discarded those previsions from hypothesis 8 and 9 indicating that neither the emotion content or changing nor the homogeneity or new topic target ratings were significant in relation to ESP. Regarding the scoring for emotion of targets, we noticed that this should be evaluated by the receivers and not by the researchers, since we found that our evaluations as experimenters did not correspond to the evaluations of the subjects during the experiments. But we confirmed hypotheses 10 for the receiver's data. The target factor that presents significance, doing hypotheses 10 acceptably was the *Relationship with the current history/moment of life or personal meaning.* This information emphasized the importance of the personal significance of the targets in their reception. Some experimental studies seem to confirm it. (Delanoy,1988; Watt,1988; Lindmeier, 2000) A qui square analysis seems to discard this result as an artifact, but naturally, this result needs to be verified further in future studies.

We failed to confirm the hypothesis 11 that predicted better ESP results with creative participants. This is inconsistent with previous work. However we relied on self-evaluation of creativity and not on groups of artists as other researchers have done (Dalton. 1997b). This could explain the results we obtained.

In addition, we did not confirm the hypotheses about extraversion, feeling thinking style, and biological relationships of agent/receiver pairs. Considering the results reported by other researchers (Alexander & Broughton, 2001), we would like to encourage further research on the latter variable.

In our opinion qualitative analyses could also contribute to establish and study ESP in the Ganzfeld. This is particularly true if we use digital systems to record mentation reports in real time. It is possible that the methodology used to evaluate ESP, that is, the hits and misses through the choice of the correct target among the false ones, may be inappropriate or incomplete. The qualitative information of this study seems to show misses more suggestive of ESP than many of the hits. If ESP actually occurred in these "quality misses" and didn't occur in some hits without quality, how could we be sure that we can obtain reliable information in terms of the variables analyzed? New technologies, such as the digital Ganzfeld, dealing with the qualitative and quantitative measures simultaneously, may help us in this regard. Maybe, a methodology that records a multitude of variables (images, sound, physiological information) in real time for both the agent and the percipient could be important in our ESP studies. Work along these lines is being developed at Liverpool Hope University, Northampton University and at the University of Gothenburg (Dalton, 2002; Fox, Smith, Williams, 2002; Goulding, Westerlund, Parker & Wackermann, 2001)

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A DMILS Study in a Non-EuroAmerican Culture[i]

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Abstract

In spite of the great diversity among the world's cultures, every culture reports parapsychological phenomena, yet there has been insufficient experimental research carried out in non-EuroAmerican cultures. These two studies, supported by the Bial Foundation, employ the cognitive DMILS protocol in Bali, Indonesia. This protocol was first introduced by Braud, Schafer, McNeill, and Guerra (1995) and replicated by Brady and Morris (1997).

The psi task consists in a person in one room (Helper) facilitating the attention focusing meditation of a person in another room (Helpee). A run consists of 16 one-minute periods. A computer in the Helper's room randomly selects the order of tasks for the Helper in each pair of periods, whether it is a Help or a Control period (resulting in 8 Help and 8 Control periods). During the Help periods, the Helper focus attention on a lighted candle and intends for the Helpee to increase her focus on a lighted candle in her room. During the Control periods, the Helper is asked not to concentrate on the candle. Meanwhile, the Helpee is asked to press a button. which is in his lap and is connected to the computer, whenever he notices that his mind has wandered from focusing on the candle, and then return to his focus meditation. The primary hypothesis in these studies, confirmed by both previous studies, is that the sum of button presses in the Control conditions will be significantly more than the sum of the button presses in the Help condition.

Two studies were carried out in Bali in January, and in May, 2002. The authors of the previous studies wondered whether meditation training might improve psi facilitation in this protocol, but they had not pursued this question. Our studies tested not only the feasibility of using the cognitive DMILS protocol in a non-EuroAmerican culture, but to see whether meditation training had a positive effect on the psi results.

In Study 1, Suryani trained 20 unpaid participants in meditation for three months, especially in focusing on a burning candle. Twenty other participants who had not been trained in meditation brought the total participants to 40. These were divided into 10 teams of 4, with two trained and two untrained participants in each group. Each session had 4 runs, one with two trained participants, one with two untrained participants, one with a trained Helper and an untrained Helpee, and one with an untrained Helper and a trained Helpee. The primary hypothesis was supported by there being fewer button presses in the Help condition than the Control condition ($t_{(37)}=2.151$, $p<.025$, one-tailed, Cohen's $d=.36$, $power_{(at\ beta=.2)}=.33$). Analysis suggested that the greatest psi success occurred with trained Helpers and high need untrained Helpees.

Study 2 used 30 unpaid participants meeting the conditions above. 60 runs were carried out, again yielding significant results, $t_{(119)}=3.161$, $p<.005$ (one-tailed), $d=.21$, power = .29. However, the significant results do not seem to have come from using meditation as a variable.

In spite of the great diversity among the world's cultures, every culture reports parapsychological phenomena. This fact makes the question of whether psi phenomena occur in other cultures is an important one for a number of reasons. First, we might find alternative conceptualizations of psi, investigating how these events are understood within the worldview. Second, we can see which parapsychological claims are cross-cultural. Third, we might learn whether there is consistency among cultures in ways to develop and employ psi; for instance, the placing of a drop of oil on the fingernail of a child in Bali, who then sees an image of a scene where one can, e.g., find a lost object, seems to be a special case of scrying (Kelly, 1981). Fourth, there is the potential for new models of lab testing to emerge from the study of psi in non-EuroAmerican cultures. Fifth, we might be able to develop a better understanding of the role of cultural variables in the production of psi, as well as psychological variables.

Bali is a good place to engage in a parapsychological experiment for several reasons. First, it is a culture that has been well researched ((Covarrubias, 1972); (Edge, 1993), (Edge, 1994, 1996, 1998); (Geertz, 1973); (Jensen & Suryani, 1992); (Lansing, 1974, 1983); (Suryani & Jensen, 1993)). Second, it is a culture that believes in the existence of paranormal functioning, and research into the Sheep-goat Effect suggests that this is an important, although marginal, factor in psi production. In our research, 78% of the Balinese believe that ESP is certain, while only 3% think that it is impossible. Third, Bali is a classic example of a relational culture, one in which the self is defined in terms of its relationship with others ((Edge, in press); Lansing 1974). The DMILS experiment that we carried out takes advantage of this factor.

DMILS (Direct Mental Interaction with Living Systems) experiments have been performed for decades (*inter alia* (Braud, 1993, 1994, 1995, 1991); (Delanoy, 1999); (Delanoy & Morris, 1998-99); (Schlitz, 1977)), and it is an important methodology for process oriented studies. In this protocol, a person tries to affect some physical, psychological, emotional, or cognitive processes in another person (although targets have included fish, plants and bacteria, among others). In human studies, it is usually thought that the connection between the members of the dyad is important, and it is this factor that will be exploited in this study based on training and on Bali being a relational culture.

The DMILS paradigm traditionally has been used with animals and with physiological measurements of humans (Braud, 1991). But, in a later experiment Braud, Shafer, McNeill, & Guerra (1995) extended the paradigm to cognitive systems. They hypothesized that if a person is able to influence a remote, spatially distant living physiological system, then a facilitator could also influence a cognitive system.

Braud et al (1995) chose the cognitive process of attention focusing meditation as the process to be influenced. A person (Helpee) in one room meditated, focusing on a burning candle, while a person (Helper) in another room was designated to facilitate the meditator's focusing meditation. The experiment achieved significance ($p = .049$, two-tailed, effect size = .25).

Brady and Morris employed the same experimental design to successfully replicate this finding ($p = <.05$, one-tailed, effect size (r) = .27) (Brady, 1997). Brady and Morris were particularly interested in investigating more deeply the relationship between the pairs in the dyad.

Both Braud, et al, and Brady and Morris suggested that meditation training might facilitate psi success, but they did not explore this suggestion, so in this present study we explored whether meditation training would facilitate psi. At the time of planning the first study, which took place in January, 2002, these were the experiments that had been published in the parapsychological literature.

Method of Study 1

Experimental Design

The experimental design followed closely the two previously published experiments. A participant (Helpee) sat cross-legged on a cushion on the carpeted floor in a quiet hotel room focusing on a lighted candle. Whenever the Helpee's attention wandered from the focus meditation, the person registered the lapse by pressing a button that recorded the lapse on a computer. Meanwhile, a Helper was also seated on the floor in a room across the hall. During Influence periods, eight of the sixteen 1-minute periods, this Helper focused attention on the same kind of lighted candle with the intention to positively influence the Helpee in focusing attention. During the Control periods, the other eight periods, the Helper was asked to think of something else. The Influence and Control periods were randomly assigned within couplets. To check for success in the Helper influencing the Helpee, the number of button presses in the Control periods was compared to those in the Influence period. At the end of the session, both the Helper and the Helpee were asked to fill out two measurements, one a measure of success at focusing attention (Questionnaire 1), and the second a measure of distractibility in everyday life (Questionnaire 2).

Participants

Forty unpaid volunteers, ages 23-48, participated (16 females, 24 males). Twenty of them were first recruited by Sri Wahyuni, a Resident Intern of Suryani in the Department of Psychiatry at Udayana University; the participants were employed at the Bali Post, a newspaper in Denpasar, Bali. They were asked to participate in an experiment involving meditation, not being informed of the exact design of the experiment, but told they would be trained in meditation by Suryani for a three month period. Suryani tried to match each of these meditation-trained individuals with an untrained person of the same sex and age for the experiment.

Meditation Training

Suryani started the training with 20 people from the *Bali Post*, and two Resident Interns who had time to attend (Sri Wahyuni, who recruited the meditators, and Sinta attended all of the sessions). None of these participants had taken part in formal meditation training before. The training lasted from Oct 17 and ended Dec 29, 2001. The experiment commenced a week and a half later. Every Saturday Suryani came to the newspaper office to give training from 12-1 p.m. The first half of the session was dedicated to training in focusing attention on a burning candle and the second half trained in her own meditation method of in imagery, sensitivity, and self-confidence. They were also asked to train at home twice a day, and every week Suryani gave them a different meditative task.

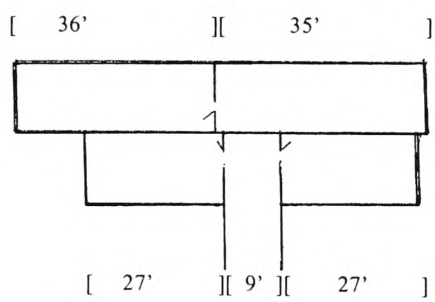
Setting

No appropriate dedicated laboratory space was available at the university or the hospital, and noise was a problem in both of those locations. Given the tourist down-turn in Indonesia, it was possible to rent three rooms at The Grand Bali Beach Hotel, in Sanur, not far from Denpasar, during January 7-10. The participants were picked up by drivers for the experiment and returned to the Bali Post afterwards.

Physical Layout. The three rooms were situated at the end of the fourth floor. The suite, located at the end of the floor facing the beach, was quite large, consisting of a large bedroom, two bathrooms, a kitchen and a large sitting area, in addition to two balconies. This room was used to greet the participants, explain the experiment, and to house everyone during the experiment. The construction between the rooms was quite good, and the experimenters could not hear any noise between rooms, except when they banged on the walls. Noise from the outside was minimal, as there were few tourists.

The two experimenter rooms, each 27 feet long and 13 feet wide, were typical hotel rooms, along the hall just before the suite. The hallway was 9 feet wide. The rooms were separated by two closed doors, and an assistant sat outside in the hallway to make sure there was no inadvertent communication between the participants, as well as to make sure no noise came from other people on the floor. Both participants sat on the floor in a semi-darkened room, with a lit red candle on a 50 cm stand approximately two meters in front of them. They were separated by approximately 57 feet.

Floor Plan of Experimental Rooms



In the Helper's room was a TV monitor and an automated computer system. The software was designed by Paul Stevens and was an updated version of the program used previously in the Koestler Lab at the University of Edinburgh. The couplets of help/control periods were randomize as part of a pseudo-randomized algorithm built into the Quick Basic program, insuring an equal number of help and control periods (8 each). After the program was initiated, the "Help" or "Control" was displayed on the laptop computer monitor (next to the monitor was a sign, translating and explaining the conditions; it read: "Help = Meditasi, Membantu teman meditasi," (i.e. Meditate, help your meditating friend) and "Control = *tidak meditasi, santai* (*tidak memikirkan teman meditasi*" (i.e. do not meditate, relax (do not think about your meditating friend))); at the beginning of each one-minute period, a "beep" was sounded to let the Helper know to look at the monitor to see if it was a help or a control. The program produced automatically a data file on the hard drive, and this was copied onto a diskette at the end of each run.

Questionnaires

During the meditation training prior to the sessions, the 20 participants keep a record of their meditation activities, the times they practiced meditation on their own, and the results. All of the meditators practiced routinely at home on their own.

During the experiment, two questionnaires were given to the participants after their trials. The first was a 15-item measurement of the degree of difficulty in concentration during everyday activities (see Appendix 1); this questionnaire was originally created and used by Braud et al (1995). The second (see Appendix 2) was an estimate of success at focusing attention during the meditation session (a one-item visual analog scale on which the participant marked on a 10 cm line to indicate how well attention had been maintained on the candle for the overall session, one end saying "not successful at all" and the other end saying "extremely successful.") These measurements were used to explore the question of whether more needy participants, particularly more needy Helpees, would be more successful in being influenced than less needy Helpees, a question also tested in the two previous experiments (Braud, et al, 1995; Brady and Morris, 1997). More needy participants were those who scored below the median on the attention success measurement (the first questionnaire) and above the median on the difficulty in concentrating in everyday life (second questionnaire). Thus, the more and less needy scores took into account both their experience during the experiment and in everyday life.

Procedure

The experiment used 40 people who initially had no formal training in meditation. Half of them had a 3 month training period before the experiment, and the other half had no training. Many of the participants knew each other before the experiment but some of them did not.

We formed 10 teams of 4 people. On each of the teams, two of the people had received the meditation training while two had never had any meditation training. The participants were not told any of the details of the experiment before arriving at the experimental site, but we were told to be positive about the success of the experiment.

The four people comprising the team were brought by car from the newspaper office to the site of the experiment, the Grand Bali Beach Hotel, and were brought into a comfortable suite, where they were given snacks, and they were told the details of the experiment.

Suryani orally gave instructions (in Indonesian) all four participants the following explanations at the beginning of the Session, taken verbatim from Brady and Morris (1997).

Suryani then asked if there were any questions and she answered them. She then took all four participants to both the Helpee and the Helper rooms, and explained the experiment again. (Edge had lighted the candles and made the rooms ready, including the computer). Afterwards, the first two participants were taken to their rooms, while the other two went back into the suite to relax; again, as the participants were seated on the floor to begin the experiment, Suryani successively explained their respective tasks to them and made sure they understood their respective tasks. Then Edge started the computer and both of the experimenters left the room and closed the door, going back into the Suite.

After 17-18 minutes, Suryani went into the Helpee's room and "talked the person down," going then to the Helpers room. Edge went also and saved the file to disk and to the hard drive. Suryani then asked both the Helper and the Helpee to fill out the two short questionnaires back in the suite. When this was completed, the participants were told to relax, or, periodically, one of them then participated in the next run.

We had four sessions of four runs the first day, four the second, and two the third, making a total preplanned 10 sessions, with 40 runs.

Each of the four participants (two trained and two untrained) on the team went through two runs in each session. Each session was comprised of the following four runs:

1) Trained 1 as Helper
   Trained 2 as Helpee – both trained condition
2) Untrained 1 as Helper
   Untrained 2 as Helpee – both untrained condition
3) Untrained 2 as Helper
   Trained 1 as Helpee – Helpee only trained condition
4) Trained 2 as Helper
   Untrained 1 as Helpee – Helper only trained condition

These conditions were counterbalanced among the teams.

Planned Analyses

Three analyses were planned:

1. The primary hypothesis was that the Helpees distraction score (frequency of distractions, i.e. # of button presses) would be greater for Control than for Help periods. In other words, it was predicted that the Helpers will be successful in influencing the Helpees' focus mediation, reducing their distractions. Because of the success in the two previous studies, a matched t-test, 1-tailed, was planned, as well as a calculation of the effect size.

2. Two *need related hypotheses* were offered, again in keeping with previous two studies. The hypotheses were:
   a) the Helpees who are classified as more needy will experience a greater psi interaction score than those classified as less needy, and
   b) The Helpers who are classified as more needy will contribute a lesser psi interaction score than those classified as needy.
3. There was another planned analysis, but we did not have an hypothesis: We planned to compare the four different conditions (i.e. when both were trained, when neither were trained, when only the Helper was trained, when only the Helpee was trained) to see if one condition was better. Both Braud, et al (1995), and Brady and Morris (1997), had suggested meditation training as a potential method of increasing psi facilitation, but it was unclear in what way meditation training might affect the outcome. For instance, we did not know whether a ceiling effect might be produced because of the meditation, i.e., whether the training would make the system less stochastic and thus less amenable to psi facilitation when the Helpee was trained. On the other hand, it might be the case that a trained meditator would be a better psi facilitator on an untrained Helpee. Or, perhaps, training might help both the Helper and Helpee be more successful.

Results

For each of the forty sessions, the number of button presses (indicating distraction) was summed across the eight one-minute control and the eight one-minute help periods. As in the past two published experiments, these two variables (control vs. help) were used to generate a *psi index*, arrived at by dividing the total number of button presses by the number of button presses in the Control condition. Therefore, this index gave an indication of psi interaction. Finally, the index was dichotomized at 0.5 to create a new binary variable called *evidence of psi*. All the above variables were used at different stages in the analysis that follows.

Two cases (5% of total cases) were identified as univariate outliers, because of their extremely high scores in either the control or the help periods ($z_{control} = 4.42$, $z_{help} = 3.79$, $p < .001$, two-tails). By using the Mahalanobis distance (the distance of a given case from the average distance of all cases and assessed through a chi-square distribution (Tabachnick & Fidell, 2001, pp. 67-70), the response of one of the above cases in the control period was also characterized as a multivariate outlier ($x_{(1)}2 = 19.5$, $p < .001$, two-tails). Both cases were removed from the dataset, leaving 38 valid sessions.

1. The primary hypothesis predicted that there would be a direct mental influence from the Helper on the Helpee, shown through fewer button presses during the help period as opposed to the control period. Indeed, the mean of the total button presses in the control period was 2.58 (*s.d.* = 2.18), and in the help period it was 1.89 button presses (*s.d.* = 1.64). These means were statistically significant from each other, indicating that overall there were significantly fewer distractions in the help period ($t_{(37)} = 2.151$, $p < .025$, one-tail, Cohen's $d = .36$, $power_{(\text{at beta} = .2)} = .33$).

2. The second hypothesis was two-fold and concerned those classified as more or less needy based on results from the two questionnaires.

2a. In the first part, it was hypothesized that high need Helpees would experience a greater psi interaction score than the low need ones, since they would be open to be helped by the Helper in focusing their meditation. Due to low observed frequencies, the Fisher-Irwin exact test was used on the cross-tabulated data of evidence of psi (yes/no) vs. needy Helpee (high/low). The result seems to support the hypothesis (exact $p = .013$, one-tail). Further analyses revealed that high need Helpees tended to have significantly higher scores on the psi index ($\chi^2 = .66$, *s.d.* = .14) than the less needy ones ($\chi^2 = .33$, *s.d.* = .36) ($t_{(16)} = 2.83$, $p < .01$, one-tail, Cohen's $d = 1.2$, $power_{(\text{at beta} = .2)} = .59$). This result was almost entirely attributable to the responses in the control period ($t_{(16)} = 2.46$, $p < .02$, one-tail, Cohen's $d = 1.3$, $power_{(\text{at beta} = .2)} = .84$), in which Helpees who were classified as more needy indeed appear to have experienced a greater psi interaction score ($\chi^2 = 4$, *s.d.* = 2.27) than those classified as less needy ($\chi^2 = 1.5$, *s.d.* = 1.64).

2b. The second part of this hypothesis predicted that Helpers who were classified as more needy would contribute a lesser psi interaction score than those classified as less needy. Following the same logic as above, the Fisher-Irwin exact test was applied on the cross-tabulated data of evidence of psi vs. needy Helper, but the results did not seem to support this hypothesis (exact $p = .53$, one-tail).

3. The third planned analysis examined the effect of meditation training on the psi scores measured either through the psi index or the button presses in either the control or the help period.

A 2 x2 between subjects ANOVA, with factors helper vs. Helpee and levels presence vs. absence of meditation training, did not identify statistically significant main or interaction effects of the factors on the psi index, suggesting that in general meditation training may not substantially affect psi success. That said, a closer inspection of the results (Fig.1) revealed that the highest psi interaction appeared when the Helper was trained and the Helpee was not; and in fact, although this simple effect was marginally nonsignificant ($t_{(16)} = 1.83$, $p = .08$, two-tails, Cohen's $d = .86$, $power_{(\text{at beta} = .2)} = .41$), the magnitude of the effect suggests the existence of a strong moderation between these variables at this level.

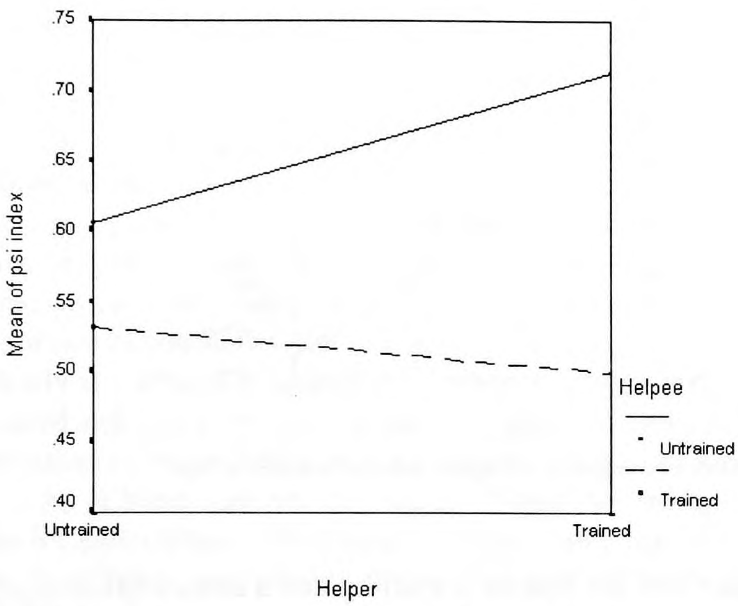


Fig. 1 Mean psi index scores for two levels of meditation training of helpers and helpees

A clearer picture can be obtained through the use of the distraction scores (button presses) during the Control and the Help period. A 2 x 2 x (2) mixed factorial ANOVA was used with factors Helper vs. Helpee vs. period (Fig. 2). The results show a relatively strong interaction between Helpers and Helpees ($F_{(1,34)} = 4.89, p < .05, O_2 = .13, power_{(\text{at beta} = .2)} = .57$). This interaction can be attributed to the following two simple main effects: a) in the Control period when the Helper was untrained, the untrained Helpee generated a significantly higher distraction score ($\chi^2 = 4$, *s.d.* $x = 2.21$) than the trained Helpee ($X = 1.3$, *s.d.* = 1.25) ($t_{(18)} = 3.36, p < .005$, two-tails, Cohen's $d = 1.5$, $x\ power_{(\text{at beta} = .2)} = .88$); and b) to a lesser extend the fact that in the Help period when the Helper was trained the distraction score of the trained Helpee ($\chi^2 = 2.22$, *s.d.* = 1.48) had a marginally nonsignificant difference from the one obtained by an untrained Helpee ($\chi^2 = 1.11$, *s.d.* = 1.17) ($t_{(16)} = 1.77, p = .09$, two-tails, Cohen's $d = .83$, $power_{(\text{at beta} = .2)} = .38$). Generally, although when both subjects were untrained they gave the highest distraction scores, they were generated when only one of the subjects was trained - specifically in the Help period with an untrained Helpee.

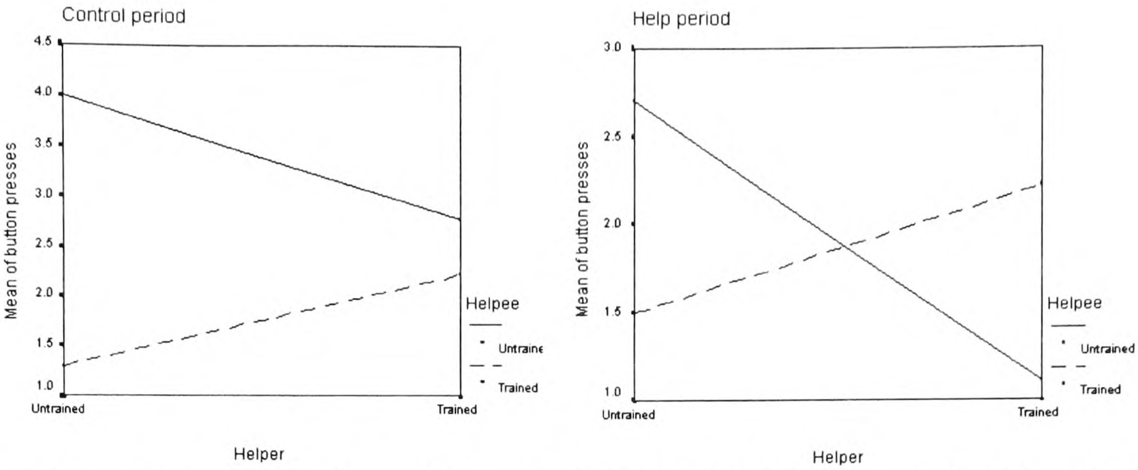


Fig. 2 Mean button presses for the two levels of meditation training of the helpers and the helpees in the control and the help period.

Finally, the above results appear to suggest that the Helpee's training had a somewhat stronger contribution to the psi scores than the Helper's one. In addition to the above findings, although no main effects of either Helper or Helpee were observed, there was a statistically significant interaction between period and Helpee ($F_{(1, 34)} = 6.86, p < .02, 0_2 = .17, power_{(at\ beta\ =\ .2)} = .72$). This interaction appeared mainly because during the control periods untrained Helpees tended to have significantly higher distraction scores ($\chi^2 = 3.42$, *s.d.* = 2.43) than trained ones ($\chi^2 = 1.74$, *s.d.* = 1.52) ($t_{(30.2)} = 2.56, p < .01$, one-tail, Cohen's $d = .93$, $_{beta\ =\ .2)} = .88$).

Discussion

1. As in the two previous studies that aimed to explore the cognitive DMILS paradigm (Braud et al, 1995; Morris and Brady, 1997), the overall psi DMILS effect was supported. There was a significant difference in the distraction scores between the Help and the Control conditions.

There is a strong psi effect ($p < .025$) in this study. This suggests that the cognitive DMILS paradigm is robust enough to be used in cross-cultural settings, and, in fact, it may be a more useful tool in a culture like Bali where meditative prayer is ubiquitous.

When one compares the effect size of other DMILS studies to this one (Cohen's $d = .36$), this study fares quite well. The effect size in the Braud, et al study was .25, and in the Brady and Morris study it was .27. These effect sizes are about the same as found in the 15 electrodermal studies (.25) reported in Braud & Schlitz (Braud, 1991). It is worth asking what factors may have contributed to this success. This experiment was planned not only to see if the DMILS paradigm could be successful in a non-Western environment, but also to test whether meditation training would increase psi interaction. Since the success might be due to the non-Western environment, to the specific meditation training, or to certain factors about the Helpers or Helpees, among other hypotheses. We could only eliminate some possibilities. Specifically, it did not look like the meditation training had an overall positive effect on the outcome, as we will see below.

2. Braud et al pursued the question of the need-relatedness of psi. The PMIR model (Stanford, 1978) asserts that psi works in stochastic systems in which a need shifts the probability of the system in such a way that the need is fulfilled. To test this hypothesis, they used two questionnaires, one investigated the degree of difficulty the participants had in concentrating during everyday activities. The second questionnaire asked the participants to estimate their success at focusing attention during the meditation. Both questionnaire were created by Braud et al (1995). They dichotomized the participants into more needy and less needy in each questionnaire and correlated them with psi success scores. Both questionnaires correlated positively.

Brady and Morris also used these questionnaires, but they combined them to get their high need and low need participants. However, they did not find a correlation between the two questionnaires, nor did their results support the need-based hypotheses.

As in Brady and Morris, we combined the two questionnaires to arrive at high need and low need scores for participants. We found, as anticipated, that the high need Helpees had a higher psi score than those classified as less needy. This seems to confirm the first part of the need hypothesis, and fits with the PMIR model. However, in a post hoc analysis, we found that a high need Helpee was ten times more likely to be untrained (odds ratio = 10, $p = .06$, two-tails). Thus, there is a confounding of the factors of high need and of being untrained among the Helpees.

The second hypothesis predicted that Helpers who were classified as more needy would contribute a lesser psi interaction score than those classified as less needy. However, this hypothesis was not confirmed.

3. We did not support the hypothesis that training in focus meditation straightforwardly helped facilitate psi interaction overall. However, the highest psi interaction occurred when the Helpee was untrained and the Helper was trained, and the magnitude of the effect suggests a correlation, even if main interaction did not reach statistical significance. This suggests that a study composed of high need, untrained Helpees might produce higher psi interaction scores in a cognitive DMILS study in Bali, particularly when paired with trained Helpers.

STUDY 2

New DMILS Studies in the Literature

Two additional articles using the DMILS protocol (Watt and Brady, 2002; Watt and Baker, 2002) were published in parapsychology journals in 2002; because they were carried out at the University of Edinburgh, we knew of them and their results earlier. Because both of them dealt with a subject we were not directly concerned with in these studies, the experimenter effect, they did not affect our studies in any direct way.

Method

Experimental Design

Because of indications that trained Helpers and untrained, high need Helpees might facilitate psi success, we set up the experiment accordingly. Thus, this study should be considered a conceptual (not an exact) replication. The participants consisted of Helpers, who had been trained in meditation and who were the most successful Helpers in Study 1, as well as untrained Helpees from Study 1 who had scored as high need (above the median). As there were not enough Helpers from this group, we gave Questionnaire 2 (distractibility in everyday life) to a number of volunteers, choosing those persons with scores above the median score on the January tests, until we completed the number of Helpees we needed. Therefore, this study differed from the first one in having all of the Helpers trained in meditation and all of the Helpees untrained and with high need. The task was the same: The Helpers sat cross legged in a hotel room in front of a laptop computer, which displayed every minute (along with a soft beep) either "Help" or "Control." The Helpee also sat cross-legged in a non-adjacent room with a button in her lap and was asked to press the button whenever she noticed her mind wandering from a focus on the burning candle. At the end of the session, both the Helper and Helpee were asked to fill out the same two questionnaires used in Study 1 (if they had taken Questionnaire 2 just prior to the experiment, they were not asked to retake it). Additionally, all participants were interviewed by Suryani about their experience after each trial.

Participants

Thirty unpaid volunteers, ages 23-45, participated (16 Females, 14 males). The fifteen Helpers had participated in Study 1. Seven of the Helpees had participated in Study 1, and eight were new (one of these substituted at the last minute for an untrained Helpee in Study 1 who could not participate).

Setting

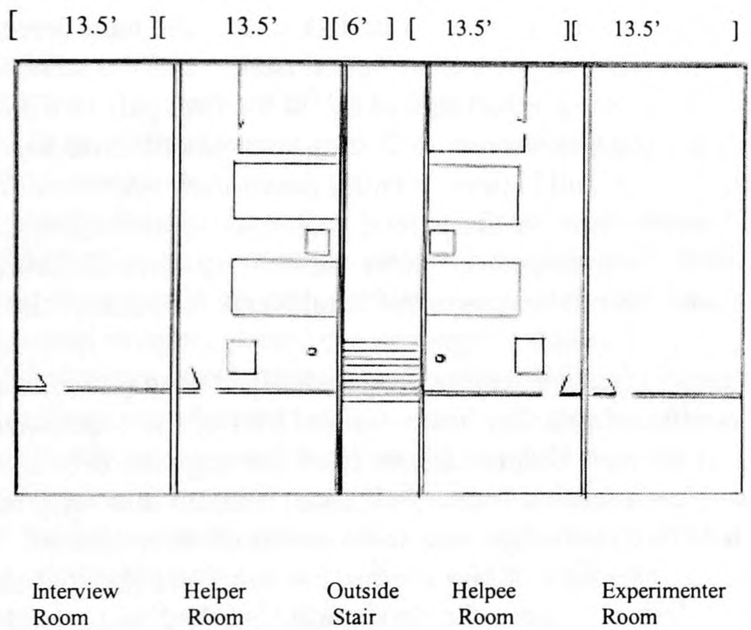
Since no laboratory space was available, we again rented rooms in a hotel, this time at the Puri Santrian Hotel, on Sanur Beach not far from the Grand Bali Beach Hotel (site of the first experiment). This hotel is not a high rise, but consists of a series of two story buildings, more appropriate to Balinese culture, and it is more densely planted with vegetation. Participants who were involved in the previous study remarked that this venue was more comfortable for them. As before, most participants were picked up from their work and brought to their sessions.

Physical Layout

Four rooms were rented on the first floor of the most isolated of the buildings. These were regular hotel rooms (24 feet by 13.5 feet) with a table separating two queen size beds and a bathroom at the far end of the room. The rooms had window air conditioners. The two pairs of the rooms were separated by a six feet wide stairway to the second floor and a walkway going to the back of the building. The two rooms to the extreme ends were used by the experimenters as greeting and interview rooms, while the two rooms in the middle (but without a common wall and separated by a six feet walkway) were used as the rooms for the experiments. There was a sitting porch in front of each room, separated from each other by a six feet tall wall.

Both participants sat on cross-legged on a folded blanket on the carpeted floor near the door in a semi-darkened room, with a lit red candle on a 50 cm stand approximately two meters in front of them. The participants were separated by approximately 26 feet. The same computer equipment, software and button were used as in Study 1.

Floor Plan of Experimental Rooms



Questionnaires and Interviews

Each of the participants was asked at the conclusion of each run to fill out Questionnaire 1: Estimate at Success of Focusing Attention. Additionally, Suryani carried out a semi-structured interview, trying to obtain additional information about their experiences. She asked what strategies they used during the session, what bodily sensations they had, whether or not they became distracted, how much they thought they helped or gotten help from the other person, and what they felt like at the end of the session. The information from the interview was categorized and put in an Excel file and used in exploratory analyses.

Additionally, Questionnaire 2 was given once to each participant at one of three times: Just before the experiment began for the new participants so that we could find high needy subjects, just after their first session, or just before their first session if they were waiting for their run to begin.

Procedure

Most of the participants were brought to the site in groups of four, two Helpers and two Helpees. They were greeted by the experimenters and asked to sit in the Interview Room and relax. They were offered snacks and drinks, and the same procedure as in Study 1 of informing the participants of their task and getting them started was employed. At the start of the run, Suryani then returned to the Interview Room and asked the remaining Helper-Helpee pair to fill out Questionnaire 2, if they had not done so already. Edge and Morris[ii] worked in the Experimenter Room.

After 17-18 minutes, Suryani went to the Helpee's room and told them to stop meditating, and she talked them out of meditation where necessary. Then she went into the Helper's room and did the same thing, after which Edge went into the room and saved the data to disk and to the hard drive.

Then, the second Helper-Helpee pair was taken to the experimental rooms and the same procedure was followed. Suryani returned to the Interview Room and asked the first pair to fill out Questionnaire 1; if they had not previously filled out Questionnaire 2, they were asked to do so. In the remaining time, Suryani interviewed both the Helper and Helpee, writing down their answers. At the appropriate time, Suryani and Edge closed down the run for the second pair, and the same procedure was followed. The first pair then participated in their second run, after which they were interviewed again, as the second pair engaged in their second run. It took two and a half days for each of the pairs to run two runs each.

Then, Helpers were assigned new partners (except for the dyads who had been paired in the January sessions and had scored well; they continued together in the second half of the experiment) based on logistical considerations, and each of the new Helper-Helpee pairs participated in two runs during the last two and a half days. The four runs in each session took about an hour and forty minutes. Two four-run sessions were carried out each of five mornings; one session was completed each afternoon for five consecutive days. This was a reduction of one session per day from the first study, but the experiment lasted five days as opposed to four days in the first study. Study 2 had a total of 60 runs.

Hypotheses and Preplanned Analyses

Based on the previous study, we made several predictions:

The *primary hypothesis* was that there would be a significant difference in the Help and Control conditions, with significantly fewer button presses occurring in the Help condition than in the Control Condition.

We offered three *secondary hypotheses:*

1. Given the use of Questionnaire 2 as a way to pick out high need Helpees (used by Braud et al (1995), it was important that subjects responded to this questionnaire in a consistent way. Since it purports to point to relatively stable traits, we predict that there will be test-retest reliability from January to May in the subjects who were in both experiments. Brady and Morris (Brady,

1997) had cast doubt on this measurement, as it did not serve as a predictor in their study as it had in Braud et al (1995). Since, however, it seemed to relate to psi success in our first study, we employed it in this study.

2. The few subjects who were paired up in both January and May sessions, since they had consistently positive psi scores in January, would also have consistently positive psi scores in Study 2.
3. Since it was suggested in the first study that trained Helpers were better, we reasoned that those who meditated consistently (often) would produce better runs than those who had not meditated consistently.

Finally, we had a number of *exploratory questions* based on the interview data. Interviews had not been used in previous DMILS cognitive experiments, so we were not sure what data we would get and how useful it would be. After having categorized the interview data, we were able to ask the following exploratory questions:

1. Is one strategy in the use of imagery better than others? Morris (Morris, Nanko, & Phillips, 1982) has long been interested in investigating whether one strategy is more helpful than others in producing psi. In the interviews, we discerned three categories the participants seemed to use: a general imagery strategy, a strategy of thinking, and a strategy using thinking explicitly in words (where words were heard or thought).
2. Was there any consistency between those people who seemed to help (or be helped)—noted by higher psi scores—and their saying that they helped (or were helped)? In other words, can participants know if they are helping or being helped in the focusing task?
3. Do the higher need Helpees (the top half) do better than the lower half? This is an extension of the original hypothesis that high vs. low need will do better, but since all Helpees are high need according to January's definition, we wanted to find out if it is the case that that the more highly needy subjects do better (is there a limit to neediness).

Results

Primary Hypothesis

There was a significant difference in the button presses between Help (mean = 2, SD = 2.02) and Control (mean = 2.48, SD = 2.55) condition, $t_{(119)} = 3.161$, $p < .005$ (one-tailed), $d = .21$, power = .29.

Secondary Hypotheses

1. Questionnaire 2 exhibited both good internal reliability (Cronbach's alpha = .76), and test-retest reliability between January and May in the subjects who were in both experiments, $r = .69$, $N = 21$, $p < .005$, (two-tails), $t_{(20)} = .62$, *ns*, $d = .1$, power = .09. Hence, this looks like an adequate instrument to employ in these studies.

2. There were two few subjects who were paired in both experiments to test this hypothesis.
3. Helpers who meditated often were not statistically better in psi scores than those who meditated infrequently (the meditation data were dichotomized), $F_{(1,\,16)} = .001$, *ns*, (effect size) part-0^2 = .003, power = .001. This result can be explained in three ways. First, because there were not many Helpers who marked that they did not consistently meditate, the comparison may not have been robust enough. Second, meditation may not admit of gradations; it may be that initial training was sufficient to be psi effective. Third, it was only suggested by the data in the first study that trained Helpers were pivotal; having a high need Helpee was more important in that study than having trained Helpers. Perhaps, meditation is not very important, or not as important as other factors.

Exploratory Questions

1. Although it appears that hearing a word as a strategy gave the highest average psi score (0.75), there was no statistical difference between the strategies, $F_{(3,42)} = .683$, *ns*, part-0^2 = .014, power = .08. We did not intentionally manipulate the various use of strategies, and so this result should not be taken to mean that some strategies are not better than others. Further study with these strategies as manipulated variables would be needed to reach that conclusion. Nevertheless, although no significant result came from this study, it is of use to see which strategies the Balinese employ spontaneously in a DMILS context. For instance, this sample of participants seemed to use auditory strategies (explicitly using words) more than expected by the experimenters.
2. In terms of the question of whether there was any consistency between those people who seemed to help (or be helped)—noted by higher psi scores—and their saying that they helped (or were helped), there was no statistical difference in the psi scores between the people who claimed that helped or were helped a lot and those who claimed they helped or were helped a little (no response and no help were excluded from the analysis, the latter because of its very few cases), $F_{(1,\,70)} = .8$, *ns*, part-0^2 = .01, power = .14. On average, the highest psi scores (0.7) were received when participants claimed they received /gave a lot of help. These results suggest that participants may have had some awareness of helping or being helped, but not decisively.
3. There were not enough cases in the groups to analyse if the high need Helpers did better than the low needy Helpers.

Discussion

As in the first study, the results of the primary hypothesis, that there would be fewer button presses in the Help condition than in the Control condition, was substantiated. Thus, it seems that the cognitive DMILS protocol is one that works well in Bali, and thus it is suggested that this is an experiment that might be useful in other non-EuroAmerican cultures.

We received mixed results on the secondary hypotheses. The good news is that the questionnaire developed by Braud (1995) that measured the difficulty in concentrating in everyday life seemed a reliable instrument in terms of test-retest reliability. In Study 1, it seemed to pick out high need Helpees, who would be more easily influenced by Helpers (predicted by theory and supported in the Braud, et al. (1995) study, but not in the Watt and Brady (2002)). On the surface, since we received a greater level of significance in the second study than in the first, it might be thought that this narrowing of conditions was successful. However, as we will mention below, the higher level of significance seemed to be due to greater degrees of freedom in the analysis, and not specifically to greater psi influence. Thus, the question of whether higher need Helpees, as measured by this questionnaire, facilitates psi is still undecided.

We did not learn much from the exploratory analyses, which were based on the interviews. This is a disappointing result, as we thought that a careful analysis of the participants' experiences derived through interviews might shed light on strategies that were useful. However, the only conclusion we can reach is that if certain strategies are psi conducive, they must be more fine-grained than we were able to decipher through our interviews, or they may be unique to individuals.

As mentioned above, in comparing the results concerning the main hypothesis of the studies, the second study achieved greater significance than the first one. However, as we mentioned above, we should not read too much into this finding, giving the overall analyses. In Study 1 the means were "better" (mean presses in Help were lower, and mean presses in Control were higher that in the Study 2), and so do appear to be the standard deviations (SD). However, the *t*-value is higher in Study 2. We may wonder why the *t* is higher while the pooled-mean and d are lower than Study 1; this result is directly dependent on the effect size *and* also on the study size (*df*). So in Study 2 although d went slightly down, *df* went up considerably.

The *p*-value is greater in Study 2, but this is a consequence of the greater degrees of freedom. In investigating whether two *p*-values of the same test (from normally distributed data) are significantly different from each other, we found that though they seem rather different, in probabilistic sense they aren't ($p = .8$). This strange result is because "normal" probabilities are not linear (rather they are more sigmoidal), so when one transforms their differences into a linear scale, then the distances tend to shrink, sometimes dramatically.

Therefore, from what we can gather from these analyses, it appears that the results of Study 2 were at best similar to those of Study 1. This is confirmed by analyses showing that all scores (except one) for Helpers who took part in both studies were worse in May, although not statistically different. Further, the correlations between each of the scores in both studies tend to be very low. This suggests that the participants' behavior in May could not be predicted by their behavior in January. These results suggest that the results in both studies appear to be relatively independent from each other.

Conclusion

The overall project in Bali aimed at seeing whether one could produce psi under controlled conditions in a non-EuroAmerican culture. The most fundamental finding is that we were successful in eliciting psi to a significant degree in both studies. The psi task of helping another focus attention on a lighted candle worked in a non-EuroAmerican culture, as it has in Euro-American cultures. Bali is a culture in which different forms of meditation or prayer is considered normal, and although the DMILS protocol was considered unusual, it was probably no more unsettling for the Balinese than it was for a European or an American. Therefore, we have good reason to believe that further experimental work in Bali employing the DMILS protocol will be successful.

The exploratory study yielded the suggestion that using high need Helpees, along with Helpers trained in meditation, would facilitate psi production. Thus, we set up the second study as a replication of the first, with modifications introduced put in to look for an enhanced effect. However, these modifications did not seem to enhance the results. One reason for this result may be that the vagaries of fieldwork, such as the lack of consistent lab space from one study to the next, may have had some effect. Whatever the reason, the results from the two studies appear, interestingly, to be independent of each other. In other words, although both studies produced statistically significant results, it was not possible to predict results from the second study based on the first study. Therefore, it is hazardous to make a connection between the significant results and the specifics of the designs in the studies. Further, the interview data, in general, did not yield a great deal of information concerning strategies that were useful to successful dyads. However, it is worth mentioning that in the lone case where an indigenous healer (*Balian*) acted as Helper in Study 2, the two Helpees reported separately that the Helper's effect on them started strongly at the start of the run, and it was so strong, that it lasted for the whole session. It produced such dramatically different experiential and behavioral reactions, that it was noteworthy. Of the four runs with this Helper, using two different Helpees, only in one run did a Helpee press the button (and pressed it only once in that run). In other words, the Helpees reported that they were affected so quickly and so strongly, and their focus became so strong, that they were not distracted during the whole run, a remarkable occurrence (this result occurred only these four times totally in the both studies, a total of 100 runs). This result suggests that it is well worth pursuing this DMILS protocol using healers as Helpers, which we plan to do in the next set of studies.

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[ii] Bob Morris, who helped with the experimental design on the two studies, joined us in Bali during Study 2.

Measuring Children's Intuition in a School Setting

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Abstract

A popular belief in Western culture is that females are more likely to trust their intuition than males although there is no substantial evidence to support this claim. Several studies have suggested that during certain intuitive tasks female students score higher on average than their male counterparts (Freeman, 1962; 1963; 1965; 1970). Other studies have shown that intuitive functioning appears higher in younger age groups and seems to decline in both genders as they grow older (Van Busschbach, 1959; Spinelli, 1983; 1987; Shargal, 1987). One experiment found that intuition scores correlated negatively with math ability, years of schooling, and age (Winkelman, 1981).*

The educational system in the United States does not acknowledge the importance of teaching intuition in schools, as evidenced by not offering classes that emphasize the need to exercise and develop the ability. Due to the lack of exercise and support, intuition, like any other functioning ability or skill, may become repressed (Ehrenwald, 1972) and through disuse, decline with age. In support of this expectation, one experiment found that children apparently do display more intuition than adults (Botrill, 1969), but it is premature to make any strong claims since there have not been enough studies comparing children with adults.

In the present study, a total of 2,040 children (1,020 males and 1,020 females), between the ages of 3-19 (60 males and 60 females at each age level) were each tested with a computer software program designed to test for the skill to predict a future, randomly selected target. All children were given this "precognition" test, consisting of 30 trials, in a school environment. Precognition is recognized as both an intuitive skill and a common form of ESP (Vaughan and Houck, 1992). The purpose of the study was to compare both gender differences and four different categories of age groups: 1) pre-primary and kindergarten (3-6 years of age), 2) grades 1-5 elementary school (7-11 years of age), 3) grades 6-8 junior high/middle school (12-14 years of age), and 4) grades 9-12 high school and college students (15-19 years of age). For all age groups combined, females scored ($z = 1.75$, $p = .04$) higher than males ($z = 0.39$) on average. The pre-primary and kindergarten age group had the highest averages per gender (males $z = 2.29$, $p = .01$; females $z = 2.13$, $p = .02$), and combined score (overall $z = 3.13$, $p = .001$). There was a significant drop-off in both genders combined from ages 3 through 10 ($r = -0.80$, $p = .02$, two-tailed. The overall average for all participants combined was positive ($z = 1.51$, $p = .07$), although non-significant (ns). More sophisticated statistical analyses are currently in preparation.

* In this paper, the author classifies psi or ESP as a category of intuition although it is not well accepted within parapsychology.

Introduction

Intuition is defined as *a cognitive functioning ability for obtaining immediate or direct knowledge.* In a study with college students, Bowers et al. (1990) concluded that intuitive hunches often guided students to accurately guess the correct solutions when they were uncertain of the coherent patterns they could not identify during verbal and non-verbal tasks. According to Goldberg (1983):

> Intuition is increasingly recognized as natural mental faculty, a key element in discovery, problem solving, and decision making, a generator of creative ideas, a forecaster, a revealer of truth. (Goldberg, p.15).

Cappon (1993) has identified twenty different intuitive skills in his *Anatomy of Intuition*, including two that parapsychologists have previously identified as *retrocognition* and *precognition*. From a scientific standpoint, little is understood how intuition works. Throughout human history, this elusive mental faculty has been labeled or referred to as: the sixth sense, extrasensory perception (ESP), psi or psychic ability, a guardian angel, and the inner voice of God. Under the ESP or psi notion, this category of intuition has been studied rigorously; however the majority of these studies have been with adult populations. Minimal research of measuring psi in children has been done in comparison. Drewes (1997) highlights important reasons why researchers may be hesitant in studying children. The difficulties with childrens' ability to trust researchers and understand the given task, and the challenge of designing experiments that are fun and engaging all factor into the decision of working with children (Anderson and McConnell, 1962; Anderson, 1966; Drewes and Drucker, 1991; Johnson, Cronqvist, Danielsson, and Mondejar, 1972; Kanthamani, Khilji, and Perlstrom, 1986).

Age Factors

An earlier study indicated that children demonstrate more ESP than adults (Botrill, 1969). A number of researchers believe that children are great subjects for study because of their differing stages of development. This conclusion is based on previously conducted studies that measure the relationship between ESP and cognitive development (Drucker, and Rubin, 1975; Drucker and Drewes, 1976; Drucker, Drewes, and Rubin, 1977; Kanthamani, Khilji, & Perlstrom, 1985). These studies indicate that children at the early developmental stages tend to score higher than children at the later stages. Spinelli (1983) conducted a study that also supports these findings. Unfortunately Berger (1989) found statistical flaws in Spinelli's experiments. Blackmore (1984) also criticized some of these experiments for not using randomized targets. In Shargal's study with children, randomized targets were used, and the youngest age group tested the highest (Shargal, 1987). Spinelli (1987) then successfully replicated her study with slightly better results. Ehrenwald (1972) postulated that ESP becomes repressed as children grow older.

Environmental Settings

Pratt (1961) suggests conducting research in an environment that is both familiar and comfortable will likely produce better results. Two places where a child may feel comfortable are at home and school. J.G. Van Busschbach (1953; 1955; 1956; 1959; 1961) conducted research with children in different schools in the United States and the Netherlands and found significant ESP results in both countries. He also found that younger children scored significantly higher than older children (Van

Busschbach, 1959). Drucker and Rubin (1975) did a smaller population study with testing children in a precognitive task and found that children tested at home scored higher than those tested at school. A follow up study by Drucker, Drewes and Rubin (1977) found similar results.

Gender Differences
Van Busschbach (1956; 1959) and Freeman (1962; 1963; 1965; 1970) have conducted most of the ESP research comparing gender differences. Earlier studies by Van Busschbach (1956; 1959) examined gender differences in scores. The first study showed males scoring slightly higher than females, while the second study showed a major reversal. Overall, Van Busschbach found that females scored significantly higher than males for both studies combined (1956; 1959). Freeman's first study involved preschool children (Freeman, 1962). Although the results were not significant overall, he did find a significant difference in scores between males and females. His later studies (1963; 1965; 1970) found that the type of targets used during the experiments made a significant difference in scoring results between the two genders. Females scored higher when the choices of targets were of a similar type from trial to trial, and males scored better when the choices of targets were different from trial to trial.

Three hypotheses were formulated based on these earlier studies:
1. Females will score higher than males on average.
2. The youngest age group of children will score the highest on average and there will be a decline in average scores with age.
3. Overall there will be a positive average score.

Method

Participants
A total of 2040 subjects (1020 males, and 1020 females) from ages 3-19 years old participated in the study. Sixty males and sixty females were tested at each age level. Previous studies with children have been done with much smaller participant sizes. Testing a population of a larger size would give researchers a better indication of how ESP is generally distributed among different genders and age groups. All participants in the present study were students selected from different schools located in two major cities: Minneapolis and St. Paul, plus the surrounding metropolitan area- a population of approximately 3 million people. During the last twenty-five years the population in these two cities and metropolitan area has increased and become much more ethnically diverse. Due to these multiple complications, a major concern of the researcher was the potential of an experimenter effect based on language barriers, a potential lack of cultural sensitivity, and ignorance of the uniqueness of each individual.

Description of the Environmental Settings
Schools are normally viewed as environmental settings for children to learn so it was ideal to collect the data for the study on site in these locations. The researcher observed noticeable differences from school to school. For example, in the inner city public schools the researcher examined more play fighting, violence, verbal abuse, hyperactivity, and disruptive and destructive behaviors than in the private schools or the public schools in the suburbs. Based on these unexpected observations,

another concern of the researcher was if the schools of a more hostile environment were both safe and comfortable enough for children to participate in the study without being too distracted.

Materials

A computer software program designed by Vaughan and Houck called *Psychic Reward* was downloaded on a Macintosh PowerBook 145 laptop computer as the testing device. The program itself contains one game that is displayed on the computer screen as shown in figure 1. A mouse was plugged into the laptop computer and sat on a mouse pad as an optional means of making selections from the screen. Psychic Reward is used to primarily measure precognition.

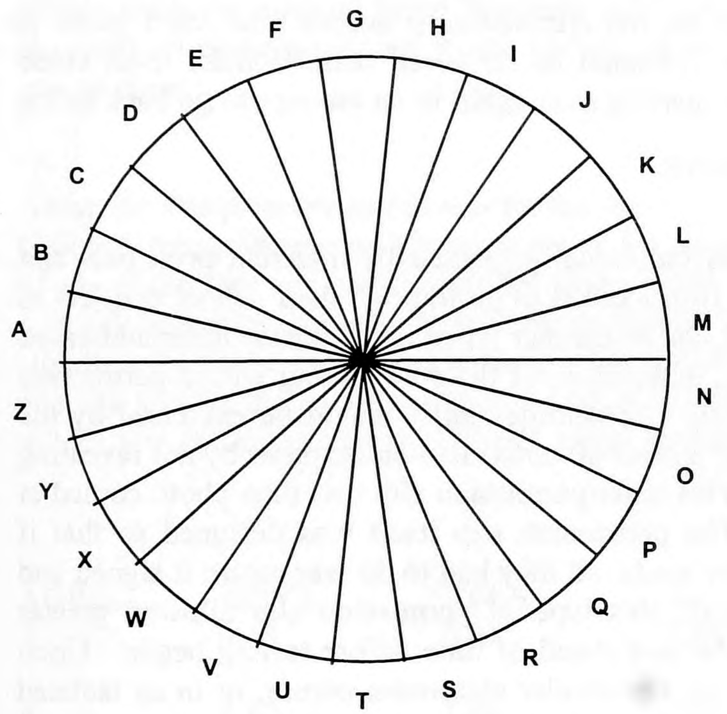


Figure 1. The wheel display of Psychic Reward

Each game consists of 30 trials as indicated in the upper left hand screen. All targets are selected by the computer, which operates as a pseudo-random number generator (PRNG). The computer's internal clock, with 8 to 33 million cycles per second in real time, freshly seeds the computer's PRNG for a new precognitive target prior to each trial. Extensive testing by Vaughan and Houck (1992; 2000) has demonstrated that the random selection process used in the program is adequately random. The author also tested the program's randomness in each site location for a total of 64,800 trials. These tests were stored on thirty-six named data files. The cumulative raw score of these data files is 36,001- with an average score of 1000.03, which is very close to the theoretical mean chance expectation (MCE) of 1000. Vaughan and Houck (1992; 2000) indicate that the MCE is 962 for less than 500 trials of testing and 1000 for trials greater than 500. The 962 score is the actual MCE for each individual participant since they are only completing one game of 30 trials. All tests were conducted both before and after students were tested to make sure that the program was not inherently biased.

The probability of choosing the correct target is 1/26 for each trial. Psychic Reward provides a graduated auditory and visual feedback, that is, a choice closer to the correct target earns more points that are shown in the lower right-hand corner of the screen and produces a longer, more exciting sound. The challenge for each participant is to predict which of the wheel's lettered slots from "a-z" will be randomly selected by the computer. After naming a data file for recording the output, a total of sixty games or 1800 trials can be recorded on each file. The researcher decided to test sixty participants, one per game, to be recorded on each of these files. Psychic Reward automatically records the score after each trial, and one game is completed after 30 trials. How is the raw score turned into a z score? The program also tabulates the cumulative z scores after each game is completed. Once a score is recorded on the file, it cannot be tampered with. Unlike most video games, there is no possibility to erase the score by starting over again in an attempt to go back to the beginning.

Procedure

Permission to do research at various schools was individually granted by different principals and teachers. There were a small number of schools that decided to go through their school districts to obtain permission. When permission was granted, the researcher typed up a concise letter addressed specifically to the parents, which included a brief description of the study along with a permission slip attached. Part of the description stated clearly that confidentiality would be exercised by the researcher- upon completion; the researcher would protect all individual participants by not revealing any of their names in publication of the results. This letter/permission slip was then photo copied at the school and sent home with each student. The permission slip itself was designed so that if parents did not want their child to participate in the study, all they had to do was return it signed and the researcher would honor their wishes. Overall, this type of permission slip allowed greater participation for the study. All teachers were informed ahead of time before testing began. Upon arrival, the researcher either set up the computer in a particular classroom corner, or in an isolated separate room. Teachers in each room were asked for a roster with the names and birth dates of each student in the classroom. Each student was also asked his or her name and age before testing began to verify that the information matched. The researcher then typed in the pertinent file according to age and gender.

Before actual testing began, the researcher attempted to establish rapport with each participant by first introducing himself with a simple greeting in a polite, respectful manner. Each participant was given specific instructions on how to play Psychic Reward. Participants were instructed to select a letter around the circle either by typing it in on the keyboard or using the mouse to click. Every participant was told that the purpose of the game was to win the jackpot as many times as possible in thirty tries. The researcher informed all participants where to find the number of trials in the upper left hand corner. Participants were also told that once a selection is made, the computer will randomly select one of these letters, and if the two letters match, they win the "jackpot." A jackpot is indicated when the computers large arrow lands on the selection made by the participant. The program produces a sound indicating auditory feedback, and the lower right hand corner will read:

$10,000 for visual feedback. Both grand total points earned and the average score are also shown in the lower right hand corner of the screen that provides each participant additional visual feedback. During the test, stickers or candy was given along with praise each time the participant received a direct hit or jackpot as a means of supportive encouragement. The youngest age groups were usually awarded stickers, and the older age groups were given candy. After completion of a game, all participants were checked off from the roster indicating participation in the study. The researcher then thanked each individual for participation.

One special note worth mentioning, unlike other tests administered in school settings, the possibility of cheating on Psychic Reward is virtually eliminated. No one could have hacked into the computer to figure out what the computer had pre-selected as the target. And, as stated before, the computer freshly seeds the random target internally after each trial. During the study, the researcher carefully observed all participants and found no behaviors suggesting that the students were trying to find a way to cheat.

Results

Group A: Pre-primary and Kindergarten Age

Group A (pre-primary and kindergarten of 3-6 years of age) had the highest overall average z scores of any of the four age groups outlined in the study. Males ($z = 2.29$, $p = .01$) and females ($z = 2.13$, $p = .02$) scored well above chance expectation. Together they scored ($z = 3.13$, $p = .001$) highly significantly above chance. The four-year-olds in particular obtained the highest overall score for one age level in the study: males ($z = 1.62$, $p = .052$), females ($z = 1.48$), and together they scored ($z = 2.20$, $p = .01$) significantly. Overall, males scored slightly higher than females in this age group.

AGE	BOYS	GIRLS	ALL
3	1.41	0.04	1.04
4	1.62	1.48	2.20*
5	0.54	1.45	1.41
6	0.98	1.29	1.61
TOTAL	2.29*	2.13*	3.13*

*$p < .05$

Table 1 - Z scores results for group A

Group B: Elementary Age

Group B (grades 1-5 of 7-11 years of age) registered the lowest z scores in the study (males, $z = -0.84$; females, $z = -0.31$; overall $z = -0.81$). For one age in particular, the lowest average scores were obtained by the ten-year-olds who scored significantly below chance (z = -2.20, p = .02, two-tailed), with the males scoring significantly below chance (z = -2.17, p = .025, two-tailed). There was a significant drop-off in both genders combined from ages 3-10 (r = -0.80, p = .02, two-tailed). The eleven-year-old females obtained the highest z scores for one particular age level according to gender in the study (z = 2.02, p = .02). When compared to eleven-year-old males, the females outscored them significantly (*z* = 2.31, *p* = .02, two-tailed). Overall, females scored non-significantly higher than males.

AGE	BOYS	GIRLS	ALL
7	0.32	-1.02	-0.48
8	1.19	-0.41	0.57
9	-0.01	-0.39	-0.27
10	-2.17*	-0.96	-2.20*
11	-1.24	2.02*	0.57
TOTAL	-0.83	-0.31	-0.81

* *p < .05, two-tailed*

Table 2 - Z scores results of group B

Group C: Middle School/Junior High Age
The z scores of Group C (grades 6-8 of 12-14 years of age) show that males (z = 0.41) and females (z = 1.23) both scored above chance. Together they scored above chance (z = 1.16, *ns*), but not significantly. Females scored non-significantly higher than males in this age group.

AGE	BOYS	GIRLS	ALL
12	0.16	0.43	0.43
13	-0.33	1.08	0.54
14	0.86	0.50	0.97
TOTAL	0.41	1.17	1.12

Table 3 - Z score results of group C

Group D: High School and College Age

The combined results of Group D (grades 9-12 and college of 15-19 years of age) are essentially flat (males z = -0.82, females z = 0.73, and overall z = -0.06). Like the results of Groups B and C, females in Group D scored non-significantly higher than males.

AGE	BOYS	GIRLS	ALL
15	-0.60	-1.03	-1.15
16	0.29	0.79	0.78
17	-1.49	0.29	-0.84
18	-0.33	0.72	0.28
19	0.28	0.81	0.78
TOTAL	-0.82	0.73	-0.06

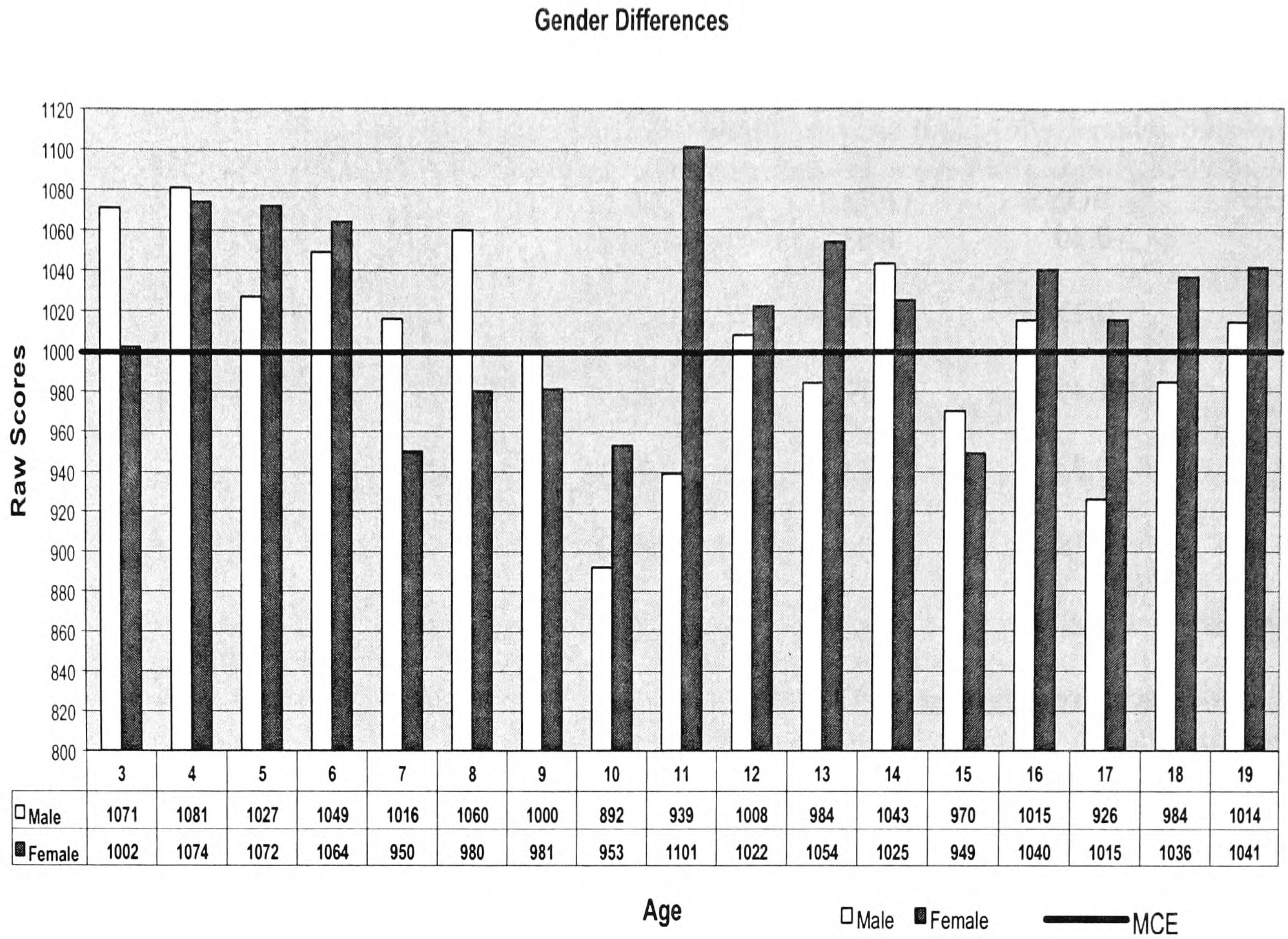
Table 4 - Z score results of group D

Overall Gender Comparisons

Graph 1 below plots the complete raw scores of all the age groups in the study. Each bar consists of 1800 trials for a total of 3600 trials per age group. The theoretical MCE is 1000. According to Vaughan and Houck (1992) the following equation is used to calculate z scores:

$z = (\text{average} - 1000)\sqrt{\ } n / 2110.345$

The number of trials equals' *n* and the standard deviation is calculated at 2110.345, which was confirmed in 62,000 Monte-Carlo iterations (Vaughan and Houck, 1992).



	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Male	1071	1081	1027	1049	1016	1060	1000	892	939	1008	984	1043	970	1015	926	984	1014
Female	1002	1074	1072	1064	950	980	981	953	1101	1022	1054	1025	949	1040	1015	1036	1041

Graph 1- Raw score by age

Discussion

Although males ($z = 0.39$) and females ($z = 1.75$) in the present study both scored positively overall, only the females scored positively significant ($p = .04$). The obvious speculation is that these results are due to an experimenter effect based on the hypothetical expectations. In order to confirm any of the three hypotheses outlined earlier in this paper, more sophisticated statistical analyses need to be done. The researcher is currently in the process of doing a multivariate analysis of variance (MANOVA) with a 4 x 2 factorial design. During the actual testing, the researcher never consciously tried to motivate females to outscore their male counterparts. Each interaction between researcher and participant was uniquely different based on the different age levels, cultural differences, and personal understanding of the English language. For instance, Group A participants had a limited understanding of the English language, being so young. At this age group, very little verbal interaction between researcher and participant happened once the game was underway. These participants were often excited to just have an opportunity to play on a computer. It is doubtful that most of them understood what they were trying to do, but they rarely asked questions.

Group B participants asked more questions, which clearly show the development of analytical thinking. More complex behaviors occurred at this age level. A more thorough post hoc analysis could have been done with six noticeable types of behavior observed in these participants. Three of these types of participants experienced mild levels of distress due to their perceptions of failure (e.g. I am not winning any jackpots so I must be bad at this game). One of these three put extra pressure on themselves to succeed (e.g. I have to win at least one jackpot if Tommy won three), while a second type displayed signs or symptoms of hopelessness (e.g. I'm never going to win). A third type showed helplessness (e.g. this game is totally impossible to win. Can you help me win?), and a fourth type was much like participants in Group A (started playing the game without any further questioning, worries or expectations). This category of participants seemed to handle playing the game very well. Whether they succeeded (scored above the MCE) or not (scored below the MCE), it did not really phase them much. A fifth type was quite shy and did not appear to feel comfortable during the test. They were often quiet during the test like the previous category. The remaining sixth of participants displayed bewildered affects and were literally confused about the purpose of the test. No matter how many times the researcher tried to explain the instructions, these participants still did not comprehend the given task. By the end of the test, which was usually under five minutes, most seemed happy to at least receive a sticker for participation. For those who earned more than one sticker for winning jackpots, it became bragging rights for certain individuals. In a future study, researchers may want to examine these complex behaviors more closely.

Group C and D participants also seemed to ask many questions. Most participants in these age groups did not put any extra pressure on themselves to succeed. For them, playing Psychic Reward was a good reason to get away from doing normal class work. Many of these students were curious about what the study was for and asked more inquisitive types of questions. The researcher suspects that a large number of participants in these age groups may have had some previous exposure to technologies based on the operation of random number generators (e.g. certain computer software games or slot machines). A small percentage of these participants claimed that this game reminded them of *Roulette*. Having prior experience may have better prepared them for playing a game like Psychic Reward. Overall, the majority of participants at these two older age levels were not as excited about receiving candy versus the younger two age groups receiving stickers for their participation. For those participants who enjoyed the candy, most of them usually asked to play Psychic Reward again so they could win more candy.

There were a number of participants who spoke English as a second or third language, so additional instructions needed to be given. No interpreter was used in the study.

Building upon previous studies outlined earlier in this paper, the current study provides support that school age children do score positively on precognitive tasks overall even though there is no emphasis or training in school that encourages or exercises this kind of decision making. Previous experiments by Winkelman (1981) indicate that precognition scores correlated negatively with math ability, years of schooling, and age. First grade (six to seven years of age in Minnesota) is generally believed to be the time where educators begin to strongly emphasize the importance of teaching students analytical skills. The methods for teaching math, science, social studies, reading and language in most schools follow a logical step-by-step procedure that may hinder how students process information more intuitively. Although it is just speculation at this point, early stages of puberty may also play a role in affecting a students' psychological decision-making process. Lemonick (2000) reports that about 5% of European-American females, and 15% of African-American females already display outward signs of incipient sexual maturity by age seven. One possible explanation for early sexual maturity is that consumers are purchasing more foods that have been grown using genetic engineering methods, along with livestock products that have been enhanced with injected growth hormones to produce greater quantities faster. In this particular study, negative scores began to manifest two years earlier in females ($z = -1.02$ in seven years of age) than males ($z = -0.01$ nine years of age), which corresponds with the fact that females generally begin puberty a couple years before males. An endocrine gland that plays a major role in puberty, and produces hormones that may enhance ESP abilities is the pineal body (Roney-Dougal, 1993). The pineal gland is most productive during the hours after midnight and most of these precognition tests were administered during the morning between 8 am and noon. Future studies could look into the possible connections of the pineal body, puberty and psi functioning.

A large number of participants in the current study expressed interest in playing Psychic Reward more than once whether they wanted to improve their score or if they wanted to receive more prizes. In a previous study, Drucker et. al. (1977) tested the same children two times for ESP after administering an IQ test and found that children with higher IQ's scored significantly higher the second round of testing. A follow up study could allow participants to be tested more than once to see if there is any difference in scores. IQ tests have been criticized in the past for cultural biases and for only measuring certain aspects of intelligence (ex. linguistic or mathematical intelligence). Selecting the proper IQ test would have to avoid these problems.

Some other factors that may affect performance in which might be of interest to researchers include: differences in testing environment (in the classroom versus in an isolated room), socio-economic status, medical diagnoses, types of intelligence (e.g. musical, kinesthetic, etc.), and ethnic diversity. Even within one school, a wide range of these different factors can be observed (e.g. children of lower, middle, and upper classes attending the same school). A more recent study by Bourgeois and Palmer (2002) found a difference in children's ESP scores between African-Americans and European-Americans, with African-Americans scoring significantly below chance ($z = -2.008$, $p < .02$). There are a number of concerns with this finding such as: having the same number of participants in each group, and the potential racist backlash from the community. Exploring this further may not be an ideal choice unless it is carefully designed. An easier type of follow up study would be to compare standardized test score averages of different schools and districts with psi performance. It is required for students to take these tests yearly. Designing this kind of study would be easier on the participants since it would not require taking any additional tests. It would be interesting to see if there is any correlation between how children succeed on basic standards tests and psi tasks.

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A forced-choice ESP experiment with natural and simulated sferics: Displacement scores and psychological variables.

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Abstract

In a previous study a negative correlation had been found between ESP scores on a forced choice ESP task and the natural sferics activity during the 24-hour interval before the ESP session. In the present study, the ESP task was preceded by the application of simulated sferics during 25 min, a period which usually produced detectable changes in the EEG. Subjects (N = 57) were recruited at the psychology department of the University of Giessen, resulting in a sizeable representation of psychology students. Subjects were randomly assigned to a sferics-group and a control group, a double-blind condition. During the period of sferics application, questionnaires were filled out on biographical items, attitudes and experiences of paranormal phenomena and personality variables.

This study differs from the previous ones in that the ESP task was done by the subjects as a one-person task, instead of in competition with a co-subject. The subject would take part in a lottery if he or she had a significantly high score. The same task was administered two times, with two independent lotteries.

The results of this study are somewhat disappointing with regard to the influence of sferics: The application of simulated sferics was associated with non-significantly higher ESP scores. The correlation with natural sferics was non-significantly negative, but corroborated the earlier studies. No interaction effect between natural and simulated sferics was discernible.

As previous findings indicated a relationship between childhood trauma and displacement scores in an ESP task, displacement scores were explored in this experiment. The combined 1- and 2-forward displacement, or, the score for guessing the target 1 or 2 trials ahead, was calculated. The resulting displacement z-score included a correction for the possible influence of guessing behaviour on the relationship between hits and displacement hits.

With regard to an evaluation of childhood trauma, we took items from the personality questionnaire, the NEO-FFI, and evaluated these for relevance for traumatisation. This analysis led to the conclusion that there appears to be a strong relationship between traumatisation and Neuroticism as measured by the NEO-FFI.

The analysis of the ESP scores revealed a highly significant positive correlation between ESP scores on the first task and ESP displacement scores on the second task. Moreover, the correlation between the ESP scores in the second task and Neuroticism as measured by the NEO-FFI turned out *to be highly significant negative. In contrast, Neuroticism correlated significantly positive with the ESP displacement scores in the second task.*

The findings suggest that ESP manifests itself mainly as direct hits in the first task, but as forward displacement hits in the second. An explanation for these findings might lie in the circumstances during the experiment, by provoking anxiety. Differences between the present experiment and earlier findings are discussed. The data suggest that interaction between the juxtaposed tasks may have caused test-retest correlations to underestimate the reliability of ESP-scores.

Introduction

The present study was designed to study the influence of sferics on ESP. Sferics or atmospherics are electromagnetic disturbances that are naturally generated during thunderstorms, but which can be artificially generated in the laboratory. This is part of the present study, but the findings on the relationships between ESP-scores, ESP displacement scores and personality variables determine a shift in emphasis towards these aspects.

The experiments on ESP and sferics are reviewed briefly here. The VLF-sferics, as generated by lightning discharges, travel through the atmospheric waveguide over distances up to 1000 km. VLF-sferics constitute brief (0.5 ms) oscillations with a frequency spectrum peaking at about 10 kHz in the far field.

Sferics have attracted attention as a possible trigger of weather sensitivity, characterized typically by discomfort or somatic complaints occurring one or a few days before a change of weather. Schienle, Stark and Vaitl (1998) reviewed biological effects (ranging from reaction times to incidence of myocardial infarctions) of sferics in humans.

As regards influences on ESP from electromagnetic disturbances, a number of studies were carried out on the relationship between variations in the geomagnetic field and extrasensory perception (ESP), either spontaneous or experimental, as reviewed by Stokes (1987). These studies generally indicated a higher incidence of events ascribed to ostensible ESP in periods with a low level of geomagnetic variations.

The first study on the relationship between natural sferics and ESP (Houtkooper, et al., 1998, 1999a) indeed found lower ESP scores when there was higher sferics activity and there a stronger correlation was found in persons who scored low on the Neuroticism scale of the NEO-FFI (Borkenau & Ostendorf, 1993) and in those subjects scoring high on the Openness scale. In the findings from three further studies, carried out between 1997-1999 the size of the ESP-sferics correlation was lower, although a meta-analysis of all four studies revealed a significant relationship (Houtkooper, et al., 2001).

While continuing this work, the present study involved the application of artificial sferics, in analogy with studies of the influence of sferics on the EEG (Schienle et al., 1996, 1997).

In analyzing the data of the experiment, attention was brought to bear upon indications confirming the findings of De Graaf, Houtkooper and Palmer (2001). In that study, a very sizeable correlation between trauma-scores, as determined by the Childhood Trauma Odds Inventory (ChTOI), and ESP displacement scores was found. There are several aspects of that study, different from the present study. In the De Graaf et al. study, ESP targets were associated with potentially traumatic stimuli, which is not the case in the present study. Moreover, the present study did not employ the ChTOI, but this lacuna was filled by a detailed study of items in the NEO-FFI questionnaire. As the neuroticism items proved to be prominent in this respect, earlier studies on the correlation between neuroticism and ESP, reviewed by Palmer (1977), are relevant.

Another aspect of the De Graaf et al. study, ESP displacement scores, have been studied extensively in early experiments with Zener cards, where the phenomenon occurred that the call (guess) corresponded not with the actual card in the deck, but with the preceding card, which was called backward displacement, or, with the card following the intended card, forward displacement. Most studies were limited to displacement by one or two positions backward or forward. A definite advance in the study of displacement scores has been the analysis by Burdick and Broughton (1987), who calculated combined forward and backward displacement, correcting for guessing behavior characteristics such as repetition avoidance. As the backward displacement is not applicable in experiments with trial-by-trial feedback, the analysis was adapted to a combined score of +1 and +2 forward displacements. Under the null hypothesis this 'combined displacement score' is uncorrelated with the ESP score proper, independent of the guessing behavior characteristics of repetition avoidance and one-skipping repetition avoidance (Houtkooper and Haraldsson, 1997). The advantage of this combined displacement score is that, if it correlates with the ESP score proper, such a correlation is a characteristic of the ESP process, rather than an artifact due to the non-random guessing behavior by the subjects.

Displacement scores have been reviewed by Carpenter (1977), Palmer (1978) and Milton (1987, 1988), while the work of Crandall (1987) deserves to be mentioned here. It appears that displacement effects are most often the result of post hoc analyses and their significances have therefore to be corrected for selection. In her conclusions, Milton on the one hand doubts the reality of displacement effects per se, and their relationship with psychological variables. However, on the other hand, her review mentions a number of factors:

> "most promising as predictors for displacement ... those which reflect some aspect of the percipient's attitude which could make him or her wish to avoid the target or displace. Suitable candidates for future reseach would therefore be the sheep-goat variable; patience versus impatience; tension versus relaxation; and variables which might, in an experimental setting, be expected to give rise to some sort of approach-avoidance conflict."

In her 1988 article Milton inserts one sentence between the above two:

> "Because the review offers no strong indicators of which would be the most promising variables, logical means might provide the best criteria for selection of suitable variables."

Logical means, implying a model, perhaps representing the tacit knowledge of some generations of experimenters? It seems that the displacement effect has an implicit psychological interpretation: psi occurs, but not out in the open, it remains hidden. With these rather vague suggestions in mind the results of in the present study were explored.

Method

Participants

Participants were recruited by a notice in one of the main buildings of the University of Giessen. Of the N = 57 participants, 90% were students, two thirds of which were studying psychology. The mean age was 24.7 yrs (SD = 5.3 yrs). Twelve were males, 45 females.

The ESP tasks

The two ESP tasks administered to the subjects were similar to the computerized task in the ten Icelandic DMT-ESP experiments, described by Haraldsson and Houtkooper (1992). Each task consisted of 40 trials in which the subject had to guess in which of four fields a picture would appear. Immediately after the subject's guess the allocation of a picture to one of the four fields was made after by a combined pseudorandom and true random procedure. The latter was obtained using a Bierman-Houtkooper Zener diode noise based random number generator. Before and after each task the computer generated 1000 trials to test for randomness. The picture present in each trial was chosen from a set of 16, with a wide variety of people, landscapes and abstract and figurative paintings. The non-target fields contained the word "Blank!".

Compared with the earlier experiments, there was one difference: Hitherto subjects took the test in pairs, alternately performing 10 trials, for a total of 40 trials each. In the present experiment, the subject took the test alone, doing 40 trials in a row. After a short pause, the same subject did another 40 trials, so that more data of each subject was obtained. Each trial consisted of guessing one out of four possibilities. The ESP score was equal to the number of hits achieved, with a chance expectancy of 10. For each of the two tasks there was an incentive to score high: Obtaining 17 hits or more in a task meant taking part in a lottery with a prize of 50 DM (about 26 Euros or 23 US dollars).

Simulated sferics

The experiment started by giving the instruction for the ESP experiment, which included a few practice trials. After that started a 25 min. period in which the subjects sat down in the sferics simulation chamber, a space 2m long and 80cm wide, open at the front, which had coils on its sides by which simulated sferics signals were applied. The 6x3m room in which this took place was electromagnetically shielded by a Faraday cage. Intensity and frequency of the simulated sferics signals were the same as in earlier research by Schienle and her co-workers (Schienle et al., 1996, 1997). Peak magnetic field strength of the simulated sferics impulses was 60 nanoTesla, while the frequency was comparable to the highest hourly activity encountered during the year. As the computer equipment for the ESP experiment could interfere with the electromagnetic field of the sferics signals, the ESP task was administered after the period of sferics application.

In the experiment the subjects were assigned to one of two groups: the sferics group (N = 28), which received the sferics application as described above, or the control group (N = 29), which was treated in the same way, but for which no simulated sferics signals were turned on. The experimenters were blind to this condition.

Natural sferics

Throughout the course of the year, VLF-sferics are monitored continuously and counted per hour in Giessen, Germany. Due to a very skewed distribution the data were transformed by a logarithmic transformation. The log-transformed counts, henceforth called "log-counts", varied with a diurnal as well as an annual rhythm, characterised by a maximum around midnight for most of the year. In addition, during the summer months there was an intense activity around the mid-afternoon, which was then the daily maximum activity.

Sferics activity can be characterized by different variables. In the first sferics study, a range of variables that represent actual and preceding activity and changes in activity were chosen. The most prominent correlation was found for the variable AV24H, defined as the sferics log-counts averaged over the 24 h preceding the hour in which the ESP task started. Therefore, the variable AV24H will also be referred to as 'sferics activity' for short.

It may be noted that the exposure to simulated sferics lasts much shorter than the apparent timescale of the effect of natural sferics. The reason for this is practical. However, the shorter exposure is compensated for by a relatively high frequency and field strength of the simulated sferics.

Questionnaires

The questionnaires administered are the same as those in the 1996 study (Houtkooper, et al., 1999a). A 'Participant Information Form', the translated Australian Sheep-Goat scale (ASG) as a psi-belief questionnaire , a 9-item religiosity scale were given and the 60-item NEO-FFI (Borkenau & Ostendorf, 1993; Costa & McCrae, 1992) was used to obtain measures of Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Furthermore, a questionnaire on selfregulation, the SSI-K (Kuhl & Fuhrmann, 1998) was administered. The results of this questionnaire, as well as the intercorrelations between various variables from the psychological instruments will be reported elsewhere, combining the data of the present study with other data to study a larger sample.

Trauma and personality variables

Because of the correlations found in an earlier experiment (De Graaf, Houtkooper and Palmer, 2001) the question is whether any indication of a relationship between trauma and ESP scoring, especially ESP displacement scores, could be found. The first author of the De Graaf et al. study, who is a psychiatrist with a wide experience with traumatised patients (De Graaf, 1998), rated the items of the NEO-FFI for their indicating possible traumatisation. Most items with the highest trauma rating were items rated positive for neuroticism (N+), the trauma ratings having been made blind to the coding of the NEO-FFI. Among the 14 items with the highest two trauma ratings, there were all eight N+ items, four items rated negative for agreeableness (A-), one rated negative for openness (O-) and one positive for conscientiousness (C+). The trauma-score derived from these ratings showed good internal consistency, but as the trauma-scores were correlated with the NEO-FFI scales, the correlations were: with N: .95, with E: -.32, with O: -.11, with A: -.26 and with C: -.43. Therefore, the correlation of the trauma-score with neuroticism is so high, that it simplifies things to consider the N-scale as a good indicator of traumatisation. Excluding the N-items from the trauma-score still gave a correlation with N of .48, hinting at a secondary structure in the NEO-FFI.

ESP displacement scores

Following the method of Burdick and Broughton (1987) each trial is considered together with the two preceding calls. Each possible combination of equal or different calls, together with the result of the actual call, leads to a mean chance expectancy and a variance for the contribution of that trial to the combined +1 and +2 forward displacement score. This is shown in Table 1:

TABLE 1: Single trial Variance and MCE contributions for combined +1 and +2 forward displacement for an open deck with k equiprobable targets.

Pattern	Result	MCE	Variance
zzz	Hit	2	0
	Miss	0	0
xxz	Hit	0	0
	Miss	$2/(k-1)$	$4(k-2)/(k-1)^2$
xyz	Hit	0	0
	Miss	$2/(k-1)$	$2(k-3)/(k-1)^2$
xzz or zxz	Hit	1	0
	Miss	$1/(k-1)$	$(k-2)/(k-1)^2$

In this Table, each target is compared with its call (z) and the two preceding calls. These three calls form different patterns depending on calls being the same (z) or different (x or y) from each other. Whether the target is equal to one or both of the two preceding calls, determines the MCE for displacement for that target and its variance.

The single trial contributions are added up for all trials in a task, in this case consisting of 40 trials. The total MCE is compared with the total number of +1 and +2 displacement hits, and divided by the standard deviation, i.e. the square root of the total variance. The result is the combined displacement z-score. Note that for the first trial there are no +1 or +2 displacement hits and for the second trial of the task there are no +2 displacement hits. This is taken into account accordingly, for the details see Burdick and Broughton (1987). When mentioning 'displacement score' in the following, the combined displacement z-score is meant.

Results

Simulated sferics and ESP

The hypothesized difference between the sferics and control groups resulted in slightly below chance scoring for the control group as their ESP-score, the mean number of hits in both tasks, was 19.83, whereas the sferics group scored above chance with an average of 20.89 hits, while the mean chance expectancy was 20. The t-test on the difference in the ESP-scores between the two groups resulted in $t = 1.023$, $df = 55$, n.s. Comparing the combined displacement z-scores for both tasks resulted in $t = 0.457$, $df = 55$, n.s.

Natural sferics and ESP

The relationship between natural sferics and ESP was tested by calculating Kendall's tau nonparametric correlation coefficient between the ESP-scores and the level of sferics activity AV24H. This resulted in tau = -0.10075, N = 57, p = .14, n.s. The correlation was in fact in the same direction as in the previous four experiments, carried out in the years 1996-1999, combined. An overview of the previous experiments, together with the present, 2001 experiment is given in Table 2:

TABLE 2: Kendall's tau correlations of ESP performance of subjects and co-subjects with Sferics activity in all five studies and effect sizes for correlation in combined studies.

EXPERIMENT:	N	Subject	Co-subject	Combined
1996 (Feb.-July)	100	-.119*	-.113*	
1997 (July-Oct.)	37	-.085		
1998 (July-Dec.)	100	-.084	-.056	
1999 (Jan.-Oct.)	68	+.087	-.007	
2001 (May-July)	57	-.101		
Combined:				
1996-7-8-9	305/268	-.084	-.095	-.089**
1996-2001	362/268	-.093*	-.095	-.094**

*: p<.10, **: p<.05, two-tailed.

Therefore, the overall effect size of the sferics-ESP correlation has slightly improved from the result of the previous four experiments (ES = -.089, N = 573, z = 2.13, p = .03, two-tailed) by the contribution of the present experiment to the sferics-ESP meta-analysis. The result for all five experiments was: ES = -.094, N = 630, z = 2.36, p = .02, two-tailed.

ESP- and ESP displacement scores

The ESP-scores on the ESP tasks revealed no overall extrachance scoring: The 57 subjects obtained an average of 20.351 hits (SD = 3.930, t = 0.67, n.s.), where 20 hits were expected by chance. The ESP z-scores and the displacement z-scores for both tasks are displayed in Table 3.

The combined displacement scores in the second tasks are significantly above chance: A single-sample t-test results in: t = 2.16, df = 56, p = .04, two-tailed. Whereas the ESP-scores tend to decline from the first to the second task (t = 1.26, df = 56, n.s.), the displacement scores reveal a nonsignificant incline (t = 1.41, df = 56, n.s.).

TABLE 3: ESP z-scores and combined displacement scores for the first and second ESP tasks and for both tasks combined.

	ESP z-score Mean (Std.error)	Displacement z-score Mean (Std.error)
First task	0.173 (0.133)	-0.015 (0.133)
Second task	-0.045 (0.124)	0.280[1] (0.130)
Both tasks	0.091 (0.134)	0.187 (0.119)

[1]: p = .04, 2-tailed

Relationships between ESP tasks

As already mentioned, the advantage of the combined displacement scores is that these are "H0-independent" from the ESP-scores proper. That is, under the null-hypothesis the expected correlation between the direct hits on the ESP-task and the combined displacement scores is zero, irrespective of the - generally non-random - guessing behavior of the subjects. The actual correlations between these variables are therefore an aspect of ESP-scoring behavior, free of artifacts. The correlations between ESP-scores and combined displacement scores in both tasks are given in Table 4.

The relationship between the ESP-scores on the first task and the displacement scores on the second task is very significant: r = .447, N = 57, p = .0005, two-tailed. The correlation between the ESP-scores on both tasks is r = .095, N = 57, n.s. It might be noted that there was one subject who scored lowest of all (4 hits) on the first task, but highest of all (17 hits) on the second task. This was the one subject who won the prize of 50 DM, and also it was the eldest subject (49 years old) of the sample. There are no grounds to exclude this subject from the sample, but the weight of this data point is diminished if a nonparametric correlation is used. The test-retest correlation between both ESP-scores by Kendall's tau resulted in tau = .120, N = 57, ES = 0.17, p = .09, one-tailed.

TABLE 4: Pearson correlations between ESP-scores and displacement scores in both ESP tasks.

Score	Task	ESP/1	Displ/1	ESP/2
ESP-score	1			
Displacement	1	-.047		
ESP-score	2	.095	-.104	
Displacement	2	.447[1]	-.180	-.036

[1]: p = .0005, 2-tailed

ESP and personality

The two tasks appear to have a relationship, more complex than simply a replication, as the correlation between ESP-scores of the first task and displacement scores of the second task shows. Therefore, the relationships with personality variables were analyzed separately for both tasks, as is displayed in Table 5.

The quite striking correlations with neuroticism in the second task display opposite signs. The correlation with the ESP-score is negative and highly significant, whereas the correlation of neuroticism with the ESP displacement score is positive in the second task.

TABLE 5: Pearson correlations between the personality variables of the NEO-FFI and ESP- and displacement scores in both ESP tasks.

Score/Task:	ESP/1	Displ/1	ESP/2	Displ/2
Neuroticism	.161	-.040	-.449[1]	.285[2]
Extraversion	.120	.001	.214	-.006
Openness	-.076	-.010	-.149	-.256
Agreeableness	-.035	-.204	.035	.049
Conscientiousness	.072	-.013	.153	.041

[1]: $p = .0005$, 2-tailed
[2]: $p = .03$, 2-tailed

The correlations of ESP- and displacement scores with religiosity and psi belief (ASG) are given in Table 6:

TABLE 6: Pearson correlations between religiosity and psi belief and ESP- and displacement scores in both ESP tasks.

Score/Task:	ESP/1	Displ/1	ESP/2	Displ/2
Religiosity	.102	.061	-.277[1]	-.054
Psi belief	.036	-.102	.001	-.048

[1]: $p = .04$, 2-tailed

With regard to the significant correlation between religiosity and ESP-score in the second task it is interesting to note that the correlation between religiosity and neuroticism was $r = .259$, $p = .052$. The intercorrelation between religiosity and psi belief was $r = .424$, highly significant ($p = .001$, two-tailed).

Discussion

The primary purpose of this study, to investigate the relationship between simulated sferics and ESP-scoring, has achieved a non-significant result which was, moreover, in the direction opposite to the correlation between natural sferics and ESP. The latter correlation has also proven to be nonsignificant in this study, but in the same direction and with a similar effect size as those found in four previous studies. The, slight but significant ($p = .02$, two-tailed), negative correlation between natural sferics and ESP scoring has thereby been corroborated.

All other analyses are explorative and have to be interpreted with regard to, first, the meaningfulness of the relationships (as a post hoc and therefore weaker version of prestated hypotheses) and, second, where meaningfulness cannot be invoked, a strict correction for multiple analyses. That is, some post hoc analyses are more meaningful than others and the pessimism implied by the multiple analysis correction should be spread accordingly. A nonsensical but significant correlation should be of less interest than an almost significant but meaningful correlation. Moreover, the best known correction (Bonferroni) for multiple analysis is unnecessarily conservative in the case of intercorrelated independent variables with which a dependent variable, i.e. ESP scoring is correlated. An example of such intercorrelated variables are for instance psi-belief and religiosity (Thalbourne and Houtkooper, 2002; Thalbourne and O'Brien, 1999).

Displacement scores:

In the present study, the combined displacement scores were evaluated because of the interesting relationship with trauma scores found by De Graaf, Houtkooper and Palmer (2001). The combined displacement score according to Burdick and Broughton (1987), modified for +1 and +2 forward displacement instead of -1 and +1 dosplacement, offers an evaluation of displacement independent of guessing characteristics such as repetition avoidance.

Surprisingly, the two ESP tasks revealed a correlation ($r = .447$, $p = .0005$, two-tailed) between ESP scoring in the first and displacement scoring in the second task. "ESP going into hiding", might be the first impression, based upon the Milton's (1988) review. The overall scoring supported this idea, since the overall ESP score in the first task was positive ($z = 1.299$, $p = .20$), while the displacement scores in the second task were positive and ($z = 2.156$, $p=.04$, two-tailed) significant. The latter score draws once more attention to the importance of displacement scores as indicators of psi.

Traumatisation:

This raised the question, how to get a traumatisation score, in order to see if conceptually the same relation between ESP displacement and traumatisation would hold here as in de De Graaf et al. study. In an attempt to resolve this lacuna Dr. De Graaf examined the questionnaires. It appeared to him that in the NEO-FFI there were several items pertaining to possible traumatisation. In a blind assessment of the 60 items, there were 4 items strongly indicative of traumatisation (e.g. "I often feel completely worthless"), 10 moderately indicative of traumatisation (e.g. "Many people hold me for cold and calculating") and 19 items for weakly indicative of traumatisation. Interestingly, 3 out of the 4 strong items and 5 of the 10 moderate trauma items were loading positively on the Neuroticism scale of the NEO-FFI. A trauma scale was constructed by weighting the sums of the strong, moderate and weak trauma items according to a maximum variance criterion. The trauma scores thus obtained correlated very high ($r = .944$) with Neuroticism. Even if the trauma-scores were stripped of the N-items was the residual score significantly correlated with the N-scores ($r=.480$). Because of the large overlap between the synthetic trauma-score and the psychometrically well established N-score, it was hardly warranted to analyze the data separately for the trauma-scores. However, it may be emphasized here that the relationship between traumatisation and neuroticism is an interesting subject for further research.

Neuroticism:

The correlations between ESP-scoring and Neuroticism proved to be pronounced in the second task: The correlation between N-score and ESP-score proved to be negative and highly significant ($r = -.449$, $p = .0005$, two-tailed), lending support to Palmer's (1977) conclusion that "there is evidence for a consistent negative relationship between neuroticism and scoring on ESP tests when Ss are not tested in groups". Moreover, the correlation between N-score and displacement score in the second task was positive and significant ($r = .285$, $p = .03$, two-tailed). The corresponding correlations in the first task were nonsignificant and .16 and -.04 respectively. The $r = .16$ between N and ESP even disappears almost completely if the correlation between ESP in the first and displacement in the second task ($r = .447$) is taken into account.

This pattern of correlations calls for an explanation: First, the conditions in the present experiment may be compared with previous experiments, such as the previous experiments with natural sferics (Houtkooper et al., 1999a, 1999b, 2001) and the Icelandic DMT-ESP experiments (Haraldsson and Houtkooper, 1992; Houtkooper and Haraldsson, 1997). Secondly, we may try to find differences between the two tasks, since a test-retest paradigm obviously fails as an explanation for the observed correlations.

First, the present experiment had a setting which differed from previous experiments in a number of ways:

1. The subject (S) did the ESP task on his/her own, whereas in previous experiments he/she alternated every 10 trials with a co-subject. The atmosphere previously was one of friendly competition, which was lacking in the present experiment.
2. The same 40-trial task had to be performed twice after each other for no apparent reason.
3. The ESP task had to be performed within the narrow confinement of the sferics chamber.

4. According to the instructions, the sferics application involved the possible, but uncertain application of weak and imperceptible electromagnetic waves. Nevertheless, this might be associated with an anxiety-provoking concept like "electro-smog".
5. The experimenter was sitting in a room next to the sferics chamber where he/she could observe the subject through a window.
6. The experimenters in this study were rather skeptical with regard to the existence of psi.
7. There was a time limit to the filling out of the questionnaire, that is, after 25 min. a tone sounded and the S had to interrupt the filling out and perform on the ESP tasks, about which he/she had been given the instruction before.

From these differences in setting we conclude that some elements in the present experiment may have caused a higher state of anxiety than in previous experiments.

As to the difference between the two tasks it may be noted that for each of the two tasks there was a potential financial reward. This may have caused self-evaluative behaviour after the first task, with possible consequences for the relation between ESP- and displacement scores on both tasks. Ownership inhibition (Batcheldor, 1979) may therefore have played a role, especially in the second task, and this might have been the cause of the overall significant positive score of displacement in the second task and of the correlations with neuroticism in the second task.

Test-retest correlations:

However, within the framework of classical psychological test theory, the two ESP tasks would be regarded as test and retest under - assumed - the same circumstances. The test-retest correlations of ESP- and displacement-scores, .095 and -.180 respectively, reveal no indication of the fruitfulness of this approach. In an orthodox view, the conclusion might even be that, as ESP scores reveal such low test-retest correlations, the correlations with these scores must be spurious. But, to declare two correlations, both significant at less than .001, to be spurious is stretching this argument too far. The conclusion is that, as these correlations are not to be regarded as spurious, the assumption that the circumstances of test and retest are similar, must not have been fulfilled.

Therefore, we have to assume that for the subjects in general, the test-scores on the first task had an influence on their performance on the second task. This might be called "task interaction", analogous to the differential effect between juxtaposed tasks (Rao, 1966). The reliability of the ESP scores, as discussed for instance by Palmer (1977), had better be estimated by the correlation with extraneous variables such as neuroticism and displacement scores than by the correlation between test and retest.

Task interaction:

To explore the phenomenon of task interaction in the present experiment, we may point to the fact that the one subject who had the lowest ESP-score on a task, namely 4 hits, also obtained the highest score in this experiment: On the second task she scored 17 hits. In contrast, the next highest scorer obtained 16 hits twice. With these two examples, we may divide the present data into four subsamples, according to hitting(H) or missing(M) on the two tasks and explore the differences between the groups with regard to several variables. The subjects who score exactly at chance on any task are rejected. The results of this exploration are given in Table 7:

TABLE 7: Subjects divided into groups who scored below 10 hits (M) or above 10 hits (H) on both tasks. Means for personality and attitude variables per group and standard deviations for all subjects.

Scoring task 1/2:	MM	MH	HM	HH	Std.Dev.
N	10	6	13	12	
N(females)	8	2	12	2	
N(males)	2	4	1	2	
Neuroticism	1.8	1.7	2.5*	1.6	0.75
Extraversion	2.4	2.3	2.2*	2.6	0.41
Openness	2.7	2.4	2.8	2.7	0.59
Agreeableness	2.7	2.6	2.6	2.5	0.47
Conscientiousness	2.3	2.6	2.4	2.7	0.60
Psi belief	2.9	2.9	3.9	3.7	1.77
Religiosity	1.7	0.6	1.3	1.4	0.74

(*) p<.02, two.tailed

In Table 7 there are two variables which reveal some contrast between the HM participants ("decliners") and the other subjects. The decliners are high on neuroticism (t=3.54, p=.002) and low on extraversion (t=2.59, p=.014). When groups are combined to form the groups of consistent (MM and HH) versus inconsistent (MH and HM) scorers, the same variables differ significantly: Consistent scorers are lower on neuroticism (p=.02) and higher on Extraversion (p=.05).

Conclusion

Further research is necessary to shed light on the factors which caused the relationships between ESP-scores, displacement scores and neuroticism found in the present experiment. As suggested by previous research, the relationships between neuroticism, traumatisation and state anxiety in the experimental setting might be explored. Furthermore, as we conclude that the correlations found here are manifestly due to psi, we might further analyze the ESP data for some other characteristics:

1. Bunching of hits in each session,
2. Characteristics of guessing behaviour, and
3. The anxiety-related factor of how many misses occurred before the subject achieved his or her first hit.

These features will be reported on in a following article.

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Skin Conductance Prestimulus Response to Future Audio Startle Stimuli

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Abstract

Previous studies have suggested that the human autonomic nervous system responds to stimuli 2-3 seconds before presentation. In these studies randomly chosen photographs with high and low affectivity were presented to participants. Ensemble averaging of skin conductance in the prestimulus epochs showed a differential response between high and low affectivity photographs. Spottiswoode & May (2003) reported a study in which the problem of idiosyncratic responses to pictorial stimuli was avoided by using audio startle stimuli. Stimulus type was determined just before presentation by a true random generator. Participants heard 20 stimuli per session with a 50% chance of an audio startle as against a silent control. Their dependent variable was the proportions of 3-second epochs prior to audio and control stimuli in which a skin conductance response, that is a minimum in skin conductance followed by a maximum, occurred. They found a significant effect (N = 125, Z-score (Z) = 3.27, effect size/stimulus = 0.0901 $\pm$ 0.0275, p = 5.4×10^{-4}). In the study reported here, we conducted a formal replication study with N = 100 participants and used the same protocol as before with the exception that the prestimulus interval was extended another ½ second to 3.5 s. We found nearly a 2:1 ratio of proportions, whereas the ratio should be unity under the null hypothesis (Z = 5.08, effect size/stimulus = 0.161 $\pm$ 0.032, p(1-t) = 1.8×10^{-7}. We discuss and reject many potential artifacts that might have led to this result. Finally, we show a near exact replication between two large, independent data sets of the proportion effect size as a function of the width of the prestimulus interval.

Background

While the autonomic nervous system response to emotional stimuli is long established (Andreassi, 1989; Bouscein, 1992), recent research by Radin (1997a,b), Bierman & Radin (1997, 1998), and Bierman (2000) has suggested that skin conductance and other autonomic measures can act as a statistical predictor of a future experience. These results have begun to attract interest elsewhere (Parkhomtchouk, et al, 2002) and are beginning to be investigated with other techniques such as functional magnetic resonance imaging (Bierman & Scholte, 2002).

To illustrate their method, imagine a large pool of emotional photographic stimuli that have been previously evaluated with regard to the degree of emotional content. Schematically, the protocol in Radin's (1997b) experiments was as follows:

- A participant pressed a button to initiate a trial while watching a blank computer display.

- After a predefined time called the prestimulus period, a selection of a single photograph was made uniformly at random and was displayed for three seconds. The ratio of calm to emotional targets was 2:1, as the target pool had twice as many calm as emotional photographs.
- The trial ended after a 15 second post stimulus period.

The above sequence was repeated 30 times. On the average, there were 10 emotional photographs and 20 calm photographs. Using the change of skin conductance from the trial onset as the dependent variable, ensemble averages were constructed separately for the emotional and calm presentations. The difference between the ensemble averages in the prestimulus region was the session dependent variable. Relevant statistics were determined by randomized permutation techniques.

We offer criticism of this approach on two grounds:

1. Photographic stimuli can elicit idiosyncratic responses. For instance, a picture that has been rated as having a low average affectivity may have, for some individual participants, a large affectivity. This mechanism reduces the contrast between arousing and calming presentations and constitutes an unwanted source of variance in these designs.
2. Average-based epoch analyses, which where used in these studies, are sensitive to amplitude outliers, even with a randomized permutation analysis test statistic.

Critchley et al. (2000) have shown using fMRI techniques that there are three components that contribute to an overall skin conductance response (SCR). These are responses to an emotion, an external stimulus and a motor movement. If photographic stimuli, such as those contained in the Lang et al. (1999) International Affective Picture System (IAPS) set, are used in a prestimulus response study the first two of the three sources of skin conductance changes are involved and the emotional component can introduce variance due to idiosyncratic responses.

Spottiswoode & May (2003) abandoned the IAPS stimuli in favor of an audio startle stimulus comprised of a 1-s burst of 97 db white noise delivered to sound-isolating earphones. Differing from the studies above, their dependent variable was the proportion of 3.0-s prestimulus intervals that contained a single fully formed, non-specific skin conductance response before a future audio stimulus compared to the proportion of prestimulus intervals before a future silent control. Under the null hypothesis, these proportions should be equal. The results reported by Spottiswoode & May for 125 first time participants is shown in Table 1.

Table 1. Results

Interval Type	Number of Intervals Containing a Response	Number of Prestimulus Intervals
Before a Control	56	1181
Before a Stimulus	105	1319

From this Table, we see that the proportion prior to an audio stimuli is 0.0796 and before silent controls is 0.0474 ($Z = 3.27$, effect size/stimulus = 0.0901 ± 0.0275, $p(1t) = 5.4 \times 10^{-4}$, effect size/session = 0.292 ± 0.089).

Of these 125 participants, the first 105 of them were used to set parameters and an inclusion criterion for participants in our formal replication. This paper describes the results of 100 additional participants (beyond the 105 above) who met the criterion for the formal study.

Hypothesis

The level of arousal of the autonomic nervous system, as measured by phasic skin conductance changes, responds in advance significantly more before future audio stimuli than before future silent control stimuli.

Method

We used an SC5-SA skin conductance monitor, manufactured by Contact Precision Instruments. This unit is specified to have an absolute accuracy of $\pm$ 0.1 μSiemens, a DC excitation voltage of 0.5 V, a constant sample rate of 40 samples s^{-1}, and a relative accuracy of 5.96×10^{-6} μSiemens. The unit contains a hardware low-pass filter with an upper cutoff frequency of 10 Hz to prevent aliasing.

The electrodes used were 10 mm Ag/AgCl (Med Associates TDE-022SN) and were applied with an electrode paste of 0.5% saline in a neutral base (Med Associates TD-246). The electrode surface, which was surrounded by a 2 mm high Teflon rim, was covered with a film of electrode paste even with the rim and the electrodes were fastened to the distal phalanxes of the first and second fingers of the non-dominant hand by a loop of adhesive skin tape. The electrode cables were secured to the palm by a third piece of tape to minimize any mechanical motion being transmitted to the electrodes.

Stimulus timing was derived from a pseudorandom number generator (Marsaglia, & Zaman, 1987), which was seeded from the system clock at the start of a session and in contrast to earlier studies (Radin, 1997a,b, Bierman & Radin, 1997, 1998), our participants were not required to initiate each trial; rather, the experimental session was "free running," and contained no stimulus-timing cues. The inter-stimulus interval was 60 ± 20 s and comprised the following sub-intervals: 5 s prestimulus period, 1 s stimulus duration, 24 s after stimulus time (i.e. a total of 25 s post stimulus according to the usual definition), 10 s fixed delay, and a random delay in the interval [0,40] s.[1]

Stimulus type was determined by electron shot noise within a true random number generator that was developed in the physics department at Ulm University in Germany.[2] This device, when hashed[3] with a pseudorandom generator passes the "Gold Standard" for random number generators—The Die Hard tests.[4] This generator was sampled at the end of the 5 s prestimulus period to determine the stimulus type—binary one indicated an audio stimulus, a binary zero indicated a silent control stimulus. In this way, the decision as to the stimulus type occurred after all prestimulus data were recorded and stored in memory. This fact, coupled with the inherently indeterminate nature of a true random number generator of this type, constrains the interpretation of a positive outcome to the experiment. Such an interpretation must be based either upon chance, retrocausality, or upon psychokinetic effects acting upon the random number generator.

The audio startle stimuli were derived from computer-stimulated white noise of 1-second duration and 97-dB intensity and saved as a WAV file, while control stimuli comprised one second of zero signal, or silence. The participant wore sound isolating headphones[5] during the trial ensuring a low background sound level during the experiment sessions.

Before a session began, participant information such as name, age, and gender and session parameters such as number of stimuli and stimuli timing data were entered into screens provided by the data collection program.

Sessions consisted of 20 stimuli divided between audio and control, or silent, stimuli on a random basis. Thus, on the average, there were about 10 audio and 10 control stimuli in a session which lasted approximately 25 minutes, given that the inter-stimulus interval was 60 ± 20 s. The sequence of events during a session was a follows:

- The participants were given a brief overall project history and a complete description of the experiment. In addition, the participants were asked to review and sign an informed consent document.
- The participants were asked to rinse their hands in water and dry them thoroughly.

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[1] Because of a technical consideration of buffer size, the 5 s prestimulus period only served as a time to transfer the skin conductance data from the serial port buffer to the computer memory. In the analyses, 3.5 s was used as the prestimulus period and was defined relative to the stimulus onset. During the prestimulus period, the data collection software was quiescent waiting for a 5-second timer to elapse.

[2] Details of this generator may be found at http://hlhp1.physik.uni-ulm.de/~freitag/spinoffs.html.

[3] Thedata from the RNG was exclusive or-ed with numbers from a pseudo-random number generator.

[4] See http://stat.fsu.edu/~geo/diehard.html for information and source code of these tests.

[5] Radio Shack # 33-1198

- An experimenter attached the electrodes as described above.
- The experimenter and participants watched the skin conductance on a display to demonstrate how their skin conductance changed if they moved or were startled by a clap of the experimenter's hands. They also conversed for about 10-15 minutes to allow the electrodes to equilibrate with the skin and to give the experimenter an opportunity to check that the equipment was performing normally.
- The participant was instructed how to abort the session, if necessary, by clicking on a button labeled "Abort." They were also told that at the completion of the run they would hear a message on the headphones saying that the run was complete. They were asked to then call out for the experimenter who would disconnect them and conduct an immediate analysis of the data.
- The participants were instructed to keep their eyes closed and to try to maintain a state of vigilance, or active expectation, during the trial time. They were also asked neither to employ any meditative techniques during the session time nor to fall asleep.
- The experimenter terminated the setup time by setting the system to automatic and initiating the session. At this point, the skin conductance plot shown on screen would go blank.
- The experimenter left the room for approximately 25 minutes and waited outside the door until the call from the participant at the end of the session.
- After the participant was disconnected from the monitoring equipment, the experimenter analyzed the data to provide feedback to the participant.

Data Collection Software

The data collection program was written in Microsoft's Visual Basic 6 and run on a PC under either the Windows 2000 or Windows XP Professional operating system. Great care was taken in the design of this code such that all steps in the computer program should be identical in the prestimulus region regardless of future stimulus type. Thus, even the computer was "blind" when collecting the skin conductance data, right up to the last point in the prestimulus region, as to what the next stimulus type would be.

At the start of the data collection period, the stimulus sounds, comprised of two identical size "WAV" sound files, were loaded from disc into memory.[6] Skin conductance data collection started when the experimenter initiated the automatic mode and left the room. At that time, a 135 ± 15 s cool down period timer was started automatically. When complete, the program went into a 20-fold loop and collected the experimental data in accordance with the stimulus timing described above.

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[6] The silent control WAV file consisted of all zeros but was the same size as the stimulus WAV file.

After the final stimulus a further 30 s of skin conductance (SC) data were collected after which a message signaling the end of the trial was played to the participant's headphones. At that time, the skin conductance data was written to disk.

During the code's operation data acquisition was interrupt driven by the various timers and no data were stored to disk; thus, there was no code related disc activity. Occasional disk activity was observed to occur during test sessions, which resulted from the normal swapping activity of operating systems, and this did not interrupt the skin conductance data stream into the serial port buffer.

Participants

Participants for this experiment were drawn from the public via word-of-mouth and from various advertisements on the Internet. A lower age limit of 18 was pre-specified and participants who were discovered during conversation with the experimenter to be seriously ill or on medication were excluded. Since the protocol was not counterbalanced as to the number of audio versus control stimuli, we decided in advance to reject sessions with less than six stimuli of either type, to reduce the variance of the within session effect size.[7] We specified 100 participants would participate in the formal study.

Analysis

Our analysis was to compute the difference between the proportion of skin conductance responses prior to audio stimuli and prior to controls. This method was originally used by Vassy (1978) in an experiment based upon a classical conditioning paradigm.

To detect a non-specific skin conductance response, we used a two-fold cubic spline interpolation method to both smooth the skin conductance data and to assure, by definition of the cubic spline method, that the first derivative was well behaved.[8] Figure 1 illustrates the method used on a single skin conductance response from one of the datasets.

[7] A two-tailed binomial probability of exclusion of 0.041.

[8] By two-fold, we mean we first down-sample the raw data as a smoothing procedure, and then up-sample the spline to the original data length.

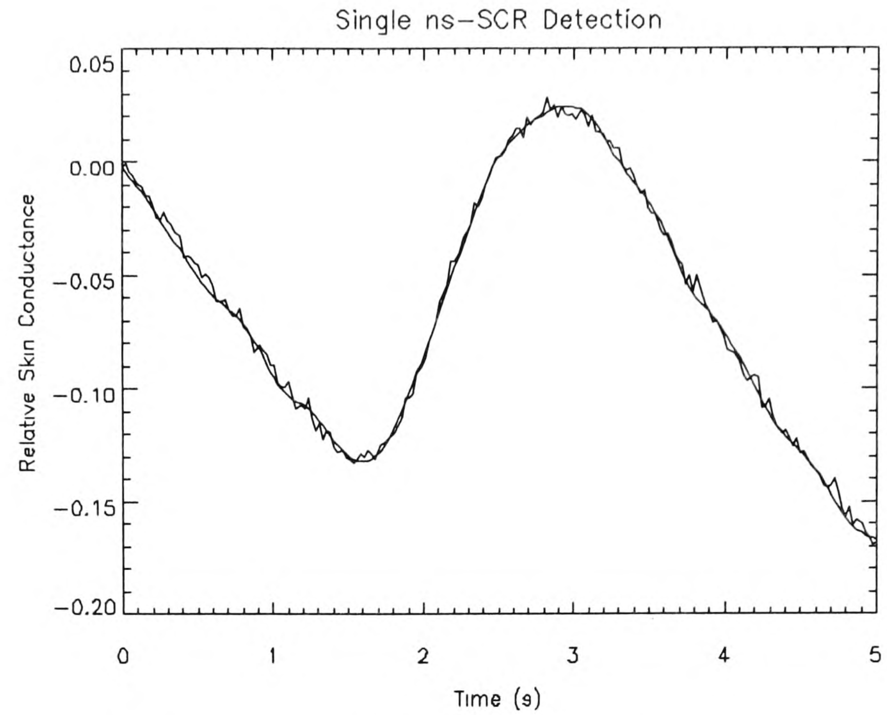

Figure 1. Spline Interpolation Method of Skin Conductance Response Detection

The "noisy" line in Figure 1 is a typical skin conductance response. (We have added a small amount of Gaussian noise to the original skin conductance data to illustrate the general method.) The solid smooth curve is the result of initially sampling the data at every eighth point, computing the cubic spline interpolation, and then using that spline to obtain a skin conductance approximation of the same length as the original record. Our definition of a skin conductance response required that a minimum be followed by a maximum in the prestimulus region. In this example, the algorithm computed the amplitude of this skin conductance response to be 0.156 μSiemens. Additionally, to qualify as an skin conductance response in our prestimulus region of three seconds, we required that the amplitude, computed from the above algorithm, must have exceeded a specified threshold, and that only a single skin conductance response be present in the region. Because of the slow response times of skin conductance changes, , it was rare that two skin conductance responses were found in the prestimulus region, and we ignored these epochs. To define the detection threshold, we computed the mean amplitude of all the skin conductance responses in a single session, removing the data from [-6,10] s around each stimulus. The skin conductance response amplitudes in the remaining regions were found by applying the same algorithm as above. However, we required that the amplitude of the skin conductance response be greater than or equal to 0.005 μSiemens to exclude instrumental noise in very stabile participants and low amplitude pulses such as those due to heart pulse, as was observed in a few participants. To account for differing skin conductance levels between participants, we defined the threshold for a skin conductance response for each session. Specifically, we required that a given skin conductance response meet or exceed 0.1 times this mean skin conductance response amplitude for each participant. This value of 0.1 was arbitrary, and as we will show below, our results are insensitive to this parameter.

We defined the lability of a participant as the number of skin conductance responses that exceeded this threshold divided by the total number of seconds in the above analysis period. Participants at the upper end of the lability range (e.g., .1 responses per second) are conventionally denoted "labile," while those at the lower end are called "stabile."

Under the null hypothesis, the proportion of skin conductance responses prior to an audio stimulus should be equal to that before a control, silent "stimulus." The analysis proceeded as follows.

Consider two types of intervals: (1) a prestimulus period just prior to sound and (2) a prestimulus period just prior to a silent control. We counted a skin conductance response as having occurred in either of these intervals if the criteria that were described above were met:

The proportions prior to audio stimuli, p_s, and prior to control, p_c, stimuli are defined as:

$$p_s = \frac{\#\,of\ skin\,conductance\,responses\ prior\ to\ audio\ stimuli}{\#\,audio\ stimuli = N_s},$$

$$p_c = \frac{\#\,of\ skin\,conductance\,responses\ prior\ to\ control\ stimuli}{\#\,control\ stimuli = N_c}.$$

The standard relation for the Z-score for the difference between two proportions is given by (Larsen & Marx, 1986):

$$Z = \frac{p_s - p_c}{SD},$$

where the standard deviation, SD, is given by:

$$SD = \sqrt{p(1-p)\times\left[\frac{1}{N_s}+\frac{1}{N_c}\right]},$$

and p is given by:

$$p = \frac{(p_s N_s + p_c N_c)}{N_s + N_c}.$$

The analysis was the same for a single session as for data combined across sessions. In the latter case, the proportions and stimulus counts reflected the combined data.

Prestimulus Interval and Inclusion Criterion

Spottiswoode & May (2003) used a prestimulus region of 3.0 seconds, which was based on earlier sessions involving epoch analyses and a complex filtering system. Using only the first 105 participants, they re-examined the sensitivity to the choice of prestimulus region except this time they based their calculation upon the ns-SCR proportion measures described above. They found that the effect size associated with the proportion difference, peaked near –3.5 seconds but the effect was visible from about –8.0 s to –0.5 s prior to the stimulus. For all further sessions, the prestimulus interval was set to –3.5 seconds.

The formal study described here included 91 individuals from the set of 165 first time participants beyond the original 105. To be included in the formal study, a participant must exhibit at least one prestimulus interval, regardless of future stimulus type, that contained an ns-SCR. This criterion therefore excludes the most stabile participants.

Results

The dependent variable was the difference between the proportions of prestimulus intervals that contained an ns-SCR prior to an audio stimulus and prior to a silent control stimulus. The 100 participants comprised 52 males and 48 females ranging in age from 18 to 81 years (median age 47 years). Labilities ranged from 0.01 to 0.27 non-specific skin conductance responses per second.

We used the expression for the Z-score described above to assess the statistical significance of the difference between these two proportions. Table 2 shows the results.

Table 2. Formal Study Results

Interval Type	# of Intervals Containing a Response	# of Prestimulus Intervals
Before a Control	87	1000
Before a Stimulus	162	1000

From this Table, we see that the proportion prior to an audio stimuli is 0.162 and before silent controls is 0.087 (Z = 5.08, effect size/stimulus = 0.161 ± 0.032, $p(1t) = 1.8 \times 10^{-7}$, effect size/session = 0.508 ± 0.100).

Potential Artifacts

There are a number of sources of potential artifacts:

- Cueing. Subtle cues allowed the participant to know the up-coming stimulus type.
- Expectation. Either the rate of skin conductance responses or the skin conductance level could have increased due to stimulus hunger.
- Stimulus Generator. There were non-random anomalies in the stimulus generator that allowed a participant to infer the next stimulus' type.
- Programming Errors. The observed effect arose because of errors in either the data collection or analysis code.
- Data Collection Computer Anomaly. The observed effect was due to an unknown mechanism in the data collection computer, which caused it to record skin conductance responses in a biased manner.
- Participant or Experimenter Fraud. The results occurred because of cheating.

We address each of these points below.

Cueing

Both the experimenter and the participant were blind to the up-coming stimulus choice. The data collection code was also "blind" as well, since the stimulus type was determined by a hardware RNG 25 ms *after* the last skin conductance data point in the prestimulus region had been saved in computer memory. The data collection computer ran identical code for each of the two possible future stimuli types up to the moment of stimulus presentation. In addition, the audio files that were played as the stimuli were resident in memory throughout the run and thus there were no code-related disk accesses. Cueing could not therefore contribute to the observed outcome.

Expectation: Skin Conductance Response Analysis

Lately there has been theoretical interest in possible contributions to apparent prestimulus response by expectation effects (Dalkvist et. al, 2002. Wackerman, 2002). The approach is to assume that there is a monotonic increase in the dependent variable as a function of time between adjacent arousing stimuli; simulate this in a computer program; and then to compute the resulting Z-score reflecting this assumption. The discussion has focused upon skin conduction level shifts, but the concept could apply to our dependent variable as well if there were an increase in the rate of skin conductance responses as time elapses between adjacent audio stimuli. However, these studies also show that in analyses in which data is summed across subjects, as here, an expectation bias effect is vanishingly small, and this is confirmed in our study by the following three tests.

The first approach to the expectation issue is, perhaps, more direct. By definition, expectation artifacts of any kind should contribute more the longer the time since the last audio stimulus. Given an audio stimulus, if the distribution of times to the next audio stimulus were statistically identical to the distribution of times to the next silent control stimulus, no expectation bias regardless of type or magnitude could contribute to the differential proportion outcome measure.

In our formal study, the mean of the distribution of times to the next audio stimulus was 113.1. s for audio stimuli and 112.9 s for controls (Mann-Whitney U Z-score = 0.237, $p = 0.406$, effect size = 0.006 ± 0.023), and the distributions of these times were not significantly different (Kolmogorov-Smirnov $p = 0.985$).[9] Since these two sets of times are statistically indistinguishable, expectation bias cannot produce differences in the differential skin conductance response rates.

This result in itself is sufficient to reject an expectation bias hypothesis; however, we consider two additional tests to determine whether a bias exists in our data.

In the first of these, we moved the analysis period back 3.5 s to [-7.0,-3.5) s relative to the audio and control stimuli and recalculated the proportion statistic. By repeating this process of moving the whole analysis backwards, we computed the effect size as a function of prestimulus intervals before the stimulus. Figure 2 shows the result including the effect size for the actual prestimulus interval of [-3.5, 0.0) that was used in the study.

[9] Note that this is the probability that the distributions are drawn from the same parent distribution.

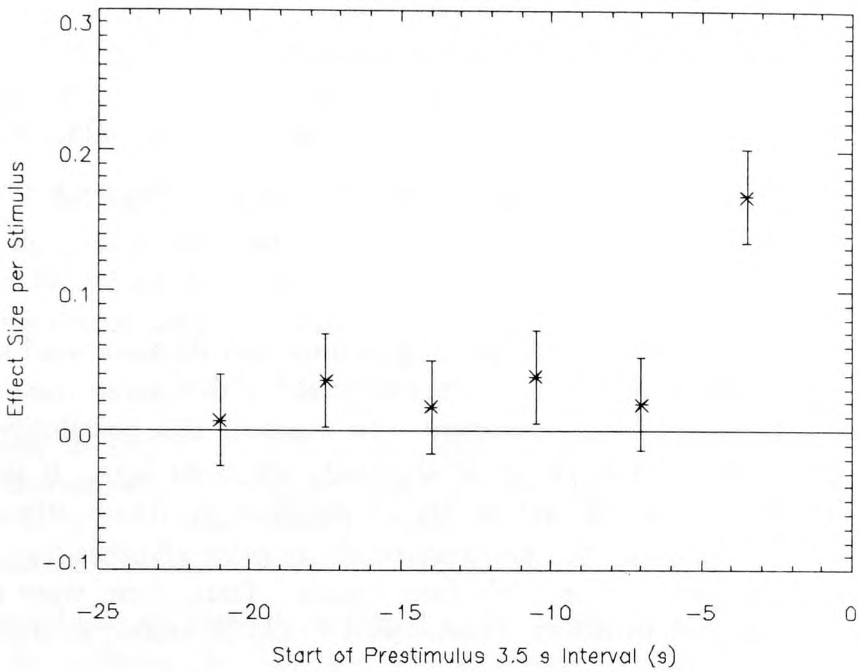

Figure 2. Proportion Difference Effect Size

The effect size in the 3.5 s window immediately prior to the prestimulus period is significantly smaller than that in the prestimulus region (i.e., t_{dff} = 3.16, df = 1810, p = 0.0008) and the effect size remains at mean chance expectation for an additional four earlier intervals.

We now have the following three conditions: An excess of skin conductance responses in the prestimulus epoch prior to audio stimuli, no such excess over chance expectation in the preceding epochs and a randomized inter-stimulus interval of 40 s to 80 s. Any expectation effect must appear as an increase in the dependent variable (i.e. rate of production of skin conductance responses), which is a monotonically increasing function of the time since the last arousing stimulus. Such an effect, were it to occur, could not give rise to an increase in the skin conductance response rate solely in the epoch prior to the next startle stimulus, *a fortiori* when the timing of that stimulus was randomly varied and unknown to the participant.

Finally, we consider the ns-SCR production rate as a function of time since the last audio stimulus. If this production rate were independent of time since last arousing, then no bias exists in the data.

Given an audio stimulus, the times to the next one ranged from 40 s to 494 s. We combined the data into 60 s bins and computed the probability of an ns-SCR prior to the next audio stimulus as a function of the time-since-last-audio stimulus. Because the times since the last audio stimulus is Poisson distributed, the number of events in the long-time period bins was small. Therefore, we computed a weighted, linear least squares fit to assess whether the probability depended on the time since the last audio stimulus. We found that the slope associated with this fit was 2.73×10^{-5}. Even under the worst case of 500 s, this slope corresponds to an effect size increase of 0.014 above a mean of 0.167. Thus, the ns-SCR production rate was essentially independent of the time since last audio stimulus.

Given these three approaches to possible expectation bias, we conclude that such a bias cannot account for our $z = 5.05$ result.

Stimulus Generator

As we have pointed out above, the hardware stimulus generator and its associated software passes the "gold standard" test for randomness; however, it remains possible that some momentary stimulus-to-stimulus dependence could be sensed by a participant. To examine this possibility we computed the auto-correlation for the actual stimulus sequence in the study for $\pm$ 20 lags. If there were no serial dependencies between the given stimulus and up to 20 previous or future stimuli, then the auto-correlation function would be unity at zero lag and statistically zero for all other lags. In $\pm$ 20 lags, we would expect one significant autocorrelation. We found none. Thus, there were no simple inter-bit patterns in the stimulus sequence and, therefore, a participant would be unable to anticipate correctly the up-coming next stimulus.

The number of audio stimuli was 906 and the number of silent controls was 914. This is well within mean chance expectation of an event probability of 0.5 (Binomial $p = 0.584$).

Programming Errors

The data collection code was shared between the two experimenters (May & Spottiswoode). To guard against both a conceptual error and a possible coding error in this shared code, we replaced the human participant with a resistor that represented a typical skin conductance level (i.e., 220 kΩ) that was placed between the earphones to crudely simulate a human. We would expect no differences between the prestimulus regions regardless of stimulus condition. Not only did we not observe any differences, but when we also measured the skin conductance of participants without any overt stimuli, we also saw no significant effects and no post-stimulus responses.

To guard against coding errors in the analysis code, May & Spottiswoode conceptually agreed on the analysis method. They then both coded that analysis with different approaches using different computer languages and sharing no code. The results were not accepted unless the calculations agreed to within machine precision for floating point calculations. This method guards against coding errors but does not eliminate possible conceptual errors.

Conceptual errors were also very unlikely in that the primary analysis was a simple skin conductance response counting exercise. Therefore, programming errors did not contribute to the positive results of the study.

Data Collection Computer Anomaly

As an additional check for unknown artifact mechanisms, we constructed a pseudo participant as a control condition for the entire experiment. The details can be found in Spottiswoode & May (2003). Using the same test statistic used in our formal study they found the number of intervals that contained a fully formed ns-SCR prior to audio and silent controls was 104 and 95, respectively (p = .249, *ES/stimulus* = 0.0191 ± 0.0283). That is, the effect size was within one standard error of zero. Therefore, we concluded that no artifact-inducing effects occurred in the data collection hardware and software. In fact, the entire processing sequence from data collection to final analysis was tested in these simulation results, which demonstrate that replacing the human participant with a near simulacrum in terms of skin conductance behavior caused the observed prestimulus response effect to vanish.

Fraud

For participant fraud to occur, an individual, who was not aware of the technical details of the experiment, had a maximum of 28 minutes to replace the actual data file with a clandestine pre-defined, fraudulent one or to try to manipulate the data collection system or generate signals by motor movements to mimic the prestimulus response effect.

To eliminate the possibility of participant fraud, all programs and data were 128-bit encrypted on the computer's disk. In addition, the data file structure was confidential and not shared with anyone. During the time of the experiment, the data collection computer was not connected to the Internet. Therefore, the first mechanism is extremely improbable. Fraud based on manipulation of the data collection system or generation of signals by movements is moot since the stimulus type, which would have to be known in advance to generate false signals, was unknowable until their occurrence.

Therefore, the results of this study cannot be accounted for by participant fraud.

Discussion

We have observed a robust and significant prestimulus response in first time participants in this formal study using the skin conductance response proportion measure. This represents a significant and successful replication of our earlier works (Spottiswoode & May, 2003). In the language of psychophysiological work on skin conductance, we would call this the phasic component of prestimulus response.

To illustrate the lack of tonic component, we conducted the same type of ensemble averaged epoch analysis reported by Radin, (1997 a,b) except we clamped the data at –3.5 s. A randomized permutation of the 1820 stimuli produced an epoch analysis Z-score corresponding to the tonic and phasic SC difference prior to audio and control stimuli, respectively, of 0.124 and an effect size/stimulus = 0.0029 ± 0.0234. This type of epoch analysis is sensitive to slow tonic changes. The relatively rare ns-SCR in the prestimulus region is not sufficient to yield significant tonic differences.

Our definition of a valid skin conductance response contained one free parameter: namely, the fraction of the mean skin conductance responses for each given session. We arbitrarily chose 0.1. Figure 3 shows the effect size for the differential skin conductance response count as a function of this fraction.

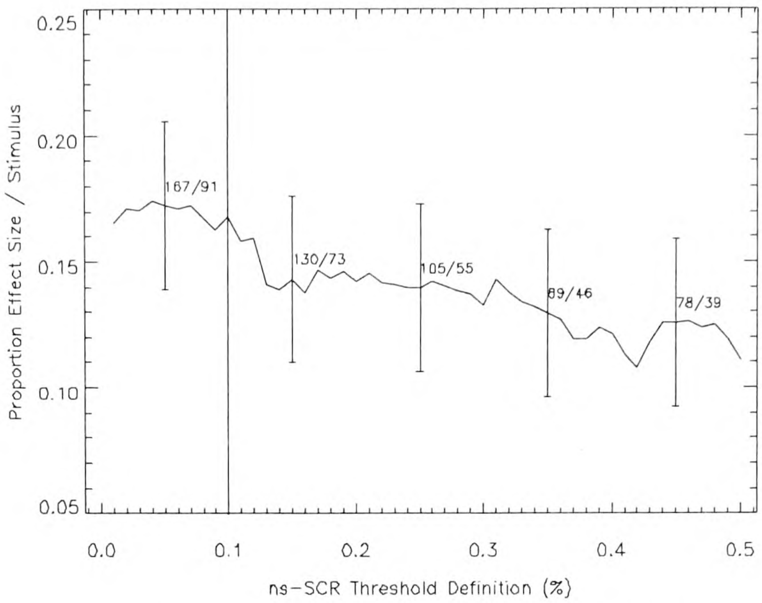

Figure 3. Effect Size Sensitivity to Threshold Parameter

The error bars are for one standard error for the effect size.[10] The threshold, which was determined from the 105-pilot set, used in this study was 0.1. Therefore, our result is insensitive to the choice of discrimination threshold for a wide range of values. Even at the extremes of the 50% range, the values of the effect size are within one standard error of each other. We do note, however, a decline as a function of threshold.

Post Hoc Observation

As we noted above, we computed the effect size per audio stimulus as a function of starting time of the prestimulus region for the original 105-participant data set.[11] Figure 4 shows the result in 0.5-second steps from –14.0 s to –0.5 s prior to the stimulus.

[10] The numbers near the error bars indicate the number of intervals prior to an audio and control, respectively, at those points.
[11] All prestimulus regions end at the stimulus decision point and onset time.

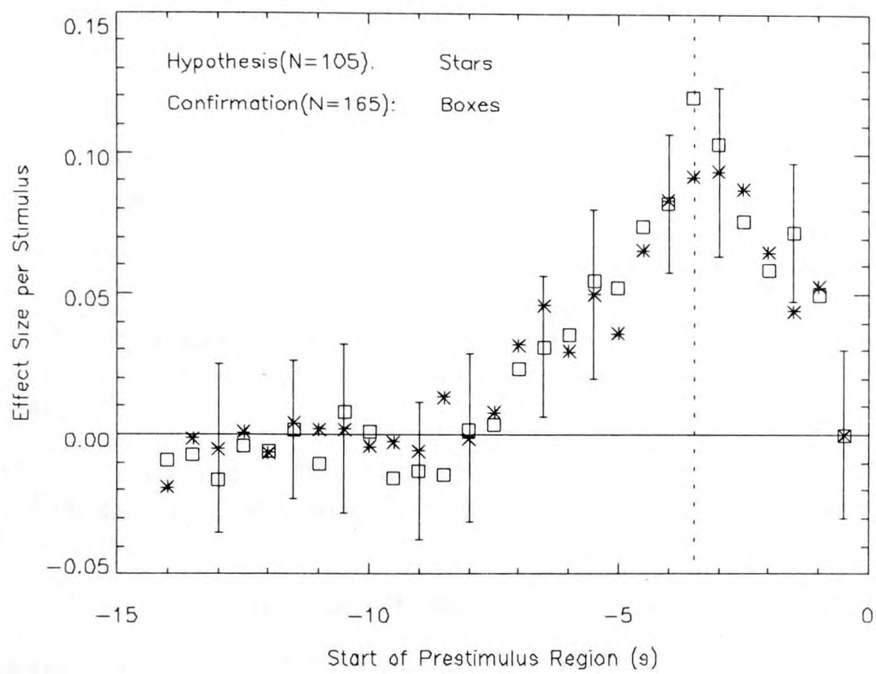

Figure 4. Sensitivity to Start of Prestimulus Interval

The vertical dashed line shows the choice of the prestimulus interval start time. Our 3.5 s prestimulus interval was determined arbitrarily after a visual inspection of only the 105-participant data set (i.e., the stars in Figure 4).[12] Post hoc, we declared the temporal distribution of effect sizes as a hypothesis to be tested with new data. The open boxes show the effect size per stimulus for the completely independent, additional 165-participant data set. The two curves are well within each other's standard errors as shown by the error bars.

Thus, an audio mediated prestimulus response appears above the noise at about –8.0 s prior to the stimulus and peaks at about –3.5 s. The drop-off for earlier times, however, may be an artifact of our requirement of a fully formed ns-SCR in the prestimulus region.

Acknowledgements

We thank Zoltán Vassy for inspiring the approach in this experiment and for many helpful discussions. We thank the Institute of Noetic Sciences for helping to recruit participants. We thank Diane Bassett for her tireless effort in recruitment as well. We also thank the Fundação Bial, the Institute of Noetic Sciences and the Samueli Institute for Information Biology whose financial support made this study possible.

[12] At that time, the remaining 165-participant had not yet been collected.

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Evidence of anomalous information transfer with a creative population in ganzfeld stimulation [1]

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Abstract

To test for anomalous information transfer between a sender and receiver, the study used the automated ganzfeld system of the Koestler Chair of Parapsychology, University of Edinburgh. A total of 40 creative participants (22 musicians and 18 visual artists), contributed one session each. Each participant was required to act as the 'receiver' in a ganzfeld based setting. The 'sender' (researcher not acting as experimenter for that session) was shown a random video-clip. At the end of the sending period the receiver was required to assign a rating (from 0 to 99) to 4 video clips, (this representing the degree of correspondence of each video clip to their ganzfeld experience). Participants completed Saucier's (1994) personality inventory, having factors for surgency (extraversion), agreeableness, conscientiousness, neuroticism and intellect and a general questionnaire including items on experience with mental disciplines and beliefs. It was predicted that extravertion, mental discipline practice and routine ESP beliefs would all be significantly correlated with ganzfeld success. Overall, results were 15 hits in 40 trials, a 37.5percent hit rate, p=0.05, one-tailed, ES(h) = 0.26. As a sub-group artists had the best overall hit rate at 44.4percent, but this was marginally nonsignificant. Correlations between ganzfeld z-scores and individual differences measures was significant only for the trait of extraversion at rho = 0.317, p= 0.02, one-tailed. No other correlations between z-scores and the personality traits or the PIF measures were significant. An exploratory analysis revealed a 66.7percent hit rate for the 21 participants who had viewed the web-site (designed to give detailed information of the current study). There was a significant difference in the z-scores between participants who had viewed the web-site and those who had not viewed the web-site. This and the other outcomes from the study are discussed.

[1] We would like to acknowledge the programming and technical assistance of Dr Paul Stevens, as well as the financial assistance of the Inova Foundation.

Introduction

A prominent area of investigation into the ganzfeld effect is the study of individual differences and characteristics of a good receiver. Honorton (1992) identified that: previous psi experiences, belief in ESP, a high score on the Myers-Briggs feeling / perception scale, some experience with mental disciplines (e.g. meditation) and extraversion are all predictors of success in the ganzfeld. Other studies have shown that creativity (especially in music and the fine arts) is strongly linked to ganzfeld success.

For example, Honorton (1967) found that individuals' ESP scores varied directly with their scores on a test of creativity. Similarly, Moss (1969) found artists scored higher in an ESP test than non-artists. More recently, Schlitz and Honorton (1992) found that students from the Juilliard School (one of the top colleges in the world for performing arts) achieved a hit rate of 50 percent. The musicians were particularly successful, as 75 percent of them successfully identified their targets.

In addition, Cunningham (in Morris, Cunningham, McAlpine and Taylor, 1993) conducted a ganzfeld study involving 32 participants pre-selected to have musical or artistic ability. Overall, there were 40.6 percent hits ($p < 0.05$). It was also found that highly creative individuals scored significantly better than others ($p < 0.025$) Morris, Dalton, Delanoy, & Watt (1995) also used a creative population made up of artists and musicians, with the overall study significant at 33 percent. ($p < 0.05$) Dalton (1997) also examined creative groups (visual artists, musicians, creative writers, and actors) and found overall a direct hit rate of 47 percent ($p = 7\text{x}10^{-8}$), a highly significant result. In addition, musicians obtained a hit rate of 56 percent, significant at $p = 0.0001$, and artists obtained a hit rate of 50 percent which is also significant at $p = 0.002$.

The results from the above studies suggest that the creative individual has certain characteristics that enables them to achieve success in the ganzfeld. For example, creativity has been described as the ability to find new relationships between things and to combine them into new wholes (MacKinnon, 1962). Frederic Myers (1903) believed that an up-rush from the subliminal mind to consciousness characterises the works of both the creative genius and the psychic. Thus, creativity and psychic ability may be related because incubation of creative ideas and mediation of psi phenomena both occur at an unconscious level. They may also be related because the key to creativity, and psi, both involve openness to fleeting unexpected impressions (Schmeidler, 1983).

Another major variable to be correlated with ESP scores is extraversion. A number of studies measuring extraversion have found a positive relationship between extraversion and ESP performance (e.g. Nicol et al., 1953; Astrom, 1965; Brodbeck, 1969; Casper, 1952; Nielsen, 1970; L.W. Braud, 1977; Kanthamani, 1966). This particularly seems to be the case in free-response tests of ESP (Honorton, Ferrari & Bem, 1992). This trend is reinforced by Cunningham's ganzfeld study (Morris et al., 1993) which found a significant positive correlation between extraversion and hits in the ganzfeld ($r=0.428$, $p<0.01$).

Eysenck (1967) reasoned that extroverts should perform well in psi tasks because they are easily bored and respond favourably to novel stimuli. In a ganzfeld setting, extroverts may become starved for stimulation and thus may be highly sensitive to any weak incoming ESP signals. In contrast, introverts may be more inclined to entertain themselves with their own thoughts and thus continue to mask psi information despite the diminished sensory input. Eysenck also speculated that psi might be a primitive form of perception, antedating cortical developments in the course of evolution, and hence, cortical arousal might suppress psi functioning. Therefore, because extroverts have a lower level of cortical arousal than introverts do, they should perform better in psi tasks (Eysenck, 1967).

The effect of extraversion may simply be due to superior social adjustment rather than a superior ability on ESP tasks. For instance, extroverts may perform better than introverts simply because they are more relaxed and comfortable in the social setting of the ganzfeld. For example, Schmidt and Schlitz (1989) found that introverts actually outperformed extroverts in an ESP study in which participants had no contact with an experimenter, but worked alone at home with materials they received in the mail.

However, Cunningham (Morris et. al., 1993) found that the individual facets of extraversion of activity ($r = 0.324$), excitement seeking ($r = 0.311$) positive emotions ($r = 0.473$) were significantly correlated with psi-hitting in ganzfeld at $p < 0.05$ or better. Therefore, these results would suggest that participants did better who craved exciting and stimulating environments and is consistent with Eysenck's theory of cortical arousal rather than the relationship between extraversion and psi success being due to the social setting of the ganzfeld.

There are fewer studies on the effects of the other personality traits on ganzfeld performance. However, some of the remaining traits appear to have some involvement with success in ganzfeld. For example, Van Kampen, Bierman, and Wezelman's (1994) study indicates that openness ($p<0.004$) and agreeableness ($p<0.02$) are good indicators of ganzfeld success. Van Kampen et al., (1994) also found a positive relationship between the extraversion facet of activity and psi-hitting in ganzfeld. This reinforces Cunningham's findings and provides additional support for Eysenck's theory.

The current study utilised musical and artistic individuals to assess the proposed link between creative populations and success with ESP-hitting in the ganzfeld. The study tested for anomalous information transfer between a sender, (the researcher not participating as experimenter for that session) and a receiver (creative participants) in ganzfeld.

Thus, four hypotheses have been specified as follows: 1) The overall number of direct hits would significantly exceed chance. 2) There would be a positive significant correlation between number of hits in ganzfeld and extraversion. 3) There would be a positive significant correlation between hits in ganzfeld and practitioners of a mental discipline. 4) There would be a positive significant correlation between hits in ganzfeld and positive ESP beliefs

Additional individual difference measures were taken, but their analysis was purely exploratory. The study also explores whether viewing the web-site in advance (designed to give detailed information of the ganzfeld technique and the present experiment) will have an effect on receivers' performance, but no specific prediction was made in advance.

Methodology

The present study was designed to assess a prominent finding in ganzfeld research: that musical and artistic individuals perform significantly better than chance expectations in ganzfeld. To test for anomalous information transfer between sender and receiver, the study utilised the automated ganzfeld system of the Koestler Chair of Parapsychology at the University of Edinburgh. The researchers participated as the 'sender' in alternating sessions.

Participants

The population for the present study was comprised of artistic individuals recruited from Edinburgh College of Art (ECA), Edinburgh University Music School (EUMS), and Napier University Music School (NUMS). Professional musicians and visual artists also participated. A total of 40 participants, 22 musicians, (11 male and 11 female) and 18 visual artists, (11 male and 7 female) contributed one session each. Participant age range was 18 to 48 years old (mean 25; mode 22; std. dev. 6.19) but age was not a factor that was considered further. Participants had not taken part in any previous autoganzfeld studies, and were considered ganzfeld novices. Participants were recruited by displaying posters around ECA, EUMS, NUMS and in local music and art shops. A web-site was designed to recruit participants and to give them detailed knowledge of the ganzfeld procedure and the present experiment. The poster encouraged the participants to go and view the web-site. The participants all served without pay.

Apparatus

The automated ganzfeld system of the Koestler Chair of Parapsychology is a computer based system that provides automatic data recording, highly effective shielding against sensory cues, and is resistant to both subject and experimenter fraud.

The program is run on a Pentium III 500 MHz computer with 3 video cards (primary display (computer monitor) to the experimenters room, isolated secondary and tertiary displays (computer monitors) to the sender's and receiver's rooms respectively) and a DVD drive (containing digitised video and audio). There is a two-way audio link between the experimenter and receiver, and a one-way audio link from the experimenter to the sender. The controlling computer program (using a pseudo-random algorithm) selects the target clip; (the Edinburgh set-up uses the rnd function in MS visual basic).

The video clips were all dynamic clips 65 seconds long. They were clips from films, cartoons and documentaries with accompanying sound tracks. The clips were comprised primarily of more successful dynamic targets from the Psychophysical Research Laboratory (PRL). Dalton (1997) added additional clips the system to ensure a total of 100 clips in the Edinburgh system. The only difference between the clips used by Dalton (1997) and the ones in this study is that the original video-clips were on video-tape. They have now been converted to MPEG digital video format. The clips are stored as MPEGs on hard disk and played back from computer hard drive.

The 100 clips were grouped in 25 possible target sets, each containing 4 video-clips selected to be as dissimilar as possible. The computer selects one pool, then one particular clip within that pool to be the target. The system and the program was designed by Dr. Paul Stevens of the Koestler Parapsychology Unit.

Laboratory Layout

The experimental rooms are located on the top floor of the Psychology Department. The receiver and the experimenter rooms are adjacent, and toward the rear of a six room experimental suite. The additional rooms include a hospitality room where participants can relax before and after a ganzfeld session, two separate experimental rooms and an interview room where participants completed their questionnaires prior to their session. The sender's room was approximately 25 meters away along the outside hallway and up a small flight of stairs. For a detailed discussion of laboratory layout and specific details on degree of sound attenuation from sender to receiver room see Dalton, Morris, Delanoy, Radin, Taylor, & Wiseman (1998).

Individual Differences Measures

Prior to the experiment, participants were given two questionnaires to complete. The first was Saucier's (1994) 'mini-markers' personality inventory (a brief version of Goldberg's Unipolar Big-Five Markers, 1990). The inventory measures surgency (or extraversion), agreeableness, conscientiousness, emotional stability (versus neuroticism), and intellect (or imagination or openness to experience). The inventory includes 40 items, and participants were required to choose how well each of the 40 adjectives (e.g. bold, kind, etc) applied to them. Each personality dimension was represented by 8 adjectives, and the response scale ranged from 1 (extremely inaccurate) to 9 (extremely accurate). Due to time constraints the 'mini markers' inventory was extremely suitable, as it only required 10-15 minutes to complete. This inventory has shown excellent psychometric properties and has been widely used in basic and applied research (Saucier & Goldberg, 1996).

The second questionnaire was a modification of the Participant Information Form (PIF) used regularly by the Koestler Chair. The PIF contained 36 items (this shortened version was suitable for the present study). The PIF covered many aspects of the participants' background, prior ESP experiences, beliefs and thoughts on ESP, experience with mental disciplines and so on. The questions required either a yes /no answer, or to circle a number that best described their position on a 7-point scale. The remaining questions in the PIF required a more detailed written answer.

Procedure

When the participant arrived at the psychology building the researcher acting as the sender for that session greeted them at the door and took them up to the parapsychology unit. The researchers alternated between acting as sender and experimenter for each session so that the numbers for each role would be equal. In the parapsychology unit the participant was introduced to the second researcher, and was told that this researcher was the experimenter for their session.

The participant was then taken into the interview room and asked to complete the personality questionnaire and the PIF. The participant was at this point offered tea, coffee and various refreshments. After the participant completed the questionnaires, the sender led them to the sender's room where a rationale for the ganzfeld research was given. The participant was then taken to the receiver's room, where again it was explained what the apparatus is used for and were given a brief description of what they were expected to do as a receiver.

The participant was then asked if they viewed the web-site before coming along to participate. The participants who had viewed the web-site commented that it was very informative and it helped them to understand what they would be expected to do. They also commented that the photographs of the rooms were especially helpful to give them an idea of the task.

The researcher who was acting as the sender for the session helped the receiver adjust their headphones and the volume to a comfortable level. Prior discussions (via email and in person with potential participants) indicated that they were anxious about having acetate hemispheres on their eyes (the more usual ganzfeld procedure) and would be nervous about taking part in the experiment. Therefore, it was decided that the acetate hemispheres would not be used in this study.

When the receiver was comfortable in the chair, eyes closed, a flexipose 60-watt red light was placed about a metre in front of their face, switched on, and main lights switched off. The receiver was told that, once they hear the white noise start, they should report out loud any images, thoughts, feelings or impressions that come into their mind. They were also asked not to censor this and to report everything, whether they feel it relates to the target or not. The sender wished the receiver a good session and the two doors to the autoganzfeld room were securely closed. The sender then went to the sender's room to prepare for the sending period.

The experimenter then started the automated ganzfeld session and prepared to take hand written notes on the receiver's mentation. The ganzfeld session began with the relaxation instructions being played (heard by both the receiver and the sender). The instructions were a recorded reading by Dr. Caroline Watt and lasted for approximately 7 minutes. After this, white noise was played over the audio channel for the duration of the session (this lasts for approximately 18 minutes).

During this, the sender was shown the first playing of the computer-selected video clip and attempted to silently communicate this to the receiver. This target video clip was repeated 9 times during the sending period. The video clip lasted for 65 seconds and there was a 55-second pause in between each showing. The sender could hear the receiver's mentation (i.e. their verbal report of their feelings, thoughts, and impressions) and during the session attempted to mentally reinforce those aspects, which related to the target. During this time, the receiver's mentation was recorded automatically (via the microphone the receiver was wearing) by the computer and stored on its hard-drive. The receiver's mentation was also summarised by the experimenter in written notes, for use during the judging procedure.

At the end of the sending period, the experimenter reviewed the mentation with the receiver over the audio link. The receiver was, at this point, allowed to add any further details or thoughts that they might have had. The receiver was then asked to watch their computer monitor. They were then shown four video clips, one at a time, and allowed to comment on each one. They were then asked to assign a rating from 0 to 99 to each clip, this representing the degree of correspondence of each video clip to their mentation. The experimenter explained that each video clip must be assigned a different rating and they could change their ratings at any point during the judging period. The receiver scored a direct hit if the target receiving the highest rating was the target that had been viewed by the sender. All ratings were automatically recorded onto hard drive and floppy disk.

The computer program then revealed the actual target clip. The sender was then asked to come down to the receiver's room and the outcome of the ganzfeld session was discussed.

In discussion about the session it was emphasised to the participants that their experience was only one session and does not mean that they do or do not have extrasensory abilities. Finally, both researchers answered any further questions relating to extrasensory abilities and thanked the participant for taking part in the study. Confidentiality was ensured by omitting the participant's name from all of their data. Their data was allocated with a code and this was used throughout their session.

Results

Randomness Checks

The target video-clips were generated using the Visual Basic pseudorandom algorithm, seeded by the computer's clock (this is a standard way of getting pseudorandom numbers). Dalton (1997) tested this same algorithm in her creativity study and chi-square tests revealed no consistent departures from the expected uniform distribution of targets. Although 40 trials is insufficient for any meaningful randomness checks on the actual target selection in the present study, there was no indication of any pattern in target selection or in response patterns. Of the 25 target pools, 21 were used at least once; one was used five times and two others were used four times. The hit rate on these three pools was 38percent, almost the same as the overall hit rate. The distribution of the location of the correct clip in the order presented to the receiver for judging did not differ from chance ($p>.10$). The receivers showed no pattern in choosing clips: first clip shown was chosen 12 times, second 7, third 10 and fourth 11.

Direct Hit Results

Direct hits were used as the primary measure to allow the results from this study to be more easily compared to similar work. Stanford's z-scores (Stanford and Sargent, 1983) based on the target ratings were calculated for each receiver and were correlated (Spearman's correlations) with the personality inventory and the PIF items.

Overall study results, shown in Table 1, yielded 15 hits in 40 trials, a 37.5percent hit rate. This rate exceeded the chance rate of 25 percent with $z = 1.643$, $p = 0.05$, one tailed (corrected for continuity). The overall effect size was ES (h) = 0.26. This confirms hypothesis 1 (that the overall number of direct hits would exceed chance) and is consistent with similar studies that have achieved significant results with creative populations in ganzfeld.

Table 1: Overall ganzfeld results and results by each group

	Number of Trials	Number of Hits	Percent Hits	ES(h)
Total for Study	40	15	37.5 percent	0.26*
Artist	18	8	44.4 percent	0.40
Musician	22	7	31.8 percent	0.13

*Significant at $p=0.05$.

Artists had a hit rate at 44.4 percent, with $z = 1.633$, $p =$ NS, one tailed. The effect size for this group was ES (h) = 0.40. Musicians had a 31.8percent hit rate, which was nonsignificant, $z = 0.49$, $p =$ NS. The effect size for this group was ES (h) = 0.13. When the difference between the artists and musicians z-scores was calculated, no significant difference between the two groups was found: $z = 0.808$, $p =$ NS (Rosenthal & Rosnow, 1991).

For completeness, Table 2 shows the full distribution of ranks for this study, by the two creative groups.

Table 2: Distribution of ranks by the two groups.

Rank	1	2	3	4	Total
Artist	8	3	3	4	18
Musician	7	5	5	5	22
Total	15	8	8	9	40

Personality Data

Saucier's (1994) 'mini-markers' personality inventory was used as a measure of personality across the two groups of subjects. Several Spearman's correlations comparing the personality traits to the z-scores of the rankings of the video clips were performed. The correlations for extraversion are one-tailed, but two-tailed correlations were performed on all other personality traits.

The correlation between z-scores and this personality measure for the study population as a whole was significant only for the trait of extraversion at rho = 0.317, $p = 0.02$. This was in the predicted direction: that participants who did well in ganzfeld would have higher extraversion scores, and confirms hypothesis 2.

Correlations for the other personality traits that Saucier's inventory measures (i.e. agreeableness (rho = -0.116) conscientiousness (rho = -0.208), neuroticism (rho = -0.077), and intellect (or openness to experience) (rho = -0.098), were all nonsignificant.

Table 3: Personality results overall and by group

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Intellect or openness
Total for Study	0.317*	-0.116	-0.208	-0.077	-0.098
Artists	0.486*	-0.167	0.019	-0.188	0.332
Musicians	0.161	-0.034	-0.367	0.008	-0.332

*Significant at $p<0.05$

PIF Data

A modification of the Participant Information Form (PIF) used regularly by the Koestler Chair was used to assess beliefs in ESP and experience with mental disciplines across the two creative groups.

The PIFs were analysed and 50 percent of participants practised relaxation exercises, meditation or yoga on a fairly regular basis. Analysis of the PIFs also showed that 75 percent of participants had a strong belief they had experienced some form of ESP in the past. Despite this prior experience, when asked on an increasingly sceptical 7-point scale whether they believed they could display ESP in a laboratory situation the mean response rating for participants was 4.56.

When participants were asked on another increasingly sceptical 7 point scale whether the existence of ESP was certain the mean response rating was 3.25. Thus, this suggests that overall, participants were not confident about their own ESP ability in a laboratory setting, they did think the existence of ESP was likely.

Spearman's correlations comparing the PIF results to the z-scores of the participants' rankings were performed. The correlations are all one-tailed unless otherwise stated.

The correlation between z-scores and practice with mental disciplines for the population as a whole was nonsignificant, rho = -0.026, and does not confirm hypothesis 3. The correlation between z-scores and beliefs in ESP was also nonsignficant, one-tailed, at rho = -0.175. However, although this result was nonsignificant and does not confirm hypothesis 4, the correlation was in the predicted direction (that positive belief in ESP would result in more success in ganzfeld). Table 4 shows the results for the correlations between z-scores and practice with a mental discipline and for belief in psi, both for the whole study and individually by group.

Table 4: PIF results overall and by group

	Practice with mental discipline	Belief in psi
Total for Study	-0.026	-0.175
Artists	-0.116	-0.038
Musicians	0.094	-0.283

Viewing the web-site

Participants were asked whether they viewed the web-site prior to their ganzfeld session; this was used as a measure to assess whether viewing the web-site had an effect on their hit rate.

Table 5: Overall web-site viewing and by group of hit or miss

Web-site	Number of subjects	Number of hits	Number of miss
Viewed web	21	14	7
Did not view web	19	1	18
Totals	40	15	25

From Table 5 it seems that out of the 21 people who viewed the web-site 14 of them scored a hit, that is 66.7 percent. Also it seems from Table 5 that out of the people who did not view the web-site, only 1 out of 19 achieved a hit in ganzfeld.

A Mann-Whitney test revealed a significant difference in z-scores between the two groups with $z = 3.001$; $p < 0.01$, two tailed.

Further Mann-Whitney tests were carried out to test for differences between participants who viewed the web-site and participants who did not view the web-site. Participants who viewed the web-site had a significantly greater acceptance of EPS than participants who did not view the web-site, $z = 2.086$ $p < 0.05$.

A Mann-Whitney test was also carried out to test the difference between extraversion for participants who viewed the web-site and participants who did not view the web-site. Those who viewed the web-site were significantly higher in extraversion than those who did not view the web-site, $z = 2.006$; $p < 0.05$.

In addition, a Mann-Whitney test found participants who viewed the web-site were significantly lower in openness than participants who did not view the web-site, $z = 2.158$; $p < 0.05$. No further significant differences were found.

Discussion

This study successfully replicates previous autoganzfeld research indicating that creative participants perform well on psi tasks. The study yields a 37.5 percent hit rate overall, which confirms expectations and is consistent with Schlitz and Honorton (1992), Morris et al., (1993), Morris et al., (1995), and Dalton (1997), which all found significant hit rates with creative populations in ganzfeld.

Dalton (1997) has emphasised that the creative populations may tend to perform better in ganzfeld than other populations because creativity includes many of the characteristics thought to be associated with the 'psychic personality'. If further research tends to confirm the present findings, it may be possible to explore the dynamics by experimentally manipulating various situational, motivational, and attitudinal variables affecting them.

The study also successfully replicates a prominent finding in ganzfeld research that extraversion correlates with psi performance. It appears that for the whole sample, the participants who scored hits in ganzfeld also scored high on extraversion, as expected. Individual analysis for each creative group revealed a significant relationship between extraversion and psi-hitting for the visual artists only.

This is interesting as the Morris et al. (1995) study reported a trend towards introversion for psi hitters. In addition, Dalton's (1997) study reported a significant relationship between psi-hitting and introversion for artists. The present finding is not consistent with these results but may be due to the fact that only extroverted artists tended to volunteer for the current study. From looking at the extraversion scores for each individual artist, it seemed that most artists scored high on extraversion, and there were no introverted artists.

In addition, the extraversion effect for this study may simply be due to superior social adjustment rather than a superior ability on the psi task. For instance, the artists may have achieved ganzfeld success simply because they were more relaxed and comfortable in the social setting of the ganzfeld. More extroverted individuals may have volunteered to come along to participant, whereas given the nature of the task; introverted individuals may have been less likely to volunteer.

If more time had been available, it may have been useful to use a more detailed personality inventory like the NEO-PI-R. This would have allowed us to investigate whether the extraversion effect was social or an activity or excitement seeking effect, as suggested by Morris et al, (1993) and Van Kampen et al., (1994) who also found a positive relationship between the activity facet of extraversion and psi-hitting in ganzfeld.

Individual analysis on the personality traits revealed no significant relationship between extraversion and psi-hitting in ganzfeld for the musicians, although the relationship appeared to be in the direction as suggested by previous research.

There were no other significant relationships (both overall and individually for each creative group) between the remaining personality traits that Saucier's (1994) inventory measures (i.e. agreeableness, conscientiousness, neuroticism and intellect or openness to experience) and psi-hitting in ganzfeld. However, the relationship between neuroticism and psi-hitting overall was negative which is the direction that would be expected from previous research (that individuals with low neuroticism achieve more success in psi tasks).

Analysis of the PIF data found there to be no significant positive relationships between having practice with a mental discipline (e.g. yoga or meditation, etc.) and psi-hitting. There was also no significant relationship between having a strong belief in psi and psi-hitting in ganzfeld.

The results for the PIF data are not consistent with expectations, nor are they consistent with previous research which has suggested that practice with a mental discipline enhances psi-hitting (e.g. Honorton, 1977; Schmeidler, 1970, and Dukhan and Rao, 1973), as does having a strong belief in psi (e.g. Schmeidler and McConnell, 1958; Honorton, 1977; Palmer, 1977, and Lawrence, 1993).

It should be borne in mind that the participants were not pre-selected for positive attitudes in psi and most participants were not true 'sheep'. Most participants rated themselves as not confident in their psi ability in the laboratory situation. In addition, although 50 percent of participants said they practised a mental discipline, the majority had only practised a particular mental discipline once or occasionally practised on a sporadic basis.

An interesting and unexpected result is the significant difference between psi-hitting for those who viewed the web-site and for those who did not view the web-site. Further post-hoc analyses revealed that participants who were more likely to view the web-site before participating were high in extraversion, low on openness, and had a strong belief in psi.

Perhaps participants with strong beliefs looked at the web-site because their beliefs made them more inclined to be interested in the details of the ganzfeld. It is suggested that since the web-site provided detailed information of the ganzfeld procedure and the current task, the participants who viewed the web-site were thus familiar with what was being tested and what their task was as a receiver.

Thus, perhaps familiarity of the task and expectations reduces anxiety on part of the participant and enables them to achieve a relaxed state that is more conductive to psi. It may also be the case that familiarity, and knowledge of the experiment might be conductive to psi because participants would be clear about what they had to do as a receiver, thus reducing any cognitive processes involved in thinking about what they had to do, that would otherwise inhibit psi (Honorton, 1977).

It is important to consider various rival hypotheses that might account for the experimental outcomes. The automated ganzfeld testing system at Edinburgh University eliminates the potential methodological problems that were identified in earlier ganzfeld studies (Hyman & Honorton, 1986). The system provides computer control of target selection and presentation, blind judging, subject feedback, and data recording and storage. It is important to note that this autoganzfeld system is a recently developed one, indicating that the ganzfeld-creativity effect is not dependent on one system, and also appears not to depend upon the use of shields for the eyes. Merely having eyes closed with bright light may well be sufficient.

The automated system used in this study locked the experimenter out of the system once a session had been initiated. The experimenter was locked out of the system until the session was complete, or an abort signal had been sent. Additionally, an encrypted copy of the data was kept and all computer activity is logged. No session could be aborted after the experimenter knew the outcome.

If a perceptual leakage did exist, that leakage must have occurred at a much lower subliminal level than is commonly thought possible. Likewise, any other experimental error would presuppose an extraordinary sensitivity on the part of the subjects.

In conclusion, it is essential that future studies comply with the methodological standards agreed on by researchers and critics. However, it is equally imperative that attention be given to the conditions associated with successful outcomes in ganzfeld. For example, as indicated by this study and previous research, creative populations have a lot to contribute to psi research. However, more research is needed to examine this participant characteristic more thoroughly. In addition, an interesting and unexpected finding from this study was that viewing a specially designed web-site containing detailed information about the current study seemed to enhance psi-hitting in ganzfeld. It is suggested that further research into receiver's familiarity and understanding of the task and the effects of this on psi-hitting in ganzfeld should be conducted.

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Parapsychological approaches to interpreting anomalous brain function and subjective paranormal experience: The out-of-body experience as an example.

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Abstract

This paper provides a perspective as to the inappropriateness of interpreting brain phenomena as the cause of subjective paranormal experiences. It is more specifically, a perspective on the major news event of some Swiss medical scientists reporting in the journal, Nature, how stimulating a brain area produced transitory out-of-body experiences (OBEs).This finding produced significant press interest, as a site for the OBE was postulated.

The following guidelines are suggested for such cases:

1. *Analyze the Subjective Paranormal Experiences (SPEs) described in as much detail as possible.*
2. *Compare the phenomenological experiences described with the typical features of SPEs as described by Experients who do not give any history of brain dysfunction.*
3. *Perceive any pathology the subject has in the correct pathophysiological context.*
4. *Do not generalize a single case to other humans*
5. *Compare the literature.*
6. *Search for sources of single localization for specific phenomena.*
7. *Recognize the existence of nosological subtypes, For example, four kind of déjà vu exist.*
8. *Even when findings on subjective paranormal experiences (SPEs) including OBEs are referable to specific anomalous brain functioning, they neither confirm nor deny the veridicality of the SPEs.*
9. *There may be more than one explanation for events occurring in the brain: endogenous origins within the brain like pathological hallucinations do; or a particular brain function pattern may allow experience of an outside, usually covert, reality.*
10. *Similar research on OBEs and other psi phenomena needs to be performed to demonstrate that subtypes might exist.*
11. *We should be careful not to over-generalize results. Methodologically, associative links do not imply causality. To consolidate the causality hypothesis, one should analyze SPEs and also the converse, like temporal lobe epileptic subjects.*

This paper provides a perspective on interpreting brain phenomena and subjective paranormal experiences. More specifically, I focus on the approach of assuming cause and effect to such phenomena. I illustrate it by a recent example that made international news. The object of this paper is not to refute this specific case-history but to illustrate an approach parapsychologists can take to examine such reports and data in the future. Nevertheless, it has been triggered by this recent scientific publication, and I use this to illustrate the approach I suggest.

This case referred to was published in the prestigious journal, *Nature*. It soon became a major news event: Some Swiss medical scientists reported how stimulating a specific brain area produced transitory out-of-body experiences (OBEs).This finding produced significant press interest because a site for the OBE was postulated. I initially published a refutation of this information in the Australian J of Parapsychology (Neppe, 2002).

This very similar paper approaches this information from a slightly different but important perspective, emphasizing the parapsychological approach to analyzing the appropriateness of such interpretations. Because of the overlap, I will at times quote the Neppe, 2002 paper verbatim.

On 19th September 2002, *Nature* published a brief communication. (Blanke, Ortigue, Landis, & Seeck, 2002). Although the conclusions of the Swiss authors were conservative and preliminary, the title of the article made a radical claim: *Stimulating illusory own-body perceptions: The part of the brain that can induce out-of-body experiences has been located.*
Within days this was picked up by numerous internet groups and a variety of news agencies applying sensational titles:
BBC—British Broadcasting Corporation (http://news.bbc.co.uk/1/hi/health/2266740.stm) —*Doctors create out-of-body sensations.*
Nature magazine (http://www.nature.com/nsu/020916/020916-8.html) —*Electrodes trigger out-of-body experience: Stimulating brain region elicits illusion often attributed to the paranormal.*

CNN (http://www.cnn.com/2002/TECH/science/09/19/coolsc.outofbody/index.html)—*Out-of-body experience clues may hide in mind. Scientists: Misfiring brain behind bizarre sensation.*

Time magazine (http://www.time.com/time/magazine/article/0,9171,1101020930-353578,00.html)—*Hit The O-Spot For Out-of-Body. Had an out-of-body experience? Scientists believe they know why:* "Shamans teach that out-of-body experiences are best achieved through meditation, reflection and transcendental calm. Scientists believe they have found a less celestial source: the right angular gyrus of the brain."

The media, therefore, made major conclusions about a preliminary contribution at best. Any major vast "scientific" jumps require careful review. In this instance, radical negation of the paranormal may be the mischievous underlying motivation. Having myself worked a great deal with analyzing the phenomenology of déjà vu, olfactory hallucinations, subjective paranormal experiences and temporal lobe symptomatology, and having gone to great pains to indicate the dichotomous nature of brain-related explanations for such events, I find such sensationalism premature.

In essence, even when any subjective paranormal experiences are correlated with brain related patterns, the end-point interpretation is not that the SPEs derive from the brain, but that a specific endogenous brain patterning may either allow for the appreciation of exogenous experience or may have its origins in the brain itself and any exogenous experience may not exist.

This paper is an attempt at putting this and similar findings into perspective so that we may apply the lessons in future research, analyses, and theoretical interpretations. The example of Blanke et al. (2002) is only an illustrative stepping stone to derive eleven useful, overlapping principles to approach similar, further findings or claims.

First, *definitions of SPEs are best developed by experts in parapsychology.*
This obvious fact would be equivalent to saying that "physicists are in the best position to define electromagnetism not biologists." Yet the Blanke paper is just another of those involving non-parapsychologists defining phenomena: "Out-of-body experiences (OBEs) are curious, usually brief sensations in which a person's consciousness seems to become detached from the body and take up a remote viewing position" (Grusser & Landis, 1991; Hecaen & Ajuriaguerra, 1952). This definition while adequate uses terms like "detached" and "remote viewing position" both of which may be characteristic but not necessarily the only phenomenological subtype of OBE. For example, Michael Whiteman (1983)described different stages of separation of the out of body experience, including the sense of being out of the body but, nevertheless, unable to subjectively "see" the physical body. Whiteman also described how in some OBEs, the consciousness is not necessarily detached but is both in and out of the body. Whiteman's conceptualization is particularly broad and he has pointed that out indicating that the definitions of OBE of such writers as Palmer, Irwin, Morris, Shiels, Blackmore, Green and others may limit the phenomenological categorization of such phenomena (Whiteman, 1983). Finally, I am uncertain whether all OBEs can be categorized as "sensations" as opposed to subjective perceptions.

I have emphasized that one approach to the OBE may be through its "subjective" experience. (Neppe, 2002) This allows a more non-prejudicial interpretation of this phenomenon, or, for that matter, research on other phenomena that may subjectively be experienced through stimulating the brain such as "hallucinations", "flashbacks" and "déjà vu" or curious other body distortions. In all, their distinguishing characteristic is their external non-validation and their subjective nature. For this reason, I developed the term "Subjective Paranormal (Psi) Experience" (SPEs: Neppe, 1980) to emphasize the fact that such experiences need not (but still can) be objectively demonstrated in the lab. Using quality and quantity of SPEs as a measure,, criteria can be used to separate out "Subjective Paranormal (SP) experients" from "non-experients". These groups are usually derived from an "ostensibly normal" population. (Neppe, 1979). By contrast, the approach can be through the brain or some psychological function: Patients with normal or abnormal brain functioning can be analyzed for such SPEs, just as they are for hallucinations or delusions, which are other kinds of *subjective experiences.*

Second, *the SPE must be analyzed in as much detail as possible.*
Again, the illustrative example: The Blanke researchers stimulated areas of the brain to determine exact localizations of brain function and seizure firing as a presumed precursor for performing epilepsy surgery. They based their research findings on a single patient, with right (non-dominant) temporal lobe epilepsy. The focus was two inches away from the right angular gyrus, where the "OBE" occurred.
Various, more usual, complex somatosensory illusions occurred with low stimulation: high current stimulation produced the sensation of an atypical, transitory and partial OBE.
The "out-of-body and body-transformation experiences were transitory," disappearing when the patient attempted to "inspect the illusory body or body part."
The researchers therefore only had a sketchy perspective not a detailed analysis. This would be an important requirement for proper scientific analysis. (See below with Déjà vu).

I have pointed out that these descriptions are atypical for the SPE OBEs that are experienced in many SP Experients. When they are elevated above the body, they see not only their own body but the surroundings, and reports of body distortions do not play a role. Moreover, the OBEs of SPExperients are generally not transitory, but maintained effects even when the experient tries to "test" something. (Neppe, 2002). (This does not, of course, restrict my definition to this common kind of OBE: As indicated, I prefer Whiteman's extremely broad approach).
Incidentally, the Blanke authors mentioned an alternative visual attention hypothesis in this case. They use the term "phenomenological modification", not OBE in this context.
The media, however, focused on the more sensational, describing the OBE and its source from stimulating the angular gyrus. However, Blanke et al may not be innocent and may have begun the sensationalism in the title: *The part of the brain that can induce out-of-body experiences has been located.* Phenomenological modification is a far cry from out-of-body experiences and "has been located" on the basis of one marginal atypical case could be somewhat exaggerated.

We know nothing of the parapsychological background of this patient. Does she have subjective paranormal experiences? Has she had previous spontaneous OBEs? If so, have they been qualitatively the same as the current one described? Have some of the SPEs occurred at the same time as her temporal lobe symptoms—are they state related? Have some occurred separately (i.e., she has a trait potentially linked with a pattern of brain function)? What role did the environment play? The stimulation of her brain under local anesthesia occurred with surgeons interacting in bringing forth her description of being "out of body" , a term not, incidentally, used by the patient. In this instance, she was seeing separately two limited parts of her body—legs and, on command, arms. How different is this from the so-called phantom limb phenomenon, where patients "feel" an amputated limb?

There may also be another phenomenologically distinct category of OBE in near-death experiencers, as

well, who may recall events even while in coma—something very unphysiological indeed (Morse & Neppe, 1991). The Blanke et al OBE or the NDE type OBE may just be OBE variants and any conclusions drawn cannot be generalized to all OBEs.
These may seem petty points but they are not. Tiny psychological and physical features need to be recorded because they become variables that are uncontrolled in a single case history.

The third perspective is also critical for the interpretations of psi researchers. *Perceive any pathology the subject has in the correct pathophysiological context.*
With reference to the Blanke case, the right angular gyrus had been known to co-ordinate spatial relations (Baciu et al., 1999), modulate both shifts of attention within extrapersonal space and saccadic eye movements (Vuilleumier, Hester, Assal, & Regli, 1996), be involved in learning target positions (Kawashima, Roland, & O'Sullivan, 1995) and possibly could be a crucial node in a larger neural circuit that mediates complex own-body perception (Blanke et al., 2002). Thus the context here is a theoretical link with OBEs but based on special somatosensory relationships.

The next lesson from this report may be *do not generalize a single case to other humans.*
Scientific journals are loathe to publish single case histories because they are fraught with confounding features. This is why controlled medical research is so important. Interpretations should be very tentative if not blinded, controlled or with small sample sizes, particularly if the finding was incidental and not even hypothesized.

The next phase is *Compare the literature.*
The Blanke et al. report is just one case. A second, older case, by Penfield, *apparently* contradicts the anatomical angular gyrus finding. Penfield's temporal lobe epileptic patient subjectively felt he was having an out-of-body experience. (Penfield, 1955) (Possibly because of this being half-a-century ago, and with apparatus being less sophisticated, we do not know exactly where in the brain Penfield stimulated. We know about the focus in the temporal lobe, and the literature thereafter has always assumed this area of stimulation, but, as far as I am aware, it is uncertain.)

Search for sources of single localization for specific phenomena would be next in the analysis.
In these cases, the two cases in the literature may suggest evidence for non-localization or more than one locality for provoking an OBE by electrocortical stimulation.
Penfield's (1955) patient also apparently had déjà vu related seizures and this has also been evoked in a different area of the brain e.g.. by Halgren, Walter, Cherlow, and Crandall (1978) Thus déjà vu is non-localizable or at least has more than one stimulatory origin (Neppe, 1981, 1983b, 1983c). As another example of non-localizability, memory in the brain involves several discrete and combined functions and cannot be located easily (Neppe, 1983c; Oyachi & Ohtsuka, 1995).
Consequently, even if purely endogenous, there could be limited localization for OBEs as well.

Recognize the existence of nosological subtypes.
This is a critically important point. For example, at least four distinct descriptive entities of déjà vu apparently exist and these occur in different diagnostic subtypes (Neppe 1981, 1983a, b) Neppe (1983a, 1983b) analyzed déjà vu in different subtypes using fifty five different parameters and ultimately twenty-two different Euclidean dimensions. He demonstrated that there are at least four phenomenologically distinct subtypes of déjà vu. These four categories are also diagnostically distinct. Moreover, such phenomenological experiences may be used in subtyping of type, diagnosis and management—in itself, another descriptive criterion. These manifestations can explain the wide variety of déjà clinical manifestations. Temporal lobe epilepsy déjà vu occurs in some temporal lobe epileptics; associative déjà vu in so-called "normals"; déjà vu in schizophrenics; and, finally, subjective paranormal experience (SPE) déjà vu is characterized by specific anomalous time distortions in SP experients (Neppe, 1983b, 1983c).
Thus, not only is déjà vu not easily localized, one can distinguish subtypes that likely have entirely different etiologies (Neppe, 1982). Conversely, these different etiologies can be used to predict these same consistent phenomenological subtypes. (Neppe, 1983b) This has not been done yet in OBEs, nor has it been demonstrated in almost all other SPE phenomena. This research needs to be performed to make specific nosological conclusions.

Similar analyses have been done but rarely. Neppe also demonstrated that olfactory hallucinations of a specific kind occur in SP Experients. Again, there is additionally a phenomenological link with the temporal lobe (Neppe, 1982, 1983a). He extended this work, demonstrating more possible temporal lobe symptoms (PTLSs) are associated with ostensibly normal subjects claiming a large number of SPEs (experients) than with non-experients; and this was at both state and trait level.

The next important principle*: Even when findings on subjective paranormal experiences (SPEs), including OBEs, are referable to specific anomalous brain functioning, they neither confirm nor deny the veridicality of the SPEs.*
For example, in the initial temporal lobe work above the findings suggest an anomalous kind of temporal lobe functioning among the experients, but neither confirm nor deny the veridicality of their SPEs (Neppe, 1979, 1983d). Like pathological hallucinations, the SPEs may have endogenous origins within the brain; alternatively, a particular brain function pattern may allow experience of an outside, usually covert, reality.

A follow-on from these conclusions*: There may be more than one explanation for events occurring in the brain, and the broader brain approach may be useful:*
Endogenous origins within the brain like pathological hallucinations are not assumed to have an exogenous origin. But these do not necessarily imply one functional localization. The brain is extremely complex. This implies that various complex evaluations must be done to ensure more accurate neuropsychiatric evaluations besides any psi related testing or screens. In the Palmer-Neppe research, measures such as ambulatory electroencephalography and various neuropsychiatric screen tests were

done. (Palmer and Neppe, 2003 in press)

Similar research on OBEs and other psi phenomena needs to be performed to demonstrate that subtypes might exist.
When a particular brain function pattern may allow experience of an outside, usually covert, reality, a bi-directional approach may shed light on the research. This would involve
1. examining specific brain-related physiology or psychological characteristics of ostensibly "normal' subjective paranormal experients and then conversely, the SPEs of subjects with those specific brain or psychological features to ascertain whether the results would apply both ways. For example, if the symptoms of a condition are specifically associated with isolation of a specific virus in a lab, and a separate group of patients infected with this virus develop the same symptoms, the link of virus to the particular symptoms syndrome is stronger than a one-directional examination and *could* imply a causal link. The medical model uses this approach all the time, from viral conditions, like poliomyelitis, to endocrinopathies, like hypothyroidism, and indeed, even applies the same principles to complex partial seizures.
We have applied this approach to parapsychological research:
For example, Palmer and Neppe (2003 in press) have recently extended Neppe's temporal lobe work in "normal" SP Experients to the converse, namely analyzing the SPEs of temporal lobe diseased patients. This way we are attempting to establish possible causal links as opposed to associative links. Better causal links as opposed to strong statistical supportive associative links can occur but the warning below (normal vs. abnormal) should still be heeded. This kind of work, again, can fruitfully be applied to individual SPEs. Psi research has always paid enormous attention to detail, understanding the great confounding factors that could occur if not everything is properly controlled.

We should be careful not to overgeneralize results.
Where are we now after the Blanke et al. (2002) paper? Simply, with a second reported case of stimulating an area of the brain and producing a specific qualitative out-of-body experience as a consequence. We should be careful not to overgeneralize results. Methodologically, associative links do not imply causality. To consolidate the causality hypothesis, one should analyse SPEs and also the converse, like temporal lobe epileptic subjects, as suggested above. (Palmer and Neppe, 2003 in press). However, we cannot legitimately regard data derived from patients with pathology (e.g. seizures or psychosis) as the same as they would be in normal patients without seizures or psychosis.
In the Blanke example, we cannot ethically stimulate "normals,", so we would not be able to generalize this by future research.

An overriding theme of this paper is this: *Even though a certain pattern of brain function, either as a trait or state condition, may allow the experience of anomalous events, this would neither confirm nor deny the veridicality of any kind of SPE, including the OBE, as deriving either from outside the brain, or endogenously—when the SPEs would be art factual dysfunctions in the brain akin to hallucinations.*

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Electrodermal presentiments of future emotions

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Abstract

Previously reported experiments suggest that the human autonomic nervous system unconsciously responds to randomly determined future events. The effect, dubbed "presentiment," suggests a form of unconscious precognition. In those studies, electrodermal activity was monitored before, during and after display of randomly selected calm and emotional pictures. Three new experiments were conducted in an attempt to replicate the original studies, using the same basic design, but with new hardware, software, stimulus pictures, subject populations and testing environments.

The new experiments involved 107 participants who together contributed 3,709 trials. Based on prior independent assessments of the emotionality of the target pictures, half of the trials were labeled emotional and half were labeled calm. Comparison of electrodermal activity between these two categories of trials across all four experiments showed larger changes in electrodermal activity before emotional pictures than before calm pictures ($p = 0.00003$). In more general terms, presentiment predicts a positive relationship between pre-stimulus electrodermal activity and pre-assessed emotionality ratings of the targets. The observed correlation was significantly positive ($p = 0.008$).

Consideration of alternative explanations, including expectation, sensory cues, hardware or software artifacts, and analytical mistakes, revealed no suitable ordinary candidates that could systematically generate the observed results. In particular, confirmation of the predicted relationship between the a priori target emotionality ratings and the pre-stimulus responses to those (randomly selected) targets places formidable constraints on alternative explanations, including anticipatory strategies. In conclusion, these experiments and a growing body of successful replications appear to demonstrate a genuine, time-reversed anomaly in the human autonomic nervous system.

Introduction

Many people have experienced hunches or intuitive feelings about future events that later turned out to be correct. Most such hunches are probably due to unconscious inferences, others are undoubtedly chance, instances of selective memory, or attributable to forgotten expertise. However, occasionally a hunch seems so intrinsically unlikely, and yet turns out to be valid, that one wonders whether these experiences might involve perception of future information. In a series of experiments exploring this idea, I explored whether the human autonomic nervous system might respond to randomly selected future emotions (Radin, 1997).

The initial studies provided positive evidence for what I dubbed a "presentiment" effect, and publication of those results prompted other researchers to attempt to replicate the effect (Bierman, 2000; Bierman and Radin, 1997, 1998; Bierman & Scholte, 2002; McCreaty, 2002; Norfolk, 1999; Spottiswoode & May, in press; Parkhomtchouk et al, 2002; Wildey, 2001). Many of the replication studies were reportedly successful, contributing to a growing body of data suggesting that unconscious precognition may be possible.

This paper reviews the results of all presentiment experiments I conducted from 1996 through 2000, only the first of which had been formally published (Radin, 1997). All of these experiments were primarily proof-oriented replications using different hardware and software implementations, subject populations, environmental conditions and photo stimuli. Experiment 1 involved a series of pilot tests, Experiment 2 was a replication with a few modifications, Experiment 3 used entirely new hardware and software and was conducted primarily as a proof-of-principle demonstration for skeptical scientists at an industrial research laboratory, and Experiment 4 tested a custom-designed psychophysiological monitoring device.

Method

Experiment 1

This first study involved four exploratory experiments, as reported in Radin (1997). The design protocol will be repeated here in some detail so that differences introduced in succeeding experiments will be clear by comparison.

Experiment 1-a used a Dell 66 Mhz personal computer (PC) to control the test (N = 260 trials). Experiment 1-b was similar to 1-a except that it presented the stimulus pictures for one second rather than three seconds (N = 120 trials). Experiment 1-c was identical to 1-a except that the experiment was run on a Toshiba 75 Mhz notebook PC (N = 640 trials). Experiment 1-d focused on investigating combinations of three simultaneous autonomic measures (N = 160). Because tests 1-a and 1-c used identical designs, data from those two tests were pooled (N = 900), and because the other two tests were primarily designed to explore variations on a theme, those data (N = 280 trials) were excluded from the present analysis.[1]

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[1] It is worth noting that both of the excluded datasets individually provided positive evidence for presentiment.

Procedure

Twenty-four participants (P) were recruited from friends, staff, faculty and students visiting the Consciousness Research Laboratory, Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas (UNLV). P was escorted to a quiet laboratory where he or she was asked to sit in a office chair approximately two feet in front of a color computer monitor.

Surface electrodes (Ag-AgCl, 8mm diameter) were attached to the pads of P's index and second fingers of P's non-dominant hand to record skin conductance level (SCL). A Velcro band secured the electrodes to the fingers, and an isotonic skin conductance electrode gel was used to improve electrical contact with the skin. Heart rate (HR) and peripheral blood volume pulse (BVP) were also recorded using a photoplethysmograph attached to the third finger of the same hand. These three signals were monitored by a computer-controlled physiological data acquisition system (J&J Engineering, Model I-330, SCL measured at 12 bit resolution, constant voltage method at 0.3 volts, and conductance measures ranging from 1 – 100 μS with ± 0.05% accuracy). The experiment was controlled by a program written in Microsoft QuickBasic 4.5 by the author. Data were recorded at 5 samples per second.

P was instructed to rest her hand with the electrodes in her lap.[2] In her dominant hand, she held a computer mouse with her right index finger resting on the left mouse button. When ready to begin each trial, she pressed the mouse button and waited to see a picture on the computer monitor. After the button press, the computer selected a target photo at random, there was a 5 second delay during which the screen remained blank, then the selected picture was displayed for 3 seconds (as illustrated in Figure 1).

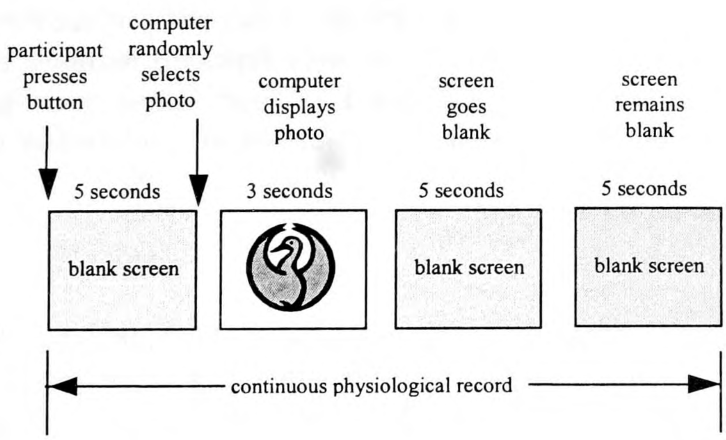

Figure 1. Illustration of experimental procedure.

This was followed by a blank screen for 10 seconds. After this cool-down period, a message appeared on the screen, alerting P to begin the next trial by pressing the mouse button at will. SCL

[2] The female gender will be used hereafter to avoid awkward wording.

was continuously monitored during the recording epoch, but not between trials. P viewed 41 pictures in a single session, one picture at a time. The experimenter coached P through the first trial to ensure that the procedure was understood and followed correctly, and then the remaining 40 trials were conducted by P alone. Only the last 40 trials were used for subsequent analysis.

If P needed to stretch or move between trials, she was asked to do so as needed and then settle down before continuing. After P indicated that she understood the procedure, the experimenter retired behind an opaque screen and P conducted 40 more trials unobserved, and at will. To enhance the display contrast of the stimulus pictures during the experiment, and to reduce possible electrical interference with the monitoring equipment, the lab's overhead fluorescent lights were turned off and a dim red incandescent lamp (10 watts) was turned on. The laboratory was air conditioned to approximately 72° F, and humidity levels were generally dry.[3]

Targets

At the beginning of each trial, the QuickBasic 4.5 pseudorandom number generator (PRNG) was re-seeded with the computer's clock time at the moment of the button press, and the target was selected out of a pool of 120 digitized color photographs. Calm targets included photos of landscapes, nature scenes, and people; emotional targets included erotic, violent, and accident scenes. Most of the calm pictures were taken from a Corel Professional Photo CD-ROM. Most of the emotional pictures retrieved from Internet photo archives.

All pictures were displayed in color, at 600 × 800 screen resolution, in a screen area about 6 inches wide by 4 inches high. If during a session a given target was randomly selected twice, another picture of similar pre-assessed subjective emotionality – but not previously shown in that session – was selected in its place. In this way, no photos were repeated within a session. To provide the independent subjective assessments of the target pictures, three men and three women were independently asked to examine each of the 120 pictures in randomized orders, and to rate each picture from 1 (calm) to 5 (emotional).

Informed Consent

Participants in all of these experiments were restricted to adult volunteers. All were asked to sign an informed consent form explaining that pictures portraying a wide range of emotions would be displayed. Immediately before starting the experiment, participants were asked to verbally affirm that the experiment should proceed.

Hypotheses

Presentiment postulates that our near-term future unconsciously influences our present physiological state. When those future experiences involve emotions, the influences are postulated to be detectable

[3] Temperature and humidity levels are reported because those factors are known to affect electrodermal responses.

as present-time arousal of the autonomic nervous system. This leads to three testable and progressively more general hypotheses.

Hypothesis 1 predicts that changes in SCL before emotional targets will be greater than similar SCL changes before calm targets. All trials are partitioned into two equal sets of emotional and calm trials based on the independently pre-assessed subjective judgments of emotion. The hypothesis was tested using randomized permutation analysis (Blair & Karniski, 1993).

Hypothesis 2 predicts that as the contrast between emotional and calm trials increases, the magnitude of the presentiment effect will increase, and vice versa. This is tested by sorting all trials by their pre-assessed emotionality ratings, then comparing top 1% most emotional vs. 1% most calm trials, then the top 2%, and so on up to 50% (which is then the same as Hypothesis 1). No specific prediction was made for the percentage cutoff that would show the greatest effect size, but it was expected that the peak would fall somewhere between 5% and 15%. This is because very high emotionality cutoffs, say 1% of the data, would provide strong emotional contrasts but at the cost of low statistical power (i.e., only 2% of the trials would be used), whereas higher contrast percentages, say 40%, would provide greater statistical power but with only weak emotional contrasts.

Hypothesis 3 predicts a positive correlation between the pre-assessed emotionality ratings and pre-stimulus fluctuations in SCL. If this correlation is significantly supported, it would provide strong evidence that future emotions affect present physiology, and it would also preclude most conventional alternative explanations for the observed effects.

Method of Analysis

SCL data in each of these experiments were prepared identically. Each sample in each trial was first normalized as $z_{in} = (x_i - \mathbf{m})/\mathbf{s}$, where **i** is the sample number within trial **n**, x_i is the SCL value for sample **i**, **m** is the average of all samples in the presentiment period in trial **n** (i.e. from the starting button press to just before the photo stimulus), and **s** is the standard deviation of all samples in the presentiment period. Then all trials were clamped to zero immediately after the button press using the difference $p_{in} = (z_{in} - z_{0n})$, where z_{0n} is the first sample after the button press in trial **n**, and **i** ranges across all samples in the epoch.

This method of analysis thus examined *changes in normalized SCL* (ΔSCL). Normalized SCL was used rather than the original SCL data because in an analysis that combines data across subjects a few participants with highly labile SCL signals would have strongly overwhelmed the majority of data from other, less labile participants. To determine the statistical likelihood of differences observed between emotional and calm trials, randomized permutation analysis (RPA) was employed, as follows:

1) The value $S_n = \sum p_{in}$ was determined for each trial **n,** where the sum was taken for all pre-stimulus samples **i** in the epoch, starting at the initiating button press and ending just before the stimulus. Each of these samples was in the form of ΔSCL. (Note that this sum is

essentially equivalent to the *mean* of the pre-stimulus samples. This analysis was also conducted using the *median*, as mentioned later.)

2) All trials in a given experiment were sorted by each trial's pre-assessed emotionality ratings, in ascending order.

3) The top 1% most calm and 1% most emotional trials were selected from the sorted list in step 2.

4) The difference $\mathbf{D} = \sum S_E - \sum S_C$ was determined for the selected trials, where E indicates the selected emotional trials and C the calm trials.

5) The order of the emotionality ratings were randomly scrambled and steps 2 through 4 repeated 1,000 times, each time keeping track of the difference **D**. These randomized permutations were used to form a mean and standard deviation for the distribution of **D** values.

6) Now $z_p = (\mathbf{D} - \mu_D)/ \sigma_D$ was calculated, where μ_D is the mean and σ_D is the standard deviation of the randomized **D** values, and p indicates the percentage cutoff value (1% in the example in step 3).

7) Repeat steps 3 through 6 for percentages ranging from 1% to 50%, in steps of 1%. This formed a total of 50 z scores, one for each emotional cutoff percentage.

A weighted effect size **e**, one for each cutoff percentage, was created to assess the observed effect combined across experiments. For each cutoff percentage in each experiment, $\mathbf{e} = z/\sqrt{[N]}$, where N was the number of samples contributing towards the z score created in step 7. Effect sizes across experiments were then combined, weighted by N samples per cutoff percentage, per effect size.

Results

A general Results section later in this paper will compare outcomes across experiments. Here, Figure 2 graphically summarizes the results of Experiment 1 in terms of ΔSCL across all trials, which are split into two equal datasets, one nominally "calm" and the other "emotional" according to each trial's pre-assessed target emotionality ratings. The vertical line in the graph is the moment in which the stimulus appeared. Skin conductance normally responds 2 to 3 seconds after an emotional stimulus, and this response is clearly evident in Figure 1. Compared to post-stimulus responses the presentiment effects appear to be quite small in magnitude, but statistically there is little doubt that the observed difference is genuine.

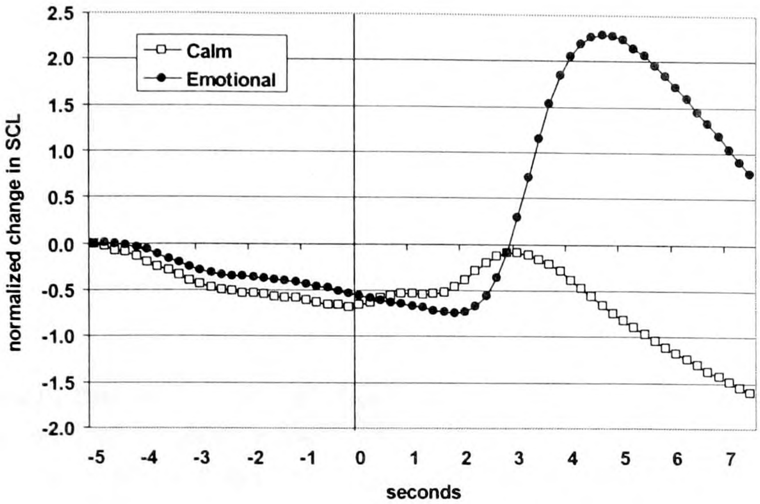

Figure 2. Results of Experiment 1 in terms of average normalized change in skin conductance level (ΔSCL) for calm and emotional trials. The pre-stimulus period is indicated by negative seconds; the stimulus appeared at time 0. Randomized permutation analysis indicates that the difference in pre-stimulus curves is associated with $z = 2.92$, $p = 0.002$ (one-tailed).

Experiment 2

Participants

Participants in this study included 50 volunteers who ran the test at the Consciousness Research Laboratory at UNLV, and 6 who ran the same test at Interval Research Corporation, Palo Alto, CA, using the same physiological equipment and target stimuli. The testing environment at UNLV was the same as described in Experiment 1; trials conducted at Interval were conducted on a 300 MHz Dell desktop PC. The testing environment at Interval was a small office where participants sat in front of a computer monitor at a desk, in an ordinary office chair. During the experiment, office lights were turned off, and windows were blocked. The office was air conditioned to about 72° F and humidity levels were comfortably moderate.

Procedure

The experimental procedure was similar to that used in Experiment 1, involving the same electrodes, physiological hardware and software, and a few enhancements. In this study, rather than using 120 pictures as in Experiment 1, 30 new pictures were added to the target pool, bringing the total to 100 calm and 50 emotional. In addition, unlike in Experiment 1 where the target photo was determined by the time of each button press used to initiate a trial, in this study the target was selected at the very end of the 5 second pre-stimulus period. The controlling program created a new seed-number immediately after the 25th sample (recall that the sampling rate was 5 Hz) by summing the computer's current clock time to the instantaneous values of three physiological signals: SCL, HR, and BVP. The resulting sum was used to re-seed the QuickBasic PRNG, which was then used to randomly select one of the target photos.

One may wonder whether the relationship between the participant's physiological condition and the selected target introduced a bias into the experimental results. While any direct relationship would be a serious flaw, in this case the relationship between physiological state and target identify was eliminated through the use of the PRNG algorithm, the computer's changing clock-time, and the combination of three physiological values which are inherently anti-correlated. (See the endnote for a more detailed discussion of this issue.)

After the target photo was selected, it was retrieved from the hard disk and displayed for 3 seconds. With this process, from the moment a button press initiated a trial, to just before the stimulus was displayed, the target was not yet determined. There were no sounds due to movements of the computer's hard disk, or electromagnetic changes in the computer monitor display, or any other hints that might have provided sensory cues about the identity of the upcoming target.

In addition, even though participants did not know the size or composition of the target pool, target pictures were randomly selected with replacement to prevent statistical hints about the future targets from accumulating over the course of the experiment. As in Experiment 1, to avoid repeating a stimulus photo that had already been selected, the computer noted the selected target's emotionality rating and randomly selected another picture with a similar rating, and used that instead. In this way, the probability of observing a calm or emotional target on any given trial was held constant throughout the experiment, and no targets were repeated.

<u>Target Content</u>

The target pool for this experiment included 150 pictures. Five men and five women were asked to independently examine the pictures, one at a time, in random order, on two dimensions: emotionality (level of arousal) and valence (negative to positive emotion). The rating dimensions consisted of 100 points, and the rating method asked the person to view the picture on a computer screen and move a pointer across a sliding scale to indicate his or her assessment for each of the two dimensions. Each individual's assessments were normalized into standard normal deviates (z-scores), and z-scores per target were combined across all 10 people to provide a two-dimensional distribution of target emotionality/valence in z-score space. Figure 3 illustrates this relationship.

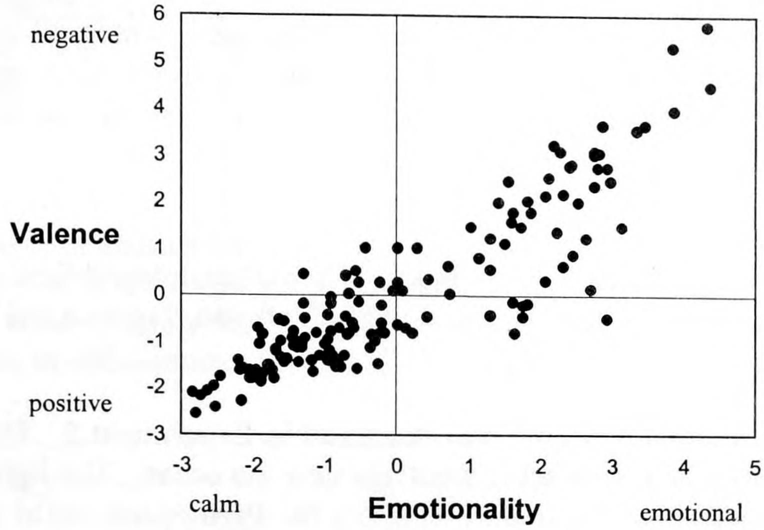

Figure 3. Normalized subjective assessment of targets, averaged over ten judges.

Results

Figure 4 shows the results of Experiment 2. As in the first experiment the presentiment effect is exhibited by a general rise in SCL that starts immediately after the participant presses the button used to initiate each trial.

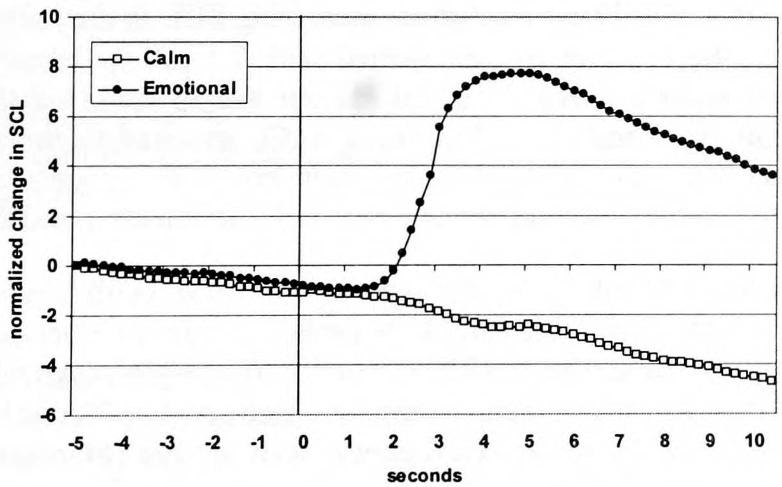

Figure 4. Results of Experiment 2. Randomized permutation analysis indicates that the difference in pre-stimulus curves is associated with $z = 1.23$, $p = 0.110$ (one-tailed).

Experiment 3

This experiment used new hardware and software, a new picture stimulus pool, and three new subject populations and testing environments. Also, rather than running 40 trials per participant, 30 trials were used to alleviate the physiological accommodation observed in some participants in Experiments 1 and 2. The first of each run of 30 trials per person was used for demonstration purposes, and was discarded from further analysis.

Participants

Forty-seven volunteers were recruited from visitors and staff of Interval Research Corporation, Palo Alto, CA, and from participants at seminars held in Port Antonio, Jamaica and Esalen Institute in Big Sur, CA.

The test environment at Interval Research was described in Experiment 2. The test environment for trials collected in Jamaica was in a closet in a cottage near the ocean. The lights were turned out and there were no windows nearby, so the room was dimly lit. Participants sat in a straight-back chair in front of a laptop PC screen. The test environment at Esalen Institute was a bedroom in a house overlooking the ocean. Window shades in the room were drawn, dimming ambient illumination. Participants sat in a regular straight-back chair in front of a laptop screen. At Esalen, the atmosphere was moderately humid and the temperature was about 75° F. In Jamaica, the atmosphere was humid and the temperature was about 85° F.

Equipment, Procedure and Targets

Trials run at Interval were conducted on a 300 MHz Dell desktop PC; the other trials were run on a 233 MHz Toshiba laptop PC, in both cases the Windows NT4.0 operating system was used. The physiology equipment used was a J&J Engineering Model I-330C2 (6 channel, battery-powered, psychophysiological monitor with 12-bit resolution, measuring SCL in the range 1 to 100 μS with an accuracy of ±0.5%, using the constant current method with 2.5 μA for excitation). Electrodermal measurements were continuously collected at 10 Hz for the duration of the session, including between test epochs. The electrodes were 8 mm Ag-AgCl, attached to the first two fingers with isotonic skin conductance electrode gel and Velcro fasteners. The program used a 6-second pre-stimulus period, in contrast to the 5-second periods used in Experiments 1 and 2.

A new controlling program was written for this experiment in Microsoft Visual C++ 5.0, by Steven Rubin. The program allowed use of either the C++ pseudorandom number generator (PRNG) or a noise-based truly random number generator (RNG) to select the targets. All trials run at the Interval office used the true RNG (a hardware circuit made by Orion, of The Netherlands; the Orion RNG passes Marsaglia's Diehard test, a standard randomness testing suite [Marsaglia, nd]), and all trials run in Jamaica and Esalen used the C++ PRNG. Targets were selected by reseeding the PRNG with the computer system's clock (with one millisecond resolution) or by sampling from the true RNG immediately before the stimulus picture was randomly selected.

The target pool consisted of the 80 most calm and the 40 most emotional pictures from the International Affective Picture System (IAPS, Bradley, Greenwald & Hamm, 1993; Ito, Cacioppo &

Lang, 1998), where "calm" and "emotional" were defined by the standard emotionality ratings (averaged across gender) that accompany the IAPS picture set. In an attempt to further enhance the contrast between the emotional and calm targets, all participants wore headphones that played one of 20 randomly selected noxious sounds for 3 seconds during presentation of emotional pictures (i.e., screams, sirens, explosions, etc.). Calm pictures were presented in silence.

Results

Figure 5 shows the results of Experiment 3. In this study because data were recorded continuously, it was possible to graph SCL data before the trial-initiating button press. This graph shows that change in SCL levels were virtually identical before the button press, but as in the two previous studies the levels began to differentiate according to the future stimulus immediately after the trial was initiated.

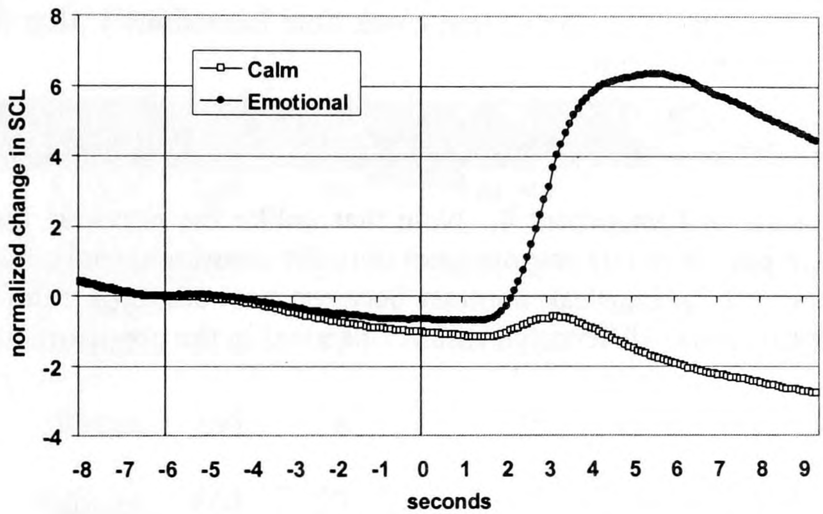

Figure 5. Results of Experiment 3. Randomized permutation analysis indicates that the difference in pre-stimulus curves is associated with $z = 3.34$, $p = 0.0004$ (one-tailed).

Experiment 4

Participants in this study were recruited from visitors to the Boundary Institute, Los Altos, CA. The test environment was similar to that at Interval Research except that the controlling computer was a Dell 300 MHz laptop PC. All tests were conducted in an office where participants sat in an office chair in front of the laptop at a desk. The office lights were turned off and a window was shaded by miniblinds. The office was air conditioned to about 72° F and humidity levels were comfortably moderate.

The physiological equipment was an experimental 8-channel SCL monitor custom-designed by a team led by Lee Felsenstein at Interval Research Corporation (the device used the constant current excitation method at 2.5 μA, and had 16-bit resolution). Software drivers for the device were written at Interval Research Corporation by Paul Korff in Microsoft Visual Basic 5.0; the experiment itself was written in Visual Basic 5.0 by the author. SCL measurements were continuously collected at 10 Hz for the duration of the session, including between test epochs. The experimental design employed a 5-second pre-stimulus period.

The SCL electrodes were custom-designed. Each electrode consisted of a gold dot, 10 mm in diameter, deposited on a flexible printed circuit board material. Two such electrodes were attached to the first two fingers without electrode paste, using a Velcro fastener.

As in Experiment 3, the IAPS target photos were used, but in this case the targets were selected uniformly at random, with replacement, from the entire set of IAPS photos. Targets were selected by the Visual Basic 5.0 PRNG based on the system clock time immediately after the last sample of the presentiment period had been collected.

Results

Figure 6 shows the results of Experiment 4. Note that unlike the previous three experiments, this study showed a positive post-stimulus response not only for emotional trials, but also for *calm* trials. As predicted by Hypothesis 2, the weak contrast between post-stimulus calm and emotional trials may have accounted for the weak differential results observed in the pre-stimulus period.

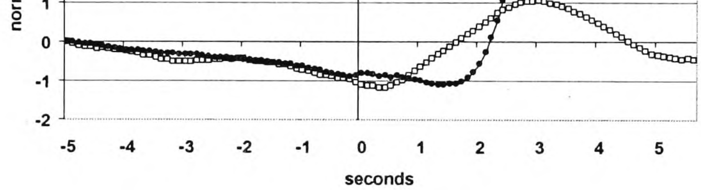

Figure 6. Results of Experiment 4. Randomized permutation analysis indicates that the difference in pre-stimulus curves is associated with z = 0.59, p = 0.28 (one-tailed).

General Results

Data Collection Summary

Table 1 summarizes key elements of the four experiments. In Experiments 1a and 1c a total of 900 trials were run, but data from one session of 40 trials were corrupted, so for Experiment 1 a total of 860 trials were available for analysis. In Experiment 2, 50 people contributed 40-trial sessions at UNLV and 6 people contributed 30-trial sessions at Interval Research Corporation. A small percentage of this data did not record properly, leading to a total of 2,059 usable trials. Most of these failures were due to one of the SCL electrodes spontaneously breaking contact with the participant's skin; others were due to equipment failures probably caused by power spikes or by the PC's operating system freezing for unknown reasons. With use of new physiological equipment, uninterruptible power supplies, and newly designed software, all sessions run in Experiments 3 and 4 were recorded properly and all data were analyzable.

Experiment	Location	Trials	Participants	Trials / Session	Targets	EDA Measure	Equipment
1a,c	UNLV	860	24	20 or 40	120 custom	Conductance	J&J I330
2	UNLV & IRC	2,059	56	30 or 40	150 custom	Conductance	J&J I330
3a	IRC	570	19	30	IAPS	Resistance	J&J I330C2
3b	Esalen	180	6	30	IAPS	Resistance	J&J I330C2
3c	Jamaica	660	22	30	IAPS	Resistance	J&J I330C2
4	Boundary	240	6	40	IAPS	Resistance	Custom
Total		4,569	131				

Table 1. Informational summary of the four experiments.

Post-Stimulus Responses

Figure 7 shows the weighted effect size (weighted per trial) for both pre-stimulus and post-stimulus ΔSCL, for data combined across the four experiments and for emotionality contrasts ranging from 1% to 50%. The strongly positive effect size shown in Figure 3 confirms that overall *post*-stimulus SCL changed in the expected way.

Applying Hypothesis 1 to post-stimulus data showed that at the 50% contrast level (i.e., a median split of pre-assessed emotionality ratings across all trials) the post-stimulus effect size was more than 20 standard deviations from chance. For Hypothesis 2, the post-stimulus effect size was observed to peak at the 5% emotionality contrast and then decline with increasing percentage. And for Hypothesis 3, the expectation that more emotional targets would result in larger post-stimulus EDA levels was confirmed: $r = 0.28$, $t = 19.7$, $N = 4{,}569$, $p \approx 0$. These results provide confidence that overall the experimental design was operating as expected for post-stimulus responses.

Pre-Stimulus Responses

Hypothesis 1 predicted that ΔSCL during the pre-stimulus periods of the 50% most emotional trials would be greater than the same measure for the 50% most calm trials. The resulting weighted effect size, shown as the 50% contrast in the lower curve in Figure 6, is 4.3 standard errors above chance ($p = 0.000008$). An unweighted Stouffer Z score combining the results across all four experiments results in $z = 4.0$ ($p = 0.00003$). Thus Hypothesis 1 is confirmed. To test how robust this effect might be, a similar test was performed based on the *median* value of the pre-stimulus emotional and calm samples. This resulted in a weighted effect size of 2.90 standard errors above chance ($p = 0.001$), and an unweighted Stouffer Z score = 3.31 ($p = 0.0005$).

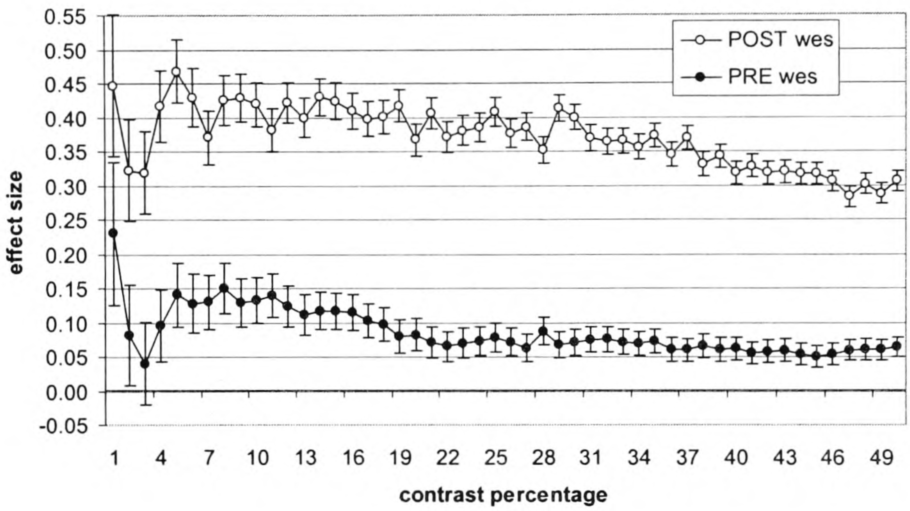

Figure 7. Weighted mean effect size (wes) and one standard error bars for post-stimulus and pre-stimulus ΔSCL, in terms of percentage of all trials compared. A contrast of 1% represents those trials with the strongest emotional contrast but includes only 1% emotional + 1% calm or 2% of all available trials. The 50% contrast level includes all trials.

Hypothesis 2 predicted that the presentiment effect size would decrease as the degree of emotional contrast declined. Because Figure 7 shows 50 tests, a Bonferroni correction requires a significance level of $p = 0.05/50 = 0.001$ to be considered significant. The peak weighted effect size of **es** = 0.23

at a 1% contrast was 2.2 standard errors above chance, but $p > 0.001$. The next highest peak of $e = 0.15$ at an 8% contrast level was 4.05 standard errors above chance ($p = 0.00003$), exceeding the Bonferroni criterion. The weighted effect size then declines to **es** ≈ 0.06 at a 50% contrast. Thus Hypothesis 2 is confirmed.

Hypothesis 3 predicted a positive correlation between the pre-assessed emotionality ratings vs. pre-stimulus ΔSCL levels. The resulting correlation was small in magnitude, but as predicted it was significantly positive: $r = 0.04$, $t = 2.42$, $N = 4{,}569$, $p = 0.008$. Individually, in Experiment 1, $r = 0.04$, $t = 1.28$, $N = 860$, $p = 0.10$; Experiment 2, $r = 0.03$, $t = 1.29$, $N = 2059$, $p = 0.10$; Experiment 3, $r = 0.05$, $t = 1.93$, $N = 1{,}410$, $p = 0.03$; and Experiment 4, $r = -0.02$, $t = -0.34$, $N = 240$, $p = 0.64$.

Figure 8 graphs the results of each experiment individually in terms of effect size. The first three experiments provided remarkably similar results across all emotional contrasts. The fourth experiment resulted in negative lower contrast percentages, but at higher contrast percentages the effect size resembled those observed in the other experiments.

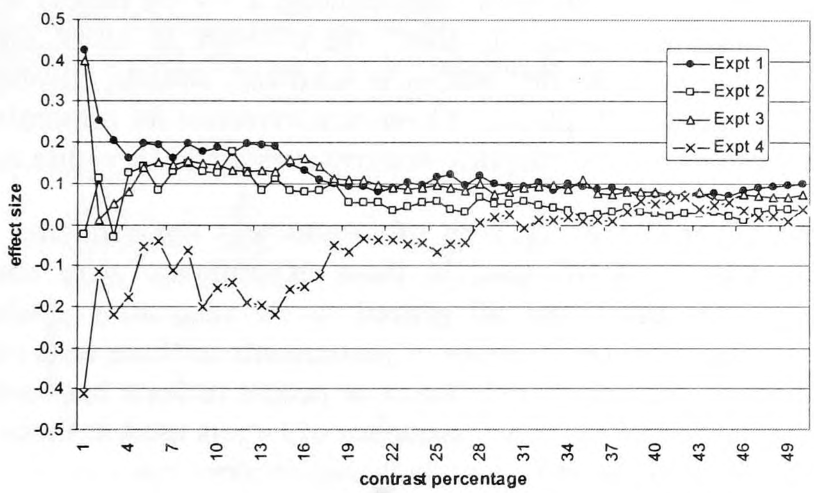

Figure 8. Effect sizes individually in the four experiments, by emotional contrast percentages.

Discussion

The experiments described here appear to support the presentiment hypothesis. Confirmation of Hypothesis 3 in particular indicates that prior to viewing a randomly selected emotional stimulus, participants' autonomic nervous system not only began to respond, but it responded *in proportion* to the pre-assessed emotionality level of the future stimulus. This places strong constraints on plausible alternative explanations for these results.

Alternative Explanations

Commonly proposed alternatives for the observed results include (1) sensory or statistical cues about the upcoming targets, (2) data collection, measurement and/or analytical artifacts, (3) selective reporting biases, (4) participant or experimenter fraud, and (5) conscious or unconscious anticipatory strategies that might produce biased physiological measures resembling the observed effects. All of these factors were considered in the process of designing and running these experiments. Each explanatory category is addressed in turn.

Sensory or Statistical Cues

If the computer's hard disk retrieved the target photo immediately after the button was pressed to begin a trial, and if the calm targets differed from the emotional targets either in terms of where they were located on the hard disk or their size, then it is conceivable that the participant could have learned to associate the computer's hard disk sounds with different upcoming targets. To avoid such possibilities, in all experiments the targets were not retrieved off the hard disk until immediately before they were displayed. Also, recall that in Experiments 2 – 4 the targets were not selected until immediately before they were displayed. In short, the software in all of these experiments was designed to ensure that there were no differences in hardware sounds, displays, or other physical cues until just before the target was displayed. Given that evidence for presentiment effects in these studies began 5 – 6 seconds prior to the stimulus, sensory cues are not a viable explanation.

Statistical cueing might occur if the sequence of targets was non-random. To circumvent this possibility, the PRNGs and true RNG used in these experiments were checked for sequential randomness before they were used, and all proved to be adequately random under long-term calibration conditions. In addition, the majority of participants in these tests ran a single session of 20 – 40 trials, an insufficient number of trials for most people to learn sequential biases, unless the biases are extreme. Examination of the actual sequence of targets used in these experiments showed that the autocorrelations were all in alignment with chance expectation.

Hardware, Software, or Analytical Artifacts

To avoid the possibility that a given implementation of the experiment might have introduced hardware or software-specific artifacts, three physiological monitors, three software programs and PC operating systems, many different computers, and four types of random number generators (three PRNGs and a true RNG) were employed to provide conceptual replications using different experiments setups.

In all experiments, the software was designed to ensure that the data representing the pre-stimulus period was already recorded in the computer's memory before the target was selected (Experiments 2-4) or displayed (all experiments). In addition, the software in all experiments marked the SCL data in real-time with the current condition of the test (i.e., pre-stimulus, stimulus, or post-stimulus) to ensure correct synchronization with external events. As a result, the hardware, software and data collection mechanisms used in these experiments are unlikely sources of systematic bias that might explain the observed results. To avoid possible violations of distributional assumptions associated with parametric tests, nonparametric randomized permutation analysis was used to evaluate the results.

Selective Reporting

Because results similar to those presented here can undoubtedly be mimicked by carefully selecting data, special care was taken to analyze all available trials in all of the presentiment experiments I have conducted, so far. The only excluded data were 280 trials from Experiments 1b and 1d that were collected using different experimental designs or intentions, and both of those experiments produced positive effects (Radin, 1997).

Anticipatory Strategies

This is the most common and at face value the most plausible explanation for the observed effects. The idea assumes a dichotomous design, i.e. two distinct conditions comparing emotional vs. calm pictures, or a stimulus vs. no-stimulus. With such a design, it is conceivable that on sequential trials the participant's EDA might monotonically increase on each successive calm trial, it would peak on an emotional trial, and then would reset back to zero on the next trial, as illustrated in Figure 9.

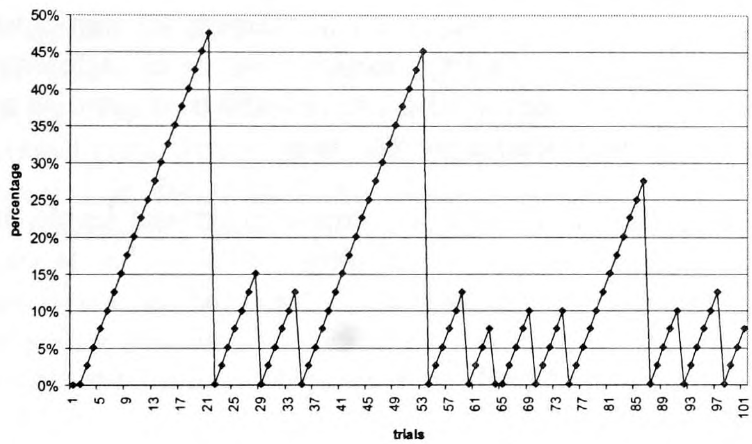

Figure 9. Simulation of simple anticipatory strategy.

With such a strategy, followed either consciously or unconsciously, because emotional trials are always at the peak of each ramp, then EDA averaged across emotional trials will be higher than the average EDA for calm trials. And indeed, simulation studies have shown that a small bias does exist (e.g., Dalkvist, Westerlund & Bierman, 2002). However, the same simulations also show that with longer sessions (> 30 trials), or after pooling trials across many participants, these biases become progressively smaller.

While anticipatory simulations are instructive, they oversimplify what actually occurs in these experiments. For example, the electrodermal system cannot become progressively aroused without limit. Thus a monotonic increase in arousal, as modeled in Figure 9, is unrealistic. A rapidly asymptoting exponential is more reasonable, and simulations based on such revisions would result in even smaller anticipatory biases. Also, anticipatory models depend on the ratio of emotional to calm targets. As the ratio approaches 1:1 the bias eventually vanishes.

An associated issue is that it is difficult to create unambiguously dichotomous photo targets; people's idiosyncratic reactions inevitably blur the distinction between calm and emotional. Thus, a more realistic anticipatory simulation would use targets with a continuous range of emotionality, and it would adjust the arousal value for trial N+1 according to the emotionality rating at trial N.

Fortunately, we do not have to make assumptions about possible anticipatory strategies because we can directly examine the actual data. To do this, data from Experiments 2 and 3 were pooled. This set of 3,469 trials, contributed by 103 participants, provided a convenient dataset for this purpose. The pre-stimulus SCL values in each of the two experiments were separately normalized and then combined.[4]

Then the targets in these studies were separated into two classes: *emotional* were those with the top 26% emotionality ratings, and *calm* were the 74% with lower emotionality ratings. These percentages were selected to create an approximate 1:3 ratio of emotional to calm targets to ensure that there would be an adequate number of "calm" targets in a row to examine the anticipatory model. Based on this definition of emotional and calm targets, 13 participants were identified who independently obtained significant ($p < 0.05$) emotional vs. calm differences in their pre-stimulus responses. Together these people contributed a total of 450 trials, and as a group they represented (by selection) extremely strong evidence for presentiment.

An anticipatory strategy supposes a monotonic increase in arousal levels in calm trials prior to an emotional trial, with the peak arousal at the emotional trial. This is equivalent to predicting a positive trend between the number of calm trials before an emotional trial and the mean ΔSCL value for each of those trials. Note that this trend, which can be evaluated with a simple linear correlation, should not include the emotional trial itself, as that would confound testing the anticipatory strategy model with a genuine presentiment effect.

Figure 10 shows the observed pre-stimulus ΔSCL means for calm trials 1 to 13 steps before an emotional trial, and the pre-stimulus ΔSCL for the emotional trial itself (the "0" point on the x-axis), with one standard error bars. The size of the error bars differ because the number of sequential calm trials before an emotional trial decreases with the number of trials. That is, there are many more cases of the 1-step sequence $C \rightarrow E$ than the 5-step sequence, $C \rightarrow C \rightarrow C \rightarrow C \rightarrow C \rightarrow E$.

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[4] The reason for the normalization was that the pre-stimulus SCL values were formed by summing the change in normalized SCL over all samples in the presentiment period, and given that the sampling rate in Experiments 2 and 3 were different (5Hz and 10Hz, respectively) those sums were also quite different.

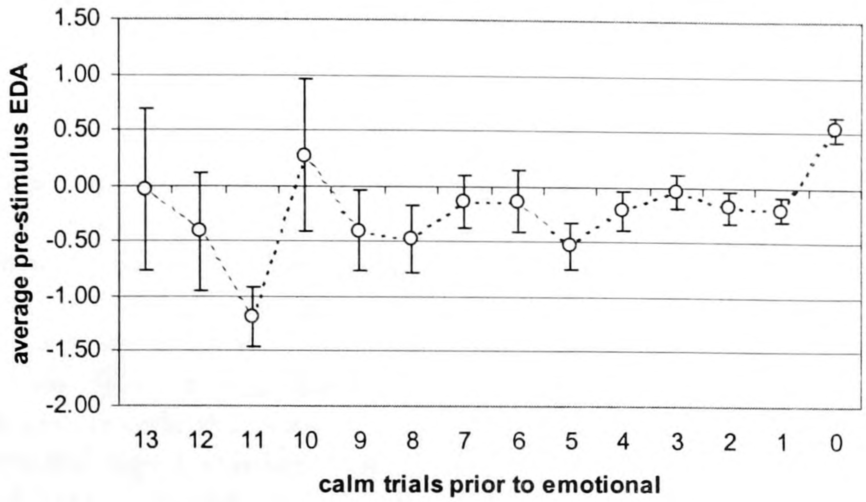

Figure 10. Average ΔSCL (and one standard error bars) for up to 13 calm trials prior to an emotional trial (0), for 13 subjects in Experiments 2 and 3, each of whom showed an independently significant presentiment effect.

The weighted linear correlation for steps 13 → 1 is positive, but not significantly so ($r = 0.29$, $p = 0.17$). Also, notice that with one exception (step 10), all of the mean ΔSCL values prior to the emotional trial are negative. Thus, contrary to the expectation of an anticipatory model, participants selected for their exceptional presentiment responses show *relaxation responses* before the emotional target, rather than arousal. In fact, the mean ΔSCL value just prior to the emotional trial is significantly negative. This does not support an anticipatory model.

Conclusions

Four double-blind experiments using different hardware and software implementations, subject populations, environmental conditions, and photo stimuli, explored the possibility that some intuitive hunches involve unconscious, non-inferential perception of future emotions. Overall the experiments provided evidence for presentiment, and examination of a variety of alternative explanations suggest that the observed effects are what they appear to be.

As independent replications of presentiment effects continue to compound, we can expect that proof-oriented studies will eventually evolve into process-oriented designs, and into new types of conceptual replications such as Bem's "precognitive habituation" experiment (Bem, 2003).

Acknowledgements

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Corporation. And Experiment 4 was supported by Interval Research Corporation and Boundary Institute.

Note

(1) In any reasonable PRNG there is no direct (i.e., linear) relationship between a PRNG seed-number and the number that the PRNG subsequently generates. To demonstrate that the QuickBasic 4.5 PRNG used in this experiment did not introduce an artifactual relationship between the physiological state and the resulting target photos, the PRNG was seeded with a number (say, N = 1), and then it was used to generate one random number from 1 to 150, using the same programming code as employed in the experiment. This created a seed-number, target-number pair. This was repeated for seed-numbers N = 1 to 5000, and then a Pearson correlation was determined between the resulting pairs. If the seed-number determined the resulting target selection, then a positive correlation would be predicted, but no such relationship was found ($r = 0.0007$, $p = 0.96$, two-tailed). (2) The PRNG seed-number was not simply the sum of three physiological values, but physiological states combined with the computer's clock time, and in any case none of these values were known by the participant or experimenter. In sum, the process by which the random targets were selected could not have introduced any systematic biases into the results.

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Possible effects of healing intention on cell cultures and truly random events

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Abstract

A triple-blind pilot study evaluated potential effects of Johrei, a spiritual healing practice, on the proliferation of normal human brain cells in culture. In the same study, truly random numbers were continuously generated by three independent sources to explore whether healing intention might be associated with the anomalous organization of random events.

The experiment took place inside a double steel-walled, electromagnetically shielded chamber over a period of three days. On each day cell proliferation was assessed in cultures exposed to Johrei healing treatment as compared to unexposed control cultures. Two random number generators (RNGs) were located inside the shielded chamber, a third was two meters outside the chamber. Four Johrei practitioners also periodically chanted and gave healing treatments to each other inside the chamber with the intention of creating a "conditioned space," said to progressively enhance intentional healing treatments.

There were three main predictions: (1) cell cultures exposed to healing intention were expected to proliferate more than unexposed controls, (2) the distribution of random events was expected to deviate from chance during the experiment, and (3) differences in treated vs. control cultures were expected to increase over the course of the experiment.

During the experiment, each of the three RNGs deviated significantly from chance at about the same time on the third day, resulting in a combined effect peaking at nearly 5 standard errors over chance. A significant increase in cell proliferation in both treated and control cultures was observed across the three day experiment ($p = 0.0003$, one-tailed), and a significant increase in treated vs. control cells was observed on the third day ($p = 0.02$, one-tailed).

In a post-hoc analysis, random event data from 36 continuously running RNGs located from 24 to 10,500 miles from the laboratory were examined to test three models: local, in which only the RNGs in the laboratory would show significant deviations; nonlocal, in which similar effects would be observed in all RNGs regardless of distance; and radiation, in which RNG effects would decrease with increasing distance from the laboratory. The data strongly supported a radiation model, with a correlation between RNG effects and square of the distance resulting in $r = -0.60$ ($N = 39$, $p = 3 \times 10^{-5}$).

After considering numerous alternative explanations, we conclude that the deviations observed in both the RNGs and cell cultures were consistent with a mind-matter interaction effect. It is conceivable that the Johrei "space conditioning" intentions may have enhanced the growth of cultured cells, and in a surprising post-hoc finding, the observed effects may have had field-like qualities that were detectable at a distance from the laboratory.

Introduction

This paper describes a pilot study investigating the effects of healing intention simultaneously on a living and a non-living target system. The primary, explicit target was normal human brain cells in culture, and a secondary, implicit target was sequences of truly random events. Previous experiments have indicated that both living systems and truly random physical systems appear to be susceptible to intention-related effects (e.g., Benor, 1990; Schlitz & Braud, 1997; Radin & Nelson, 1989, in press), but targeting both systems at the same time has not been explored.

The primary purpose of this experiment was to explore the source of intentional healing effects. The two leading explanatory candidates for such reported effects (excluding a host of mundane explanations) are (a) an active, causal influence involving direct mind-matter interaction (MMI) either on the part of the healers and/or the investigators, and (b) a passive, perceptual effect mediated by the experimenters' psi abilities, dubbed "Decision Augmentation Theory" by May, Spottiswoode and Utts (1995).

In the case of a DAT explanation there is no influence of either treated or control targets. Instead, the experimental conditions are subtly (but not consciously, or maliciously) manipulated by the experimenters via psi, so as to produce a differential effect that closely mimics the MMI explanation. A DAT illusion of intentional healing could occur, for example in an experiment involving mice, if in the process of randomly assigning mice to treatment and control groups, it turned out that the naturally healthier mice were assigned to the treatment group and naturally sicker mice to the control group.

Understanding the underlying source of purported intentional healing effects goes beyond academic interest. It is pragmatically critical if one hopes to actively cure patients via intentional healing. To put it bluntly, MMI can heal, but DAT cannot.

Design

The experiment included two somewhat unusual design features. The first involved four experienced spiritual healers who periodically chanted in the laboratory to "condition the space," or in their more poetic terms, "to raise the spiritual atmosphere." This space-conditioning meditation was said to cumulatively enhance intentional healing effects in a given location. The idea that a place can be altered by intention is weakly supported by anecdotes about numinous feelings associated with "sacred spaces," such as religious sites visited annually by millions of pilgrims. Beyond anecdotes, a small body of experimental evidence suggests that consciousness may influence objects and locations in subtle ways. Studies of "psychometry" suggest that some people can sense memories associated with objects (Bentley, 1961; Roll, 1966), and location-specific "linger" effects associated with intention have been described in healing experiments involving mice (Watkins and Watkins, 1971; Watkins et al, 1973; Wells & Watkins, 1975), magnetic and electromagnetic fields (Watkins and Watkins, 1974; Joines, 1975), and electronic circuits (Kohane & Tiller, 2000).

The second design feature was the use of three independent truly random number generators (RNGs). The three RNGs were all run before, during and after the experiment to provide a baseline period with which to confirm proper operation of the generators, and to provide a three-way "coincidence detector" to increase the likelihood that any observed deviations would be due to a common influence and not to naturally-occurring random fluctuations. The healers were aware that RNGs were present during the test, but they were hidden from view and no feedback was provided about their output.

Exploring the source

A growing number of studies indicate that RNGs placed in the vicinity of groups engaged in coherent mental activities produce sequences of numbers that deviate from chance expectation. The events studied in these "field consciousness" experiments have ranged from religious rituals to newsworthy events of global interest (Bierman, 1996; Nelson, Bradish et al, 1996; Nelson, Jahn et al, 1998; Nelson, Radin et al, 2002; Radin, 2002; Radin et al, 1996). In these tests, participants are typically unaware that RNGs are present, and in no cases do they receive feedback about the data being collected. Under control conditions, when group coherence is inferred to be absent, no systematic deviations in the random data are observed.

To help distinguish between MMI and DAT explanations in the present experiment, random bits were collected simultaneously from three independent RNGs, and that data was continuously collected a week prior to the beginning of the experiment. The first step was taken because MMI and DAT lead to different predictions based upon the number of RNGs involved in the experiment. That is, assuming MMI is "field-like," and it influences proximate RNGs in approximately the same way, then for example, if three RNGs were each influenced to deviate from chance by say, $z = 2$ standard normal deviates, equivalent to $p \sim 0.02$ per RNG, then their combined statistical effect would be $z = (3 \times 2)/\surd(3) = 3.5$, or $p = 0.0003$. Thus, an MMI effect sufficient to "cause" a modest deviation from chance in one RNG would be boosted statistically in three RNGs almost two orders of magnitude, to combined odds of about 3,700 to 1.

By contrast, if the effect were due to DAT, then to achieve a fortuitous (pure chance) deviation in one RNG associated with a modest p-value of 0.02, then, assuming a data generation rate of 1 Hz, the experimenter would have to wait about $1/.02 = 40$ samples, or under a minute. This is not an unreasonable amount of time to wait for one RNG's random walk to deviate moderately from chance. But to wait for three RNGs to simultaneously show similar deviations, the waiting time is no longer one minute but 1/ 0.0003 samples, or over an hour. In this sense, the stronger the joint

RNG deviations observed simultaneously in multiple RNGs, the more plausible the underlying explanation is MMI rather than DAT.

With regard to the second design feature, by beginning data collection far in advance of the experimental period, a DAT explanation would imply that the future must be predestined. That is, if the future were probabilistic rather than absolutely fated, then the farther one goes in temporal distance, the more those probable futures will fan out like branches on a tree, into a vast multitude of possibilities. As a result, faced with a hodgepodge of possible futures, precognitive certainty would decline and thus the investigator would not be able to reliably apply DAT to decide when to start the experiment. While experiments designed to explore whether the future is determined or probabilistic have so far produced equivocal results (Radin, 1988; Steinkamp, 1999, 2001; Targ and Targ, 1986), a meta-analysis of forced-choice precognition tests showed significantly higher effect sizes for precognition of targets milliseconds in the future as compared to targets in the more distant future (Honorton & Ferrari, 1989). Similar declines in precognitive accuracy have been observed in analyses of precognitive dreams (Dunne, 1939; Sondow, 1988). Thus, if a highly significant deviation were observed simultaneously in three RNGs a week after data collection began, then that would be contrary to existing evidence about precognitive accuracy over time, but be in alignment with an MMI explanation.

In sum, this experiment was designed so that the stronger the statistical outcome in the RNGs, the more likely the effect could be attributable to MMI vs. DAT. In addition, if the cell cultures also showed significant results, and those results occurred around the same time as the deviations observed in the RNGs, then the compound evidence could be interpreted as strongly favoring MMI.

Method

Participants

Four experienced Johrei practitioners took part in this experiment.[1] Johrei is a spiritual healing practice founded in Japan by Mokichi Okada (1882-1955). As in many spiritual traditions, Johrei maintains that there is a universal energy or spiritual force that can be cultivated and focused by individual intention. When focused on the human body, Johrei is said to raise its spiritual vibrations or to achieve spiritual purification; this in turn is said to improve health and to allow one's divine nature to unfold. In addition to healing, Johrei practices include flower arranging (Sangetsu), traditional tea ceremony (Bontemae), and natural farming.[2]

Design Overview

The experiment took place from Friday, September 27, 2002 through Sunday, September 29, 2002, in a double solid steel-walled, electromagnetically and acoustically shielded chamber in the Institute of Noetic Sciences (IONS) laboratory.[3] On each of these three days, four Johrei practitioners applied

[1] Johrei is pronounced joh-ray; translated from Japanese it means "purification of the spirit."
[2] Personal communication from Rev. Yoshiaki Kato, Izunome Association, USA.
[3] ETS-Lindgren Series 81 type enclosure, 8' x 8' x 7.5' in size, constructed by Lindgren for the IONS laboratory to exceed federal electromagnetic (EM) shielding standards (e.g., NSA 65-6, NSA S4-106 and MIL-STD-285/IEEE 299). The chamber effectively

healing intention to cell cultures, each in half-hour sessions. In addition, four Johrei practitioners chanted together and gave healing treatments to each other to "condition the space" of the shielded chamber in five, 75-minute periods over the three days.

The first cell culture healing sessions took place the first evening from 5:00 – 7:00 PM, and the first space conditioning chanting session took place from 8:00 – 8:45 PM that same day. The second day at 9:00 – 9:45 AM, 4:15 – 5:00 PM, and 8:00 – 8:45 PM the four practitioners chanted, and from 5:00 – 7:00 PM the second cell culture healing session was conducted. The third day a chanting session was held from 9:00 – 9:45 AM, and that evening from 5:00 – 7:00 PM the last cell culture healing session was held.

During all sessions a closed-circuit video camera located inside the shielded chamber allowed the third author (GY) to view the actions of the Johrei practitioners.[4] He was able to confirm that the practitioners did not touch or interfere with the RNGs or the cell cultures in any way.

Cell Culture Materials and Design

In preparation for each day of the three-day experiment, the second author (RT) placed primary human astrocytes into 16 sealed, rectangular flasks at a cell biology lab at California Pacific Medical Center (CPMC) in San Francisco.[5] He labeled each plate with a random 5-digit number and then placed the flasks into randomly assigned positions within a cell culture incubator.[6] The cultures were allowed to grow for 48 hours, then following a random selection schedule, 2 flasks were placed on the lab bench outside the incubator (as controls), 2 were left inside the incubator (as secondary controls), and 12 were placed into a thermally-insulated opaque plastic box and transported by RT to the IONS laboratory (about a 45 minute automobile drive). At the IONS lab, RT placed the thermally-insulated carrier inside a preparation room about 25 meters from the shielded chamber where the experiments were to take place.

To begin each session, RT consulted a previously generated random schedule that identified three of the 12 flasks to use for the first of four half-hour sessions. He placed the three flasks into an opaque plastic box, took the box into the shielded chamber, then returned to the preparation room and waited a half-hour. After the plastic box was placed inside the chamber, the third author (GY) consulted a randomly counterbalanced schedule that specified either to call a Johrei practitioner (referred to by the initials YK) to enter the chamber and apply healing intention for 30 minutes, or to allow the cells to remain in the empty chamber for 30 minutes as a "no treatment" control.

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shields EM signals from 10 KHz and above, and is rated at 100 db attenuation for electric and magnetic fields above 200 KHz. The 1.5-ton room rests on a rubber mat on a concrete floor to provide isolation from vibrations. Objective sound testing indicates that a 100 dB sound blast for 1 second at 1K Hz from a room 20 meters away cannot be distinguished from background ambient noise inside the chamber.

[4] The video signal was sent outside the chamber to a monitor via fiber optic cable.

[5] Astrocytes (Cambrex Corporation, East Rutherford, New Jersey) were seeded in T25 flasks (Sarstedt, Inc.) at a concentration of 2,300 cells per flask, in modified cell culture media (BioWhittaker's EBM media with the addition of 10 mg/mL insulin, 50 mg/mL transferrin, 25 ug/mL progesterone, 10 ug/mL hEGF, and 50 ug/mL gentamicin.) and incubated at 37 degrees Celsius and 5% C02.

[6] Random assignments were made by the second author using the pseudorandom algorithm in the Zbasic programming language (Zedcor Corp., Phoenix, AZ).

During the healing treatments, YK sat in front of the treatment box, the palm of his right hand directed towards the treatment box from about 20 cm away, and his left hand held about 10 cm below the right hand, palm up. At the end of the 30-minute period, YK left the chamber and went to another part of the building, then GY called RT to retrieve the plastic box. RT did so (and thus RT was unaware whether those cells were in a treatment or control condition), then he placed the flasks back into the insulated box, retrieved three new flasks according the random assignment schedule, and this process was repeated a total of four times. Through this design, on each day's test a total of six flasks were exposed to Johrei healing intention and six were controls, in counterbalanced order.

After each day's experiment, RT returned the transport box back to the lab at CPMC and placed all of the flasks back into their randomly assigned positions inside the cell culture incubator. Ten days after the first day's experiment, the cells in all flasks were fixed and stained,[7] and two CPMC analysts not otherwise involved in the experiment independently examined each flask with a low-power stereoscope and counted colonies of more than 50 cells. This "colony formation assay" is standard for measurement of cell response *in vitro*, and the two analysts commonly conduct such assays as part of their daily work. The average of the two analysts counts was used as the primary datapoint per flask.

Blinding procedures were employed throughout this portion of the experiment so that no one handling the cell culture flasks, nor the analysts who counted the cell colonies, knew whether a given flask had been exposed to Johrei treatment or was in control condition. The random flask condition codes were not revealed to anyone until after copies of the colony-forming efficiency data had been sent to an independent "code keeper."

Analysis and Predictions

Overall, the intentionally treated astrocytes were expected to proliferate more, i.e. to produce more cell colonies, than the untreated controls. In addition, the space-conditioning chanting inside the experimental chamber was expected to progressively enhance any intentional healing effects, thus differences between treated and control cells were expected to increase over the three days of testing.

The first analysis examined the correlation between the two analysts' colony forming counts. A significant positive correlation would provide confidence that the independently assessed colony counts accurately reflected cell growth in each flask. The second analysis investigated whether the act of transporting cell cultures to the IONS laboratory influenced cell growth in general. This was done by comparing cell growth in flasks left at CPMC versus those transported to the IONS lab. The comparison was tested with a two factor ANOVA: one factor was Condition (CPMC controls vs. IONS controls) and the other was Day (the measurements on each of the three days). If the main effect for Condition indicated no significant differences, then all control data would be pooled for the

[7] All cell flasks were fixed at 10 days as a matter of convenience, as the majority of cell colonies in each flask had already formed after 7 days, and those colonies were simply growing larger with the passage of time.

subsequent analysis. If the main effect did show a difference, then the CPMC and IONS controls would be considered separately.

The third analysis examined differences between the treated and control flasks. A two-factor ANOVA was employed, using the factors of Condition (treatment vs. control), and Day. The predictions for this ANOVA were a significant main effect for Condition (i.e., overall more cell growth in the treated cultures), and a Condition x Day interaction (i.e., treatment vs. control differences would increase over the course of the experiment).

RNG Equipment and Design

Three types of RNGs were used in this study to provide multiple, independent "detectors" of field consciousness effects. Two RNGs were electronic circuits: the "Orion"[8], and the "Mindsong."[9] Both of these devices output streams of random bits at 9600 baud to a PC's serial port. A Packard Bell 100 MHz computer collected data from the Orion RNG using a DOS-based Microsoft QuickBasic 4.5 program written by the first author. A Dell 1.5 GHz computer collected data from the MindSong using a DOS-based program written by the Princeton (University) Engineering Anomalies Research Laboratory. Both of these RNG/PC systems were hidden behind a curtain inside the shielded room.

Data generated by the RNGs were collected in the form of samples consisting of the sum of 200 sequential random bits. Use of such summed samples, rather than individual random bits, diminishes biasing effects of potential short-term autocorrelations. Calibration runs confirm that these RNGs generate data conforming to the expected theoretical mean, variance, skew and kurtosis for truly random binomial samples. Calibration testing by the manufacturers has shown that both Orion and Mindsong devices pass Marsaglia's "Diehard" randomness tests, a gold standard for testing RNGs (Marsaglia, nd). The 200-bit samples generated by these RNGs were collected and stored at a rate of one sample per second for the Orion, and at a slightly faster rate for the MindSong. All samples were date and time-stamped to allow later synchronization with external events, and the PCs were synchronized to standard Internet time at the start of the experiment.

The third RNG was a computer-monitored Geiger counter (model RM-60 from Aware Electronics). This device monitored background ionizing radiation (i.e., naturally occurring alpha, beta, gamma and x-ray particles), and data were collected by a Dell 1.5 GHz PC with a Windows-based software package also from Aware Electronics. The program counted and stored the number of radioactive particles detected in successive 10-second periods.

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[8] See http://valley.interact.nl/av/com/orion/rng/home.html (accessed April 29, 2003).

[9] See http://noosphere.princeton.edu/reg.html (accessed April 29, 2003); the Mindsong is no longer manufactured.

RNG Data Collection

The first author (DR) started data collection in the three RNGs on Friday evening, September 20, 2002, all within five minutes of each other. Data were collected for a full week prior to the experiment, and for one day after, to provide a long-term baseline with which to confirm proper device operation under control conditions. The IONS laboratory was not used for other purposes during the experiment, and DR was 2,500 miles away from the lab for the duration of the experiment. Data collection ended the morning of Tuesday, October 1, 2002, when DR returned to the lab. Approximately 1 million one-second samples had been collected from each of the two RNGs, and 100,000 10-second samples from the radiation monitor.

Analysis and Prediction

Each sample from each of the two RNGs was transformed into a normalized score as $z = (x - 100)/\sqrt{50}$. Then a one-hour composite score z_H was created by combining the per-second z scores as $z_H = \sum z/\sqrt{N}$, with N = 3,600 for the Orion and N = 3,970 for the MindSong.[10] Data from the radiation monitor was normalized by finding the mean **m** and standard deviation **s** of all 10-second counts, forming $z_r = (\mathbf{x} - \mathbf{m})/\mathbf{s}$ for each sample **x**, and then creating a composite z_r score per hour. This procedure created three vectors of z scores, each 263 data points in length, each z representing one hour of continuous data collection. These hourly z's were used as the statistic in the subsequent analyses.

Two types of analyses have been commonly employed in past "field consciousness" studies (e.g., Radin, 1997; Radin, 2002): a cumulative chi-square deviation (call this "*cumdev*") and a chi-square sliding window (call this "*windowing*"). The *cumdev* method is especially useful for exploring systematic biases or deviations that might arise in RNG outputs; the *windowing* method is useful for detecting spontaneous "bursts" or faster-moving deviations. In both cases, the underlying statistic is a sum of z-squares. Each z in that sum can be prepared in one of two ways when per-second data is combined into longer periods of time: (1) as a mean-shift in the form of a Stouffer z, which is then squared (i.e., $(\sum z)^2$), or (2) as a change in variance in the form of a sum of z-squares (i.e., $\sum z^2$). In this study, the per-second sample data was consolidated into one-hour blocks for the sake of analytical convenience, and both the *cumdev* and *windowing* methods were explored. This resulted in four analyses: *cumdev* and *windowing*, each based on both mean-shift and variance statistics. Thus, a Bonferroni correction factor of four is necessary, requiring p = 0.01 or z = 2.2 (one-tailed) to be considered a significant deviation.

For the *windowing* method, a sliding window was used based on the sum of 12 z-squares representing the hours 1-12, 2-13, 3-14, etc. This created a vector of 252 chi-squared distributed values (each with 12df) per RNG. Those three vectors were then combined by (a) determining the p-

[10] Mindsong RNG data were extracted for each day and the total number of samples divided by 24 to determine the number of samples used to form the hourly Stouffer Z. Instead of 1 sample per second, the Mindsong recorded approximately 1.1 samples per second.

value associated with a chi-square statistic with 12 degrees of freedom, (b) converting this p-value into a one-tailed z score using an inverse normal transform, and (c) combining the resulting 3 z's into a single composite Stouffer z score as $z_c = \sum z / \sqrt{3}$.

No prediction was made as to precisely when deviations in the RNGs might be observed, but based on previous studies involving "space-conditioning intention" (Tiller et al, 2001), it was expected that the composite Stouffer z score would increasingly deviate from chance as the three day experiment progressed.

Results

Cell Culture Results

Figure 1 shows the correlation between the two analysts' cell colony counts (the analysts are identified as T and L in the figure). This relationship should be positive to provide confidence that the measurements were accurate, and in this case it was, with $r = 0.68$ ($p = 3 \times 10^{-6}$). Recall that both analysts were blind to the conditions of the flasks (treated vs. control), and each analyst conducted her measurements independently.[11] As previously noted, the average of each analyst's colony count for each flask was used in the subsequent ANOVAS.

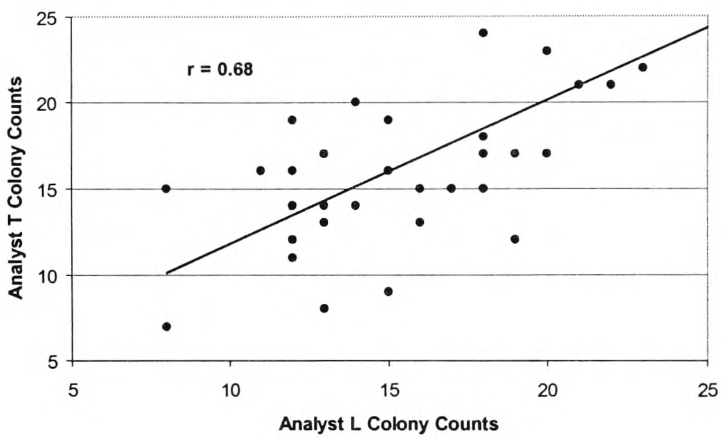

Figure 1. Cross-analyst reliability, $r = 0.68$, $p = 2.5 \times 10^{-6}$.

Table 1 shows the results of the ANOVA comparing control flasks at CPMC vs. those transported to the IONS lab. Because no significant differences were observed, all control flask counts were combined for the subsequent analysis. A small rise in overall cell counts across the three days accounted for the marginally significant main effect for Day.

[11] Use of two independent analysts to count cell colonies is atypical in cell biology experiments. Double-checking was employed here to provide greater confidence in the data given the unorthodox nature of the hypothesis.

	SS	df	MS	F	p
Day	76.26	2	38.13	2.83	0.08
Condition	4.51	1	4.51	0.34	0.57
Day*Condition	12.36	2	6.18	0.46	0.64
Error	322.98	24	13.46		

Table 1. Analysis of variance for the control flasks. The factor of Condition is controls at CPMC vs. controls at IONS, Day is the day of the experiment.

The primary analysis of interest predicted a main effect for Condition (overall more growth in treated vs. control cells) and for Day x Condition (larger differential effects over time). Results in Table 2 show that main effect for Day and the Day x Condition interactions were significant. A Newman-Keuls post-hoc test revealed that interaction was significant primarily because the treated cells on Day 3 grew significantly more than any other treatment or control measurement, including the control cells on Day 3 ($p = 0.02$). Figure 2 illustrates these differences.

	SS	df	MS	F	p
Day	244.53	2	122.27	9.932	0.0003
Condition	7.10	1	7.10	0.577	0.45
Day*Condition	110.14	2	55.07	4.473	0.02
Error	517.06	42	12.31		

Table 2. Analysis of variance for the cell culture experiment. The factor *Condition* is treatment vs. control and *Day* is the day of the experiment.

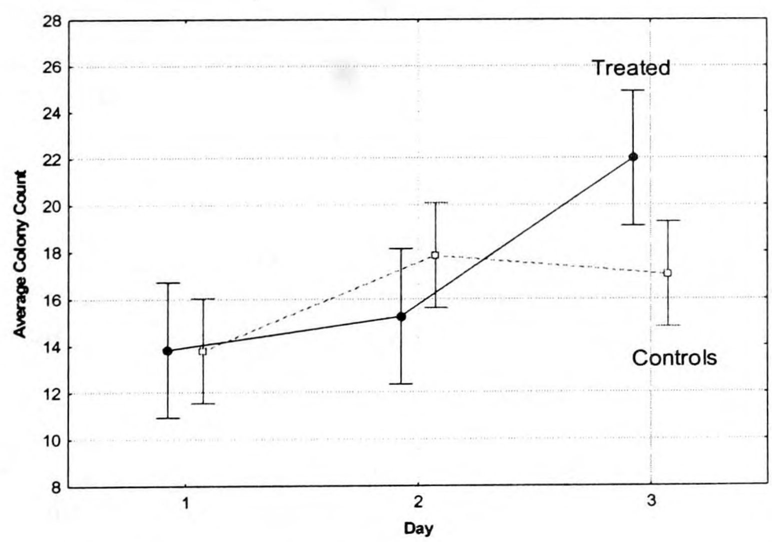

Figure 2. Means and 95% confidence intervals for treated and pooled control colony counts, per day.

RNG Results

Figure 3 shows the composite result for the three RNGs in the IONS laboratory, based on the *windowing* method (the *cumdev* method is mentioned later) As noted earlier, because four RNG analyses were performed, a Bonferroni correction requires z = 2.2 to be considered statistically significant. In addition, because the three-day experiment actually consisted of 51 hours from start to end, and the precise time at which the predicted peak deviation would occur was not specified in advance, an additional correction requires p = 0.05/51 = 0.001 or z ~ 3.1 to achieve significance. The observed peak deviation of z = 4.8 surpassed both criteria. Randomized permutation analysis was used to assess the probability of obtaining a peak as large or larger within the 51-hour experimental period, without any parametric assumptions. The analysis showed that the probability of the observed peak was p = 0.00009.

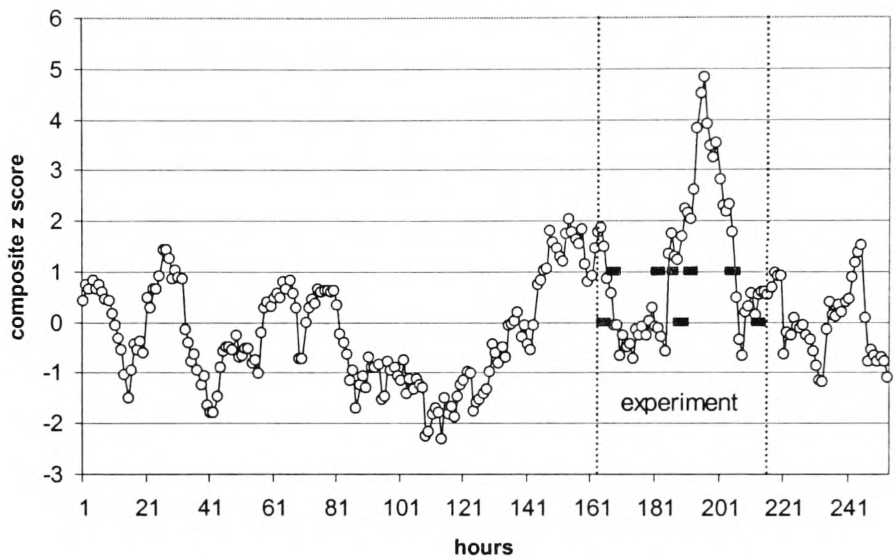

Figure 3. Combined results of the three RNGs, in terms of z scores. The black rectangles within the experimental period indicate episodes of intentional healing of the cell cultures (bars at z = 0) and chanting to condition the laboratory space (z = 1).

Figure 4 shows the individual results for each RNG. Note that the peak effects for all three RNGs occurred within the experimental period, and that these peaks were all independently significant (the peaks for the Orion and Radiation RNGs remaining significant after Bonferroni correction).

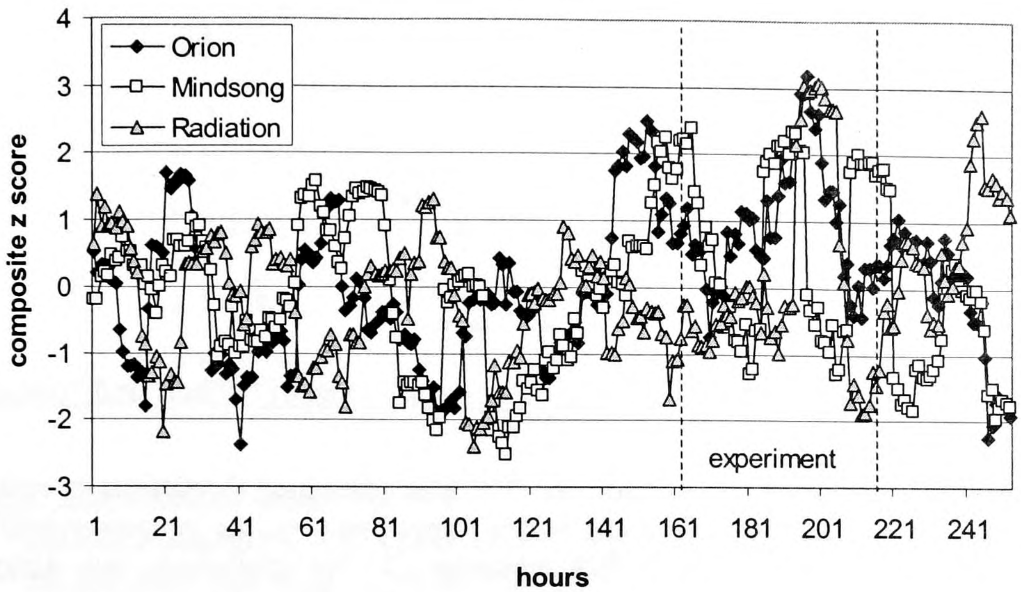

Figure 4. Results for the individual RNGs, expressed as z scores. The peak values for all three RNGs occur within the experimental period at about the same time.

Distant RNGs

Given the deviations observed in the laboratory RNGs, we decided post-hoc to examine data from other RNGs to see whether the observed effects may have registered elsewhere in similar RNGs. For the additional RNG data, we used the Global Consciousness Project's (GCP) RNGs (Nelson 2001, 2002; Radin, 2002). The GCP consists of about 50 Orion and Mindsong RNGs around the world, most running continuously. During the 11-day Johrei experiment 48 of these RNGs were active; of those, 36 ran continuously, thus data from those RNGs were used for further analysis. The generators ranged from 24 miles to 10,500 miles from the IONS laboratory.

The same analyses applied to the three local RNGs were applied to each of the distant RNGs, over the same 11-day period. The results were used to test three models. Model 1 postulated that the observed effects were spatially *nonlocal,* in which case all RNGs around the world would be expected to show deviations similar to those observed in this experiment, at about the same time. Model 2 postulated that the effect was spatially *local,* in which case the IONS laboratory RNGs would be expected to show effects, but all distant RNGs would not. And Model 3 postulated a phenomenon analogous to physical *radiation,* in which effects were expected to decrease with increasing distance from the IONS lab. Figure 5 illustrates an idealized view of the three models.

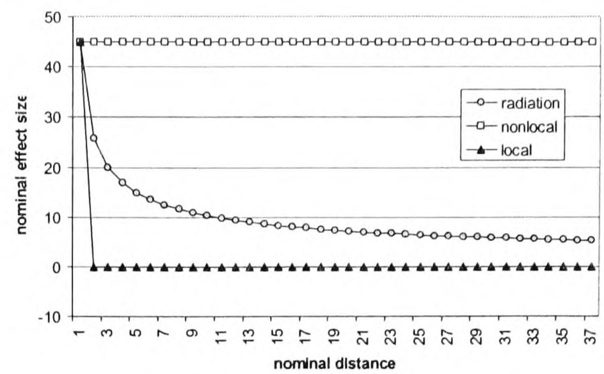

Figure 5. Illustration of the three models in arbitrary units of "effect" and "distance."

Two approaches were used to test these models. The first examined deviations in each RNG at the same time that the peak effect was observed in the experiment vs. the square root of the distance between each RNG's location and the IONS laboratory.[12] By inspection, two datapoints in the experiment were associated with z scores > 4. Those same two datapoints were then examined in the distant RNGs.

From the resulting plot, shown in Figure 6, we can exclude the idealized space-like nonlocal model, as it is clear that the magnitude of local RNG effects was not sustained in the distant RNGs. That left the local and the radiation models, both of which predict an effect size decrease with increasing distance. A linear correlation of all RNGs resulted in $r = -0.60$, $N = 39$, $p = 2.7 \times 10^{-5}$ (one-tailed), confirming a decrease. The next step was to apply the same correlation to the distant RNGs only, because for those RNGs the local model predicts a zero correlation and the radiation model predicts a negative correlation. The result was $r = -0.41$, $N = 36$, $p = 0.005$. Thus, this analysis suggests that the best fit to the data is the radiation model.

[12] The distance for the three RNGs in the laboratory were arbitrarily set to 1 for this analysis.

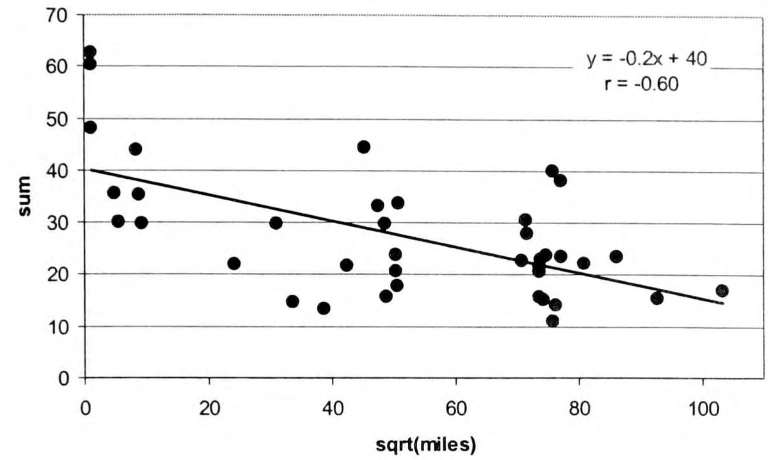

Figure 6. Correlation between square root of the distance from the GCP RNGs and the IONS lab vs. the sum of chi-squared values for the two hours where z > 4.0 was observed in the three laboratory RNGs and similar values in the GCP RNGs.

The second analysis was more general in that it examined the time-course of the effects observed in each RNG over the course of the experiment rather than just a peak value at a certain time. This was performed by calculating the correlation between each curve describing the outcome for each distant RNG (i.e., curves similar to that shown in Figure 4) versus the composite curve for the three laboratory RNGs combined (i.e., Figure 4), for data corresponding to all 51 hours of the experiment. The linear regression between these correlations and square root of the distance, as shown in Figure 7, is r = -0.53, N = 39, p = 2.6 x 10^{-4}. The same regression excluding the three local RNGs results in r = -0.43, N = 36, p = 0.004. Thus, again the radiation model provides the best fit to the data.

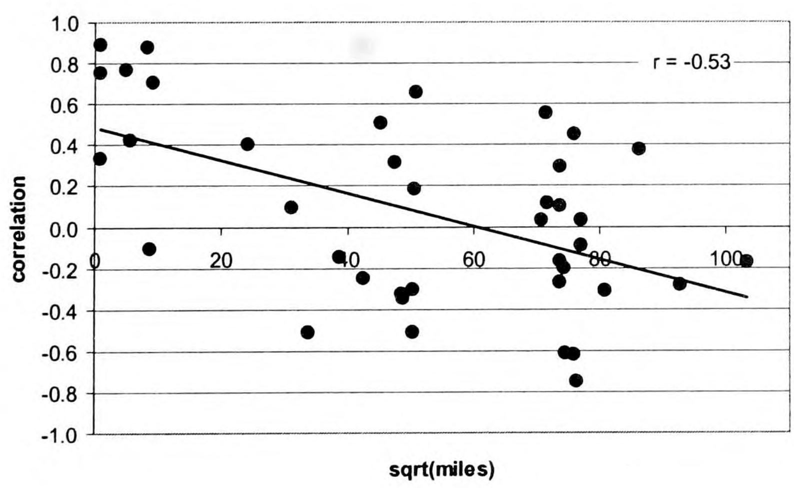

Figure 7. Correlation between square root of the distance between RNGs and the IONS lab, and similarity of each RNG's results with the three RNGs in the lab. This tests the similarity of the results for each distant RNG vs. the results observed in the local experiment.

Given that the radiation model appeared to be the best fit, it is instructive to compare the group of five RNGs all located in the Northern California Bay area (all less than 100 miles from the IONS laboratory), with a group of the six most distant RNGs (all farther than 6,000 miles). Figure 8 shows this comparison along with the results of the three RNGs in the IONS laboratory. Note that the group of five Northern California RNGs collectively peaked at the same time as the three laboratory RNGs. To illustrate how unlikely the combined results were for all eight RNGs within 100 miles of the IONS lab, Figure 9 shows the results in terms of one-tailed odds against chance.

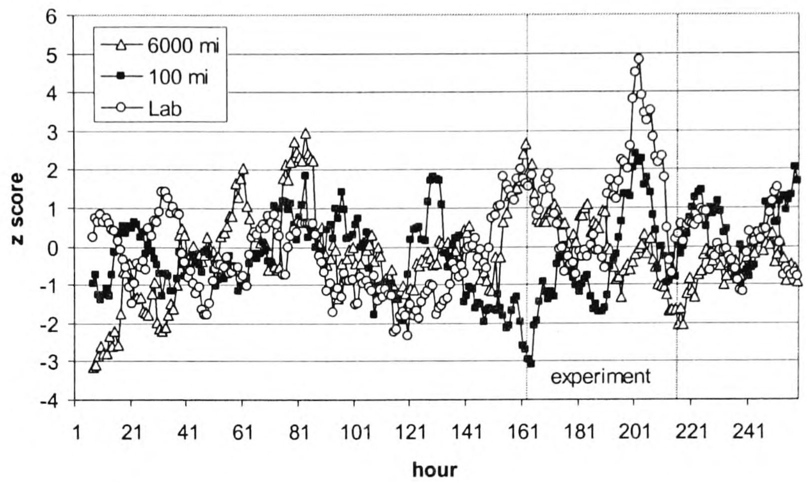

Figure 8. Results for 3 RNGs in the laboratory, 5 RNGs closer than 100 miles from the laboratory (local), and 6 RNGs farther than 6,000 miles from the lab (distant). The local RNGs peaked at $z = 2.4$ ($p = 0.008$) within an hour of the peak observed in the lab RNGs.

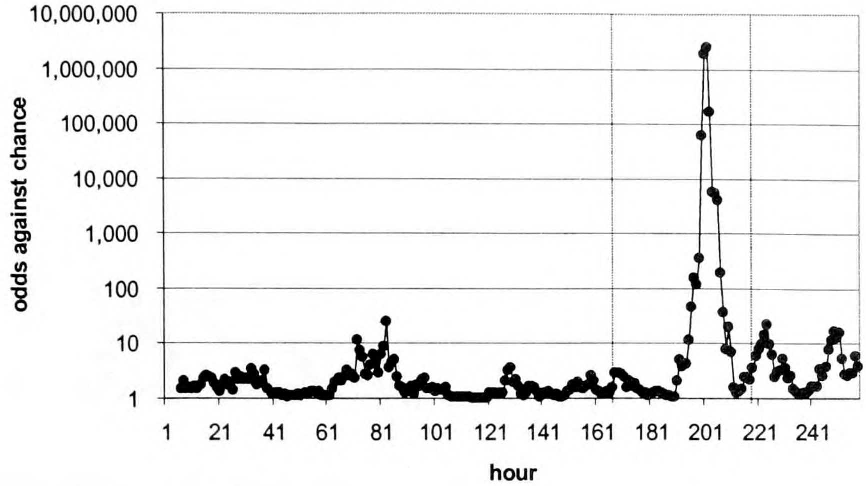

Figure 9. Odds against chance for the overall deviation observed in eight RNGs, five located less than 100 miles from the lab and three in the lab. The experimental period is indicated between the vertical lines.

Discussion

A statistically significant deviation was observed in three RNGs in the IONS lab, and possibly in five other RNGs within a 100 mile radius, all on the third day of a three-day experiment. A significant increase in intentionally treated vs. control cells was also observed on the third day. These effects were postulated to be associated with the coherent intention of Johrei practitioners, and at face value this is what the outcomes appear to confirm.

What else might explain these results? We considered 18 possibilities, ranging from the mundane to the extraordinary. In order of increasing challenge to conventional theories, the explanations considered included the following:

1) Chance,
2) RNG hardware design artifacts,
3) RNG data collection artifacts,
4) environmental influences on the RNGs,
5) differences in how the treated and control cell cultures were handled,
6) analysts' expectations producing biases in the cell colony counts,
7) proximity of a human body near the treated cell cultures,
8) inappropriate statistical analyses,
9) selective reporting of multiple, post-hoc analyses,
10) fortuitous selection of analyses that produced the desired outcomes,

11) experimenters selecting favorable moments in which to begin RNG data collection, such that the outputs of the RNGs conformed to the experimental goals,
12) experimenters randomizing the cell cultures in fortuitous ways such that the treated cells naturally grew more, in alignment with the experimental goals,
13) experimenters' intentions influencing the cell cultures,
14) experimenters' intentions influencing the RNGs,
15) analyst's intentions retroactively causing the recorded RNG data to conform to the desired outcome,
16) analysts' intentions retroactively causing the cell cultures to grow in such a way as to match the desired outcome,
17) a mind-matter interaction effect generated by the intentions of the Johrei practitioners,
18) a mind-matter "field consciousness" effect attributed to the inextricably entangled intentions of the Johrei healers, the experimenters, and the analysts.

Each of these alternatives were considered in detail, but due to space limitations we can only provide a summary discussion of a few of the explanations. Briefly, explanations 1 through 10 are various flaws precluded by experimental and analytical protocols. Explanations 11 – 18 are more interesting and more difficult to cleanly distinguish from one another. In particular, it is conceivable that alternatives 13 – 18 were all operating to some extent in this study. Let us consider explanations 7, 9 and 10 in slightly more detail.

Explanation 7: Proximity of a human body near the treated cell cultures

It is conceivable that "biofields" associated with a human body, including physical effects such as thermal radiation, electromagnetic or electrostatic fields, might have influenced the cell cultures during the healing intention periods. However, this does not adequately explain why the significant treatment vs. control cell differences were observed only on the third day of the experiment. Nor does it explain the deviations observed in the RNGs, as those circuits are immune to the weak physical fields generated by the human body (as well as fields and other physical effects that are far stronger).
i

Explanation 9: Selective reporting of multiple, post-hoc analyses

By sufficiently data-mining any dataset it is always possible to find a significant result. However, the number of different analyses required to spuriously produce the results observed in the present study would be in the thousands, and the cell culture measurements were analyzed with only two ANOVAs and a Newman-Keuls post-hoc comparison of means, and the RNGs were analyzed using only the *cumdev* and *windowing* methods. Also, *windowing* did not produce the only significant RNG result. Figure 10 shows the RNG results based on a *cumdev* analysis. The terminal z score in the experiment period was z = 2.5, p = 0.004.

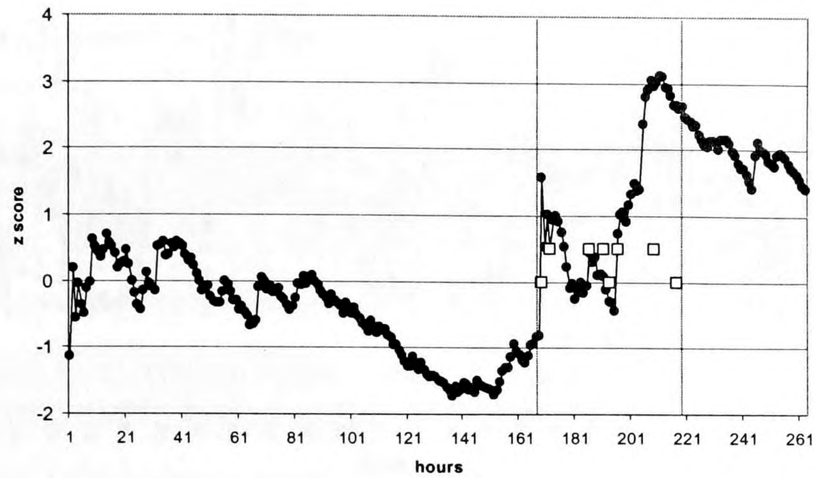

Figure 10. Cumulative RNG deviation results. The experimental period is shown between the vertical lines. The cumulation starts at the beginning of the curve and is restarted (set to zero) at the beginning of the experimental period for comparison.

Explanation 10: Analyses were fortuitously selected

Was the use of 12-hour *windowing* and 1-hour consolidations of the data fortuitous choices, or was the observed deviation robust against faster and slower time scales? Figure 11 shows analysis of the data using both 10-minute and 2-hour sliding windows, based upon one-minute consolidations of the raw (i.e., one-second) data. Both methods peak at z > 4 at the same time as observed with the 12-hour *windowing* analysis and one-hour consolidation of data. Similar analyses confirm that the peak observed in the original analysis persists from as fast as 10 minutes to as slow as 24-hour sliding windows.

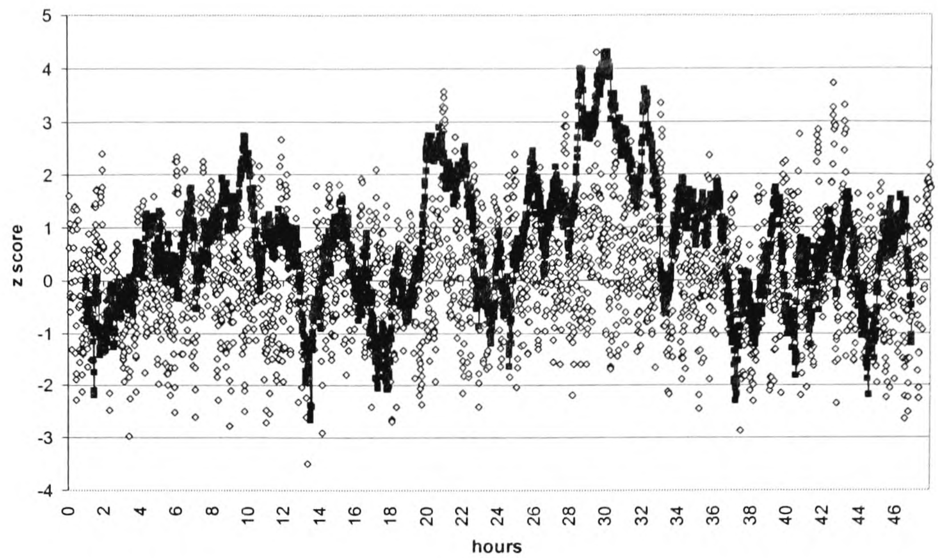

Figure 11. Analysis of results for the three RNGs in the laboratory at the 10 minute level (circles) and the 2 hour level (black squares).

Conclusions

An experiment was conducted to see (a) whether Johrei practitioners' healing intention could enhance the growth of human astrocytes *in vitro*, (b) whether the outputs of three truly random number generators would exhibit a significant degree of organization during the experiment, and (c) whether the results of the test would become progressively stronger as a result of sustained periods of "space conditioning" intention. The outcomes in all cases were affirmative.

A post-hoc examination of the role of distance in the RNG results, tested against three models, supported a "radiation" model in which the RNG effect-sizes declined with increasing distance from the nominal source of the intention. After examination of 18 possible explanations for these results, the results appear to be more consistent with an MMI effect than with other proposed explanations. If future research confirms these outcomes, then some day a new form of medical intervention may arise, based on healing intention.

Acknowledgements

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Thinking outside the box: EEG correlations between isolated human subjects

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Abstract

Electroencephalograms (EEG) were simultaneously recorded in 13 pairs of isolated human subjects using dual, independent physiological recording systems. A nominal "receiver" relaxed in a double steel-walled, electromagnetically and acoustically shielded room, while a "sender" located in a dimly lit room 20 meters away was stimulated at random times. The stimulus was a live video image of the receiver, which appeared at random times on an otherwise dark video monitor. The EEG epochs of interest in both participants were the times of video stimulus onset and offset, as experienced by the sender. The primary hypothesis postulated a positive correlation between the senders' and receivers' ensemble EEG variances across these epochs. Control tests using the same equipment and conditions, but without human subjects present, were performed to test for possible equipment and analytical artifacts.

Results, analyzed with randomized permutation analysis to take into account the autocorrelated nature of EEG signals, and to avoid parametric assumptions, showed a significant correlation between brain activity for data combined across all 13 pairs of subjects ($N = 622$ epochs, $r = 0.20$, $p = 0.0005$). A cross-correlation indicated that this relationship peaked within 50 msec of the stimuli observed by the sender, and three of the 13 pairs independently showed significant correlations.

A significant sender-receiver correlation does not necessarily mean that receivers were responding to distant senders. Receivers might have been responding to the distant stimuli. However, examination of senders' post-stimulus responses showed that the stronger the senders' reactions, the stronger the sender-receiver effect. This suggests that the receivers were directly affected to some degree by the senders.

Artifacts that might have accounted for the observed results, including electromagnetic pulses, anticipatory strategies, sensory cues, and violation of statistical assumptions, were precluded through experimental and analytical protocols. These findings support previous experiments suggesting the existence of an unknown means of communication between isolated human brains.

Introduction

A growing body of research indicates that the electroencephalograms (EEG) of isolated pairs of people can become correlated beyond chance levels under conditions of strict sensory isolation. In these studies, a "receiver" typically relaxes in a quiet room while a distant "sender" is exposed to auditory, visual or tactile stimuli. The experimental question is whether the evoked response in the sender's brain generates a detectable change in the receiver's brain.

The relevant literature starts in the late 19th century with the German scientist Hans Berger. Berger was inspired to study the electrical activity of the brain because he sought to understand a dramatic telepathic experience he had as a youth. In the course of his research he is credited with inventing the modern EEG (Berger, 1940). Some sixty years later, two studies were published reporting suggestive evidence for correlations in pairs of people, including student-teacher relationships (Tart, 1963) and identical twins (Duane & Behrendt, 1965). These reports generated a few replication attempts in the 1970s (Lloyd, 1973; Millar, 1976; Kelly & Lenz, 1976; Targ & Puthoff, 1974; May, Targ & Puthoff, 2002). Many of these studies provided additional evidence for sender-receiver EEG correlations, although the reported effects were typically weak and inconsistent. A decade later, in a series of papers, Grinberg-Zylberbaum and his colleagues reported apparently impressive results in detecting what they called "transferred potentials" between two EEGs (Grinberg-Zylberbaum & Ramos, 1987; Grinberg-Zylberbaum et al, 1993; Grinberg-Zylberbaum et al, 1994). Those studies stimulated a new series of replications, including those of Fenwick et al (1998), Richards et al (2000), Standish et al (2001) and Wackermann et al (2003).

Overall, this body of research has provided clues about the types of conditions under which EEG correlations might arise, and about the statistical methods potentially useful for detecting them. The present study attempted to synthesize these hints into a protocol that might provide a successful conceptual replication. The study was designed to investigate (a) whether correlations exist between pairs of isolated EEGs, (b) whether those correlations are associated with stimuli observed by the sender, and (c) whether the sender is a meaningful component in producing that correlation.

Method

Procedure

Volunteers were recruited in pairs and asked to read and sign informed consents to participate. It was explained that the experiment would involve maintaining a meditative focus on the presence of the other person, and to help sustain this focus, each person would be asked to exchange a personal object (a ring or watch) to hold in his or her right hand for the duration of the experimental session. The pair mutually decided who would be the "receiver" and the "sender" for the session.

The experimenter prepped the skin of each participant, and then to each attached a monopolar EEG electrode[1] to CZ according to the international 10-20 electrode placement system (Jasper, 1958), and

[1] Biopac type EL258S, 8mm Ag/AgCl shielded electrodes, Coulbourn Instruments Microlyte electrode gel.

reference and ground electrodes to the left and right mastoid processes, respectively. Because little is known about which brain areas may be responsible for the reported EEG correlations, in this replication study a single site was selected to provide an identical EEG measure in both individuals. The CZ electrode was held in place with a flexible band stretched from under the chin to the top of the head, the latter two electrodes by doubled-sided adhesive collars. Electrodermal activity (EDA) electrodes were attached to both participants' left hand index and ring fingers.[2]

The receiver sat in a reclining chair located inside an electromagnetically and acoustically shielded chamber,[3] and the electrodes were connected to a Biopac M150 physiological recording system.[4] The shielded room was illuminated with a dim incandescent lamp, and an infrared-sensitive video camera inside the chamber was focused on the receiver's face. The Biopac and video signals were transmitted outside the shielded room via optical fiber to a computer that controlled the experiment.[5] The receiver was told that at random times the sender would view his or her image from a distant location, and was asked to try to maintain a "mental connection" with the sender at all times.

After the receiver was secured in the shielded room, the sender was led through two closed doors to a dimly lit room 20 meters away (see Figure 1), and asked to sit in a chair in front of a 13" video monitor. The sender's electrodes were connected to the same model Biopac system as the receiver's, using the same amplifier settings and data sampling rate. Prior calibration tests demonstrated that test sounds in the sender's room as loud as 110 db for one second (at 1K Hz) could not be detected by a person secured in the receiver's shielded chamber; quantitative audio testing confirmed that such sounds were indistinguishable from background noise inside the chamber.[6]

Data were collected at 125 Hz from the two independent Biopac systems; the digitized outputs from the Biopacs were transmitted over a local area network and streamed onto hard disks on separate Windows-based PCs, each running Biopac's Acknowledge 3.7.1 data collection software. The experiment was controlled by a third Windows PC running a custom experimental controller program.[7] When that program was launched, it created a random timing schedule for 17 to 25 15-second epochs, each epoch separated from the next by a randomly selected 5 to 25 second inter-epoch period. At the beginning of each experimental epoch, the computer switched the video signal from the receiver's chamber to the monitor in front of the sender and simultaneously sent on-set marker signals to both Biopac systems. At the end of each epoch, the computer switched the video signal to black and sent off-set marker signals to the Biopac systems. The randomly timed

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[2] Biopac type TSD203, 8mm Ag/AgCl, and Biopac GEL101 isotonic electrode gel.

[3] Lindgren/ETS Series 81 Solid Cell, 28-gauge double-steel wall, with sound absorbing shielding. The chamber effectively shields electromagnetic signals from 10 KHz and above; it is rated at 100 db attenuation for electric and magnetic fields above 200 KHz. The chamber rests on a rubber mat on a concrete floor to isolate the room from vibrations.

[4] Biopac EEG-100C amplifier, set to 50,000 amplification, and filters set to 1 HZ high-pass, 35 Hz low-pass; Biopac GSR-100C EDA amplifer, 0-2μS scale.

[5] SI Tech Bit Driver Models 2809/2010 video link, and SI Tech Model 2550 Ethernet Bit-driver.

[6] Sper Scientific Digital Sound Level Meter, Model 840028. Additional tests confirmed that vibrations generated in the sender's room, ranging from foot-tapping to hitting the floor with a hammer, were not detectable in the shielded room by the receiver or the sound meter.

[7] The program was written by the author in Microsoft Visual Basic 6.0 (VB6). The VB6 "rnd" pseudorandom algorithm, seeded with the computer's clock time, was used to generate the random epoch timings.

appearance and disappearance of the receiver's image afforded both a visual evoked response in the sender and a meaningful reminder of the "mental connection" task.

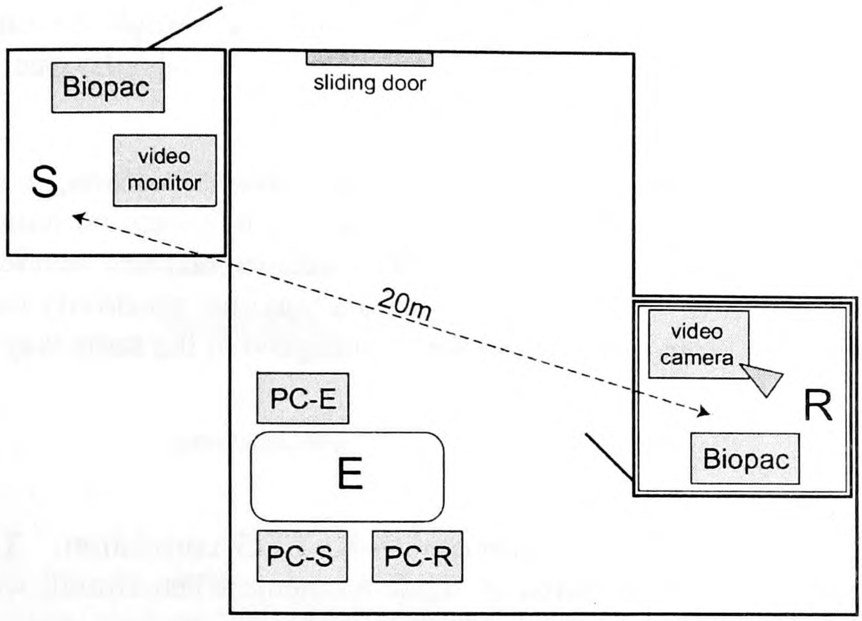

Figure 1. Laboratory layout. The experimenter's workstation (E) consisted of three computers. Two accepted the physiological data from the sender (PC-S) and receiver (PC-R) Biopac systems, and the third (PC-E) controlled the random timing of the stimuli and a video switch. The receiver (R) was in an electromagnetically and acoustically shielded room; the sender (S) was in a distant room behind two doors and a double wall.

The epochs of interest were the EEG signals evoked during those moments when the computer switched the video monitor on or off, i.e., the stimulus transition periods at the beginning and end of each epoch. Neither sender nor receiver were informed in advance of the number of transitions in a given session, the receiver was unaware of the length of the video epochs, and neither sender, receiver or experimenter knew in advance when the epochs would take place. In this sense the experiment was conducted triple-blind.

After both participants were secured in their respective rooms, the experimenter verified that the Biopac systems were recording EEG and EDA signals properly, and also that the marking signals and video switch were operating as expected. Then the experimenter initiated the controlling program and attended to other tasks while waiting for the session to end.

Calibration

A spurious positive correlation may arise between two sets of simultaneously recorded EEGs if the electromagnetic pulse created by the onset and offset of the video monitor used to stimulate the sender was detected in both EEG amplifiers.[8] A similar artifact might be caused by the marker signals sent from the controlling computer to the receiver and sender Biopac systems to indicate when the epochs began and ended.

To assess whether these electrical signals may have introduced artifacts, a calibration test was conducted under conditions identical to those in the experiment, except no humans were present in the sender and receiver rooms. The EEG and EDA electrodes were connected to the Biopac amplifiers, ungrounded, thus acting as antennas to provide maximal sensitivity for detecting potential electromagnetic pulses. Data from these sessions were analyzed in the same way as the experimental data.

Hypotheses

Hypothesis 1 predicted a positive sender-receiver (S-R) EEG correlation. The EEG epochs of interest were 10 seconds in length, centered on those moments when stimuli were presented to the senders.

Hypothesis 2 postulated that the above correlation would be time-synchronized with the stimuli.

Hypothesis 3 postulated that variations in senders' EEG responses to the stimuli would modulate the strength of the overall S-R EEG correlation.

Hypothesis 4 proposed that the stronger the senders' EDA responses to stimuli, the larger the resulting S-R EEG correlation.

Analytical Procedures

Figure 2 illustrates the basic analytical procedure. First, the sender and receiver EEG signals at each stimulus transition moment, ± 5 seconds, were extracted from each continuous EEG dataset. Samples from each 10-second epoch (1,250 samples) were normalized as $\mathbf{z} = (\mathbf{x} - \mathbf{m})/\mathbf{s}$, where $\mathbf{x}$ was each raw sample, $\mathbf{m}$ was the mean of the epoch, and $\mathbf{s}$ was the standard deviation. This normalization step created an epoch with a shape identical to the original EEG signal, but transformed into a uniform scale so that epochs could be directly compared and combined within and across subjects. Next, because head motions and eye blinks can introduce artifacts into EEG measurements, it was necessary to reject such outliers. This can be performed by visually inspecting raw EEG traces and manually identifying the artifacts, but that would introduce unavoidable subjective elements into the analysis. Thus, a more uniform and objective method of identifying EEG artifacts was employed; all normalized samples with $|\mathbf{z}| > 3$ were rejected.

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[8] The monitor's power remained on at all times; the video was switched from the receiver's image to a black image.

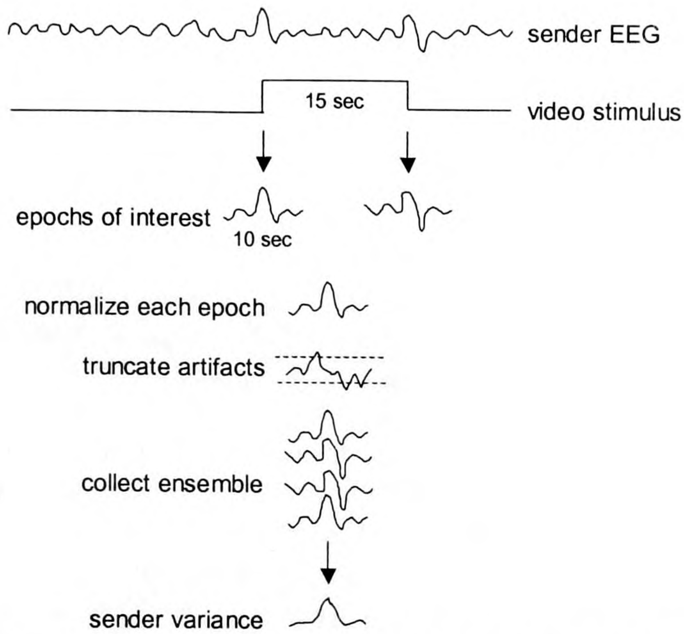

Figure 2. Data analysis procedure illustrated for the sender's EEG; an identical procedure is used for the receiver's EEG. Ten second epochs, each 1250 samples, centered on the moments of video stimulus transitions, are extracted from the sender's and receiver's EEG signals. Each epoch is normalized, truncated to remote artifacts, collected into an ensemble, and the per-sample variances determined.

Next, the ensemble variance, i.e. variance determined per sample across all normalized, artifact-rejected epochs, was determined independently for the sender and receiver data, as $\mathbf{v}_i = (\sum \mathbf{z}_i^2/\mathbf{N}_i - \mathbf{m}_i^2)$, where **i** ranged from 1 to 1250 samples per epoch, $\mathbf{z}_i$ was a normalized sample, $\mathbf{N}_i$ was the number of samples combined across all recorded epochs, and **m** was the mean across those epochs. This process resulted in an array of 1,250 variances for the sender, and a similar array for the receiver; these measurements are closely related to the absolute amplitudes of the EEG signals. Finally, the Pearson correlation between the sender and receiver variance arrays was determined.

Note that because physiological data is autocorrelated, the standard deviation associated with this correlation will be larger than if the underlying data were composed of independent samples. To determine the proper mean and standard deviation to evaluate the statistical likelihood of the observed correlation, randomized permutation analysis was employed (RPA). The method first selected a sample uniformly at random within each 10-second EEG (receiver) epoch, then created a new 10-second epoch by shifting that entire array so the randomly selected sample became the new first sample, and the remainder of the array was "time-shifted" accordingly, wrapping around as needed at the endpoint of the array to maintain an array length of 1,250 samples. This procedure maintained the basic structure of the receiver's original EEG data, but introduced a random time-shift to desynchronize the moments of stimulus transitions as experienced by the sender. After applying these random time-shifts to each receiver epoch, a new receiver ensemble variance array was formed as described above, and the correlation was determined between the original sender vs. new receiver variance array. This process was repeated 10,000 times, each time applying new random time-shifts to the receivers' normalized variance epochs. Then the value $\mathbf{z} = (\mathbf{x} - \mathbf{m})/\mathbf{s}$ was formed, where $\mathbf{x}$ was the original correlation, $\mathbf{m}$ was the mean of the randomly permuted correlations, and $\mathbf{s}$ was the standard deviation. This $\mathbf{z}$ score, transformed into a p-value, represented the probability of observing a correlation as large, or larger, than the one actually observed in the experiment.

Hypothesis 2 was tested by calculating the cross-correlation between the original sender and receiver variance arrays, lagged ± 250 samples (i.e., ± 2 seconds). The appropriate standard deviation for these correlations was determined by RPA using the method described above.

Hypothesis 3 was tested by first determining the senders' maximum normalized EEG value within one second *post-stimulus*, per epoch. Then those epochs were selected with maximum values greater than a specified threshold, and the S-R EEG correlation was determined for the selected epochs. The significance of the resulting correlation was tested using the RPA method described above. Hypothesis 4 was tested in a similar manner, except that it used the senders' maximum normalized EDA responses within three seconds post-stimulus, per epoch.

Results

Participants

Participants included 13 pairs of volunteers, 17 female and 9 male (mean age 36, range 11 to 65). The pairs included friends, mother-daughter pairs, and Institute of Noetic Sciences (IONS) staff. Nine of the pairs were fourth-year medical students participating in a small group, month-long rotation on alternative and complementary medicine, held on the IONS campus.

Sessions

To avoid problems associated with selective data reporting, all data from all 13 sessions are reported. The initial three sessions consisted of 17, 20, and 24 epochs; the number of epochs were varied to experiment with different session lengths. The remaining 10 sessions were set to a uniform 25 epochs. This produced 311 video transitions on and an equal number off, for a total of 622 epochs. The data normalization and artifact rejection method described above ultimately rejected 0.7% of the individual samples, thus subsequent analyses were based on the remaining 99.3% of the data.

Sender-Receiver Correlations

Figure 3 shows the ensemble sender and receiver normalized variance arrays in the calibration condition. The graph indicates that the sender's EEG amplifier sensed the electromagnetic pulses associated with switching a video image on and off within the sampling resolution of 8 msec. It also demonstrates that the receiver's EEG amplifier was adequately shielded from this pulse. As shown in Table 1, the S-R correlation for this data, evaluated using RPA, was not significant, r = -0.03, p = 0.61.

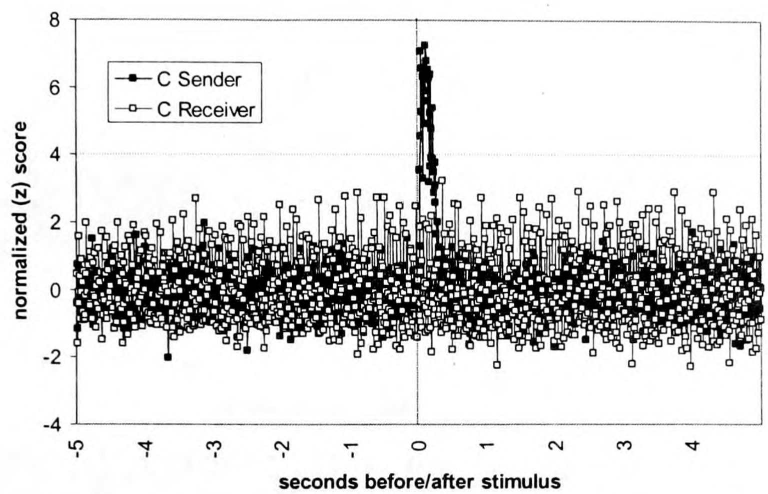

Figure 3. Normalized variances for the EEG amplifiers in the sender and receiver rooms, without humans present, based on N = 300 epochs. The sender's EEG amplifier responds within the sampling rate resolution (8 msec), and it peaks within 4 samples. No comparable effect is observed in the receiver's EEG amplifier.

Figures 4 and 5 show the same analysis applied to the experimental data. Note that unlike in the calibration condition, the senders' EEG peaked in response to the video stimuli at 368 msec post-stimulus, and the receivers' EEGs peaked about 50 msec later. Table 1 shows that the S-R correlation postulated in Hypothesis 1 was confirmed, r = 0.20, p = 0.0005.[9] Hypothesis 2 was confirmed by the cross-correlation curves shown in Figure 6, and Figure 7 shows that 3 out of 13 participant-pairs independently achieved significant correlations (binomial p = 0.02).

[9] Note that if this correlation had consisted of independent samples, the associated p-value would be $p \approx 6 \times 10^{-12}$.

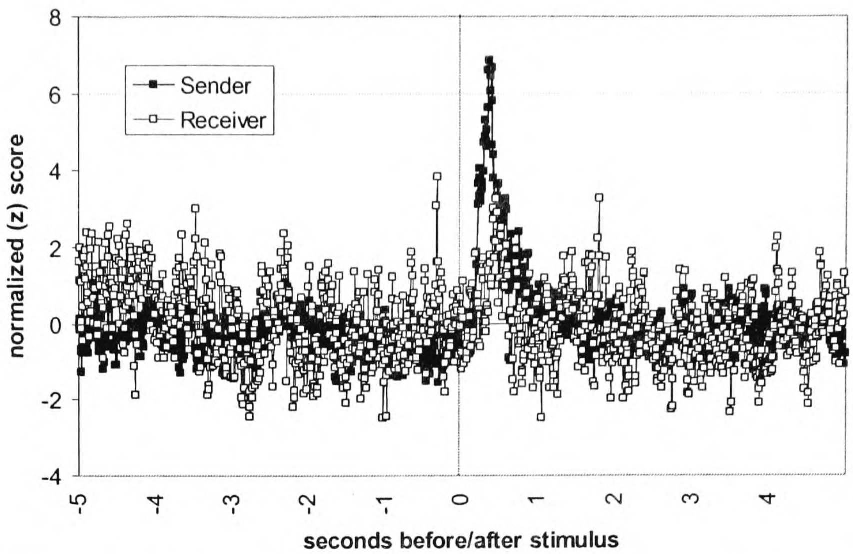

Figure 4. Normalized variances for sender and receiver EEGs, based on N = 622 epochs. The sender response peaks at 368 msec post-stimulus; the receiver response peaks at 464 msec post-stimulus.

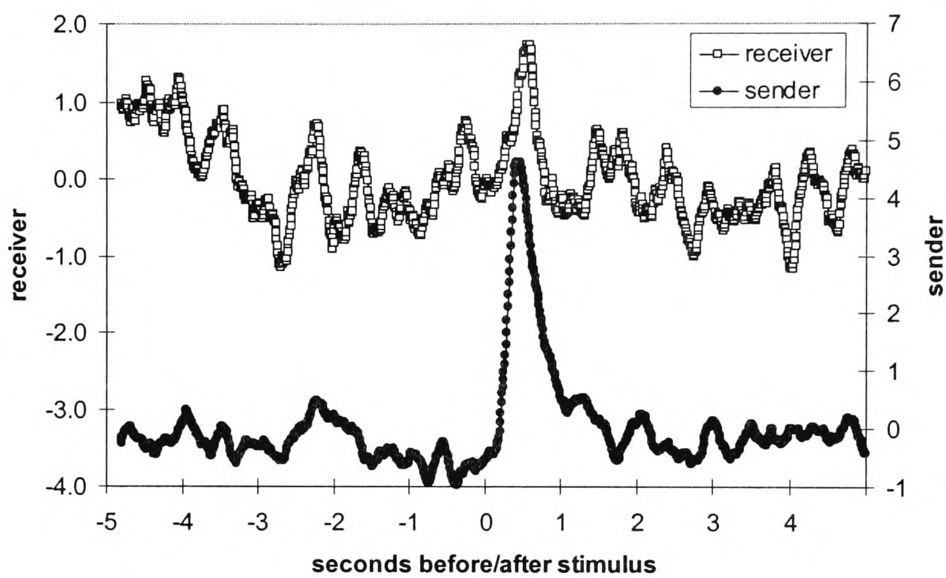

Figure 5. The same data as in Figure 4 smoothed with a 200 msec sliding average and displayed on two different scales to enhance clarity.

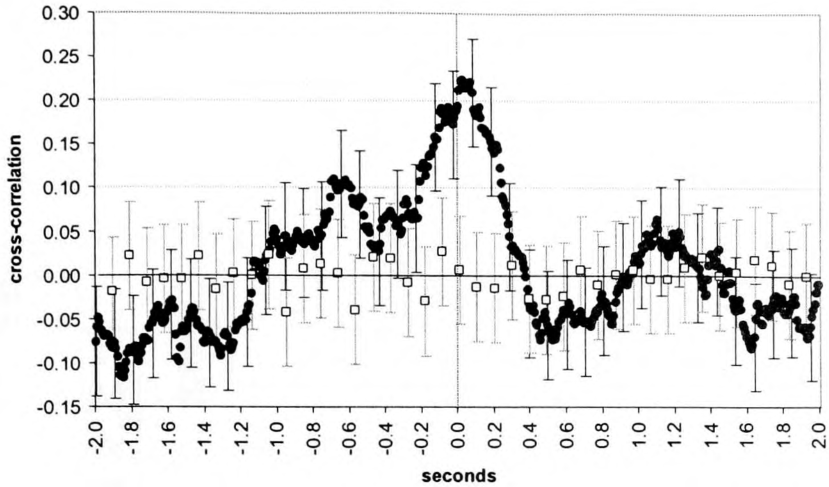

Figure 6. Cross-correlations for experimental (dark circles) and calibration data (white boxes), with one standard error bars. At the stimulus (time 0), the cross-correlation is 3.3 standard deviations over chance; about 50 msec later (S leading R), the cross-correlation is 3.5 standard deviations over chance.

	Experimental	Control
r ± 5 s	0.20	-0.03
RPA mean r	-0.004	0.03
RPA sd	0.06	0.23
z	3.32	-0.28
p	0.0005	0.61
sum	23.5	24.99
RPA mean	21.5	24.90
RPA Sd	0.61	0.09
z	3.32	0.94
p	0.0004	0.17
r ± 1 s	0.40	0.027
RPA mean	0.001	0.032
RPA sd	0.13	0.32
z	3.10	-0.02
P	0.001	0.51

Table 1. Permutation analysis results for experimental (N = 622 epochs) and calibration data (N = 300 epochs), for S-R correlations ± 5 seconds from the visual stimulus, for the sum of variances in the receiver's EEG ± 100 msec from the visual stimulus, and for S-R correlations ± 1 second from the stimulus.

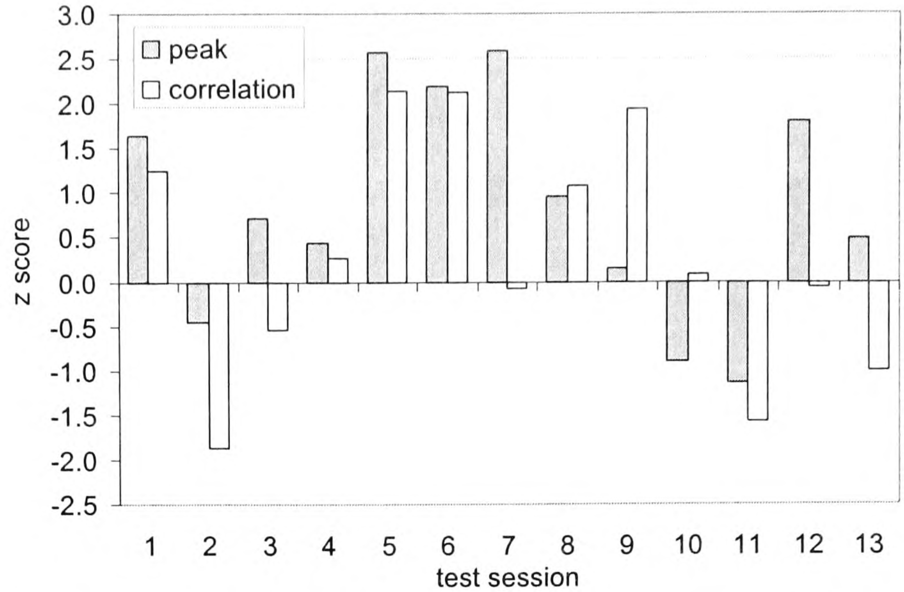

Figure 7. Results for each of the 13 sessions expressed in terms of standard normal deviates (z scores), derived from the p-values produced by RPA. "Peak" refers to the sum of sample variances in the receiver's EEG ± 100 msec from the sender's stimuli; "correlation" refers to S-R EEG correlations ± 5 seconds from the stimulus. Five of 13 sessions resulted in individually significant peaks (binomial $p = 0.001$); 3 of 13 showed individually significant correlations ($p = 0.02$).

Effects of Sender Response

The above results indicate that senders' and receivers' EEGs were meaningfully related, but they only imply that the sender was a necessary component in this relationship. The same result could be obtained if, e.g., the receivers had responded directly to the video stimuli. To test the role of the sender in the S-R correlation, we selected those epochs in which the senders showed strong EEG responses to the stimuli, recalculated the S-R correlation based on that subset of the data, and did likewise for epochs in which the senders showed weak responses. If the sender was an important contributor to the S-R correlation, then this should result in larger and smaller S-R relationships, respectively.

To quantify senders' responses to the stimuli, the maximum normalized sender's EEG value was determined per epoch from the moment of the stimulus up to one second post-stimulus. Then the S-R correlation was determined for these epochs and tested using RPA. To compare the resulting S-R correlations, an effect size calculated as $\mathbf{es} = \mathbf{z} / \mathbf{N}^{-\frac{1}{2}}$, where $\mathbf{z}$ was the standard normal deviate associated with the one-tailed p-value produced by the RPA evaluation, and N was the number of epochs involved in that correlation.

Results, shown in Figure 8, confirm Hypothesis 3: As subsets of increasingly *stronger* sender EEG responses were selected, the effect size increased. And with a subset of *weaker* sender responses, the effect size declined to chance. The difference between two approximately equal subsets (very strong sender responses, shown as "v > 2.75" in Figure 7, N = 65 epochs, versus very weak responses, "v < 1.5", N = 60 epochs) is significantly different, p = 0.007. This means that when senders were not responding to the stimuli, perhaps because their eyes were closed or they were distracted by a fleeting thought, there was no correlation with the receivers. And when senders responded strongly, the correlation appeared.

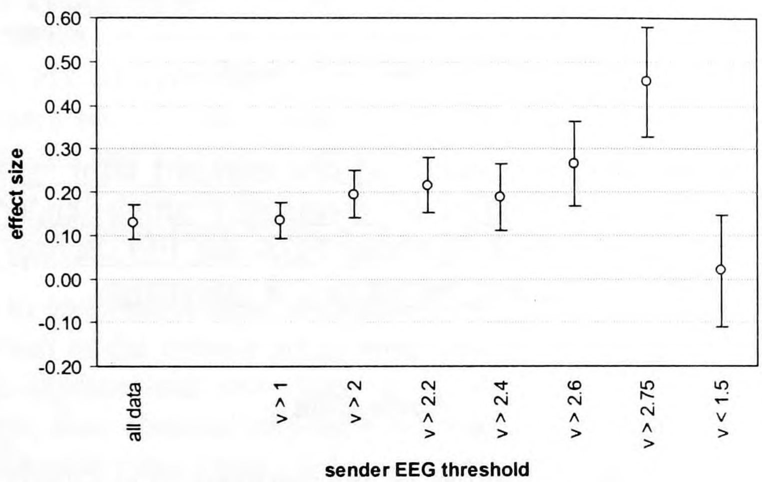

Figure 8. S-R correlation effect sizes and one standard error bars, with different thresholds for the senders' EEG responses to the stimuli. A zero effect size indicates no correlation. The two right-most effect sizes in this figure are associated with particularly strong and weak sender EEG responses, respectively.

Hypothesis 4 predicts that because of known correlates between EEG and EDA (Patterson, Ungerleider and Bandettini, 2002), that as the sender's EDA response to stimuli increases, the S-R EEG effect should also increase. To quantify the sender's EDA response, skin conductance level values were normalized per epoch, and then the maximum normalized value was determined from the moment of the stimulus to 3 seconds post-stimulus. Figure 9 illustrates that as the thresholds for these EDA responses were increased, the S-R effect size also increased, confirming Hypothesis 4. One might expect that a more stringent criterion, such as requiring the sender to have exhibited both strong EDA and strong EEG responses in a given epoch, would result in an even larger effect size. Indeed this was the case, shown as the effect size of 0.41 in Figure 9.

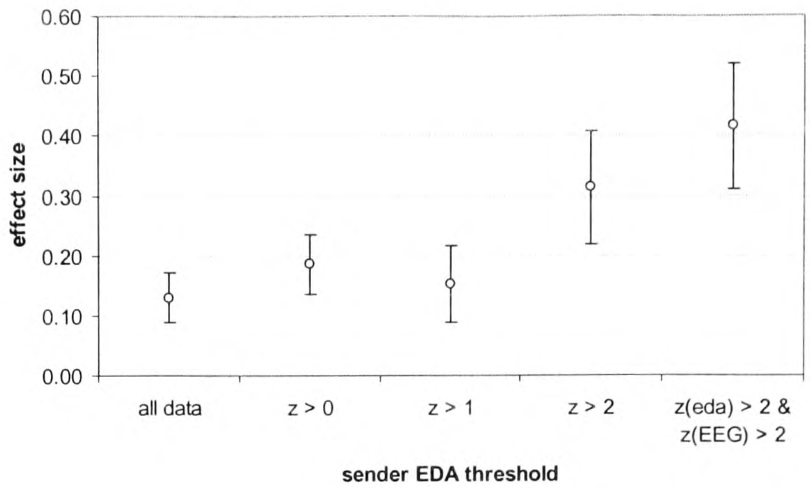

Figure 9. S-R correlation effect sizes and one standard error bars associated with subsets of data corresponding to increasingly strong sender EDA responses, and one data subset with both strong EDA and EEG sender responses (right-most point). Zero effect size means no S-R correlation.

Discussion

This experiment supports the general findings of Wackermann et al (2003) and earlier studies. The results indicate not only the presence of a significant EEG correlation between isolated human subjects, but a correlation that appears to be meaningfully associated with senders' responses. This result, especially when taken in conjunction with a century of increasingly rigorous telepathy experiments (Radin, 2003; Schlitz & Radin, in press), supports the possibility of direct mind-to-mind connections.

What alternative explanations might account for these results? At this point much more can be said about what these connections are not, rather than what they are. By placing the receiver inside a shielded chamber, we know that the results were not due to sensory leakage or to electromagnetic pulses associated with the presentation of the stimuli. We know that the correlation was not due to amplifier cross-talk or multiplexing artifacts that may occur when using a single, multi-channel EEG system to collect the data, because the design used two completely independent physiological systems. The findings were not due to participants' anticipatory responses, because both sender and receiver were blind to the number and timing of the stimuli.

The results were not due to EEG correlations that may spontaneously arise between isolated brains because RPA was used to explicitly compare the observed S-R correlation against autocorrelated signals of similar origin (Blair & Karninski, 1993), and the cross-correlation analysis showed that the resulting correlation was closely related to the stimulus timings. A second RPA analysis was later conducted to confirm that the results of the first technique was valid. In the second analysis, rather than time-shifting the receivers' original EEG epochs with respect to the timing of the stimuli, 10-

second epochs were randomly selected out of each receiver's entire EEG record. This analysis confirmed the results of the first RPA method.

Finally, the results were not due to systematic biases introduced by subjective identification of EEG artifacts, as a simple, objective artifact rejection algorithm was uniformly employed. Finally, the results were not due to erratic failures of hardware or software, because significant correlations appeared in three independent participant pairs.

If not due to flaws or artifacts, then how else may we understand these correlations? While widely accepted theoretical explanations do not yet exist, the apparent relationship observed in this study is reminiscent of quantum entanglement (Pan et al, 2000; Kwiat, Barraza-Lopez, Stefanov & Gisin, 2001; Namiki, 1990; Rowe et al., 2001). Given that under special circumstances entangled elementary systems can exhibit correlations that defy classical physics, if the physical brain can exhibit quantum properties for even short periods of time, as suggested by Hagan, Hameroff and Tuszyński (2002), Josephson and Pallikari-Viras (1991) and others, then it is conceivable that brains that become "entangled" through meaning, shared experiences, or conscious intention might occasionally produce unexpectedly large correlations (Stapp, 1988, 1997).

While theory struggles to understand these phenomena, it is worth contemplating that a century ago effects like those observed in the present study were thought to be physically impossible, and thus the only valid scientific explanations were flaws or fraud. Today, we know that the nature of the physical world is stranger than classical physics had imagined, and the direction of that strangeness is increasingly compatible with these types of observations.

In sum, while the correlations observed in the present study may confound common sense, the formalisms and experiments of modern physics provide an acceptable physical substrate. Of course, this does not mean that early 21st century physics adequately explains these results, for many essential details remain unanswered. But it does mean that arguments predicated on the assertion that "this is impossible because it violates the laws of physics" are almost certainly wrong.

Conclusion

A triple-blind experiment was conducted to see if previously reported correlations between EEG activity in isolated human subjects could be replicated. Based on data collected from 13 pairs of participants, of whom the "senders" were exposed to a total of 622 visual stimuli, the replication was successful. Three of the 13 pairs resulted in independently significant correlations. This study also indicated that the correlations were modulated by the senders' reactions to the stimuli. Future research aimed at confirming and understanding these correlations, and locating which brain areas are primarily responsible for the correlations, appears to be warranted. More detailed analyses of the sender-receiver relationships and the EDA data collected in the current study will be reported in a future paper.

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Dissociation and Mental Health in Mediums and Sensitives: A Pilot Survey

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Abstract

Mediumship is currently conceptualized in psychiatry as a dissociative state presumptively linked to dissociative identity disorder (multiple personality). There is little formal evidence for this presumption, other than anecdotal observations, dating back over 100 years in some cases. To provide some preliminary data on this issue, a pilot survey is reported of 18 self-declared mediums, 14 sensitives and 11 control subjects (N=43, 29 F, 11 M, 3 unspecified gender, age range 25-90 years). An estimated 40% of the respondents were attending a conference on mediumship; others were forwarded questionnaires by acquaintances affiliated with spiritualist churches in the U.S.A. Respondents completed validated scales of personality characteristics including temporal lobe epilepsy symptoms and absorption, and mental health including a general screening instrument and scales which specifically measure dissociative experiences (depersonalization and somatoform dissociation). Respondents were classified as Mediums, Sensitives, or Controls based partly on self-report and partly on whether they functioned publicly as mediums in either a religious or secular setting. These self-descriptions were taken at face value as indicative of a social role performed by these individuals. Respondents classed as mediums had been functioning as such for a median of 29 years (range 15-57 years) in secular and/or religious settings and 72% accepted payment or donations for their services. "Sensitives" is an intermediate category which includes people who consider themselves psychic readers or who feel they can occasionally communicate with spirits, but who do not offer their services to the public as mediums. Responses were analyzed by ANCOVA with age as a covariate. Specific hypotheses were formulated only for Mediums versus Controls, and tested by a priori contrasts. It was expected that Mediums would score higher on dissociation, CPES, and absorption, and lower on mental health measures. Results showed that both Mediums and Sensitives scored significantly higher than Control subjects on depersonalization ($p<.05$ for both groups) and absorption (Mediums: $p=.002$, Sensitives $p=.047$). Only the Mediums scored higher than Controls on Persinger's complex partial epilepsy signs ($p=.024$). Somatoform dissociation was negatively predicted by age but not by group membership. Overall mental health did not differ between the three groups on measures of well-being or psychological distress.

INTRODUCTION

The Australian parapsychologist Harvey Irwin finds that dissociative tendencies and fantasy-proneness correlate with belief in the paranormal, and can identify persons who often have psychic experiences (Irwin, 1991, 1997). However, Irwin emphasizes the need to distinguish between pathological and non-pathological dissociation, such as psychological absorption. In a sample of 100 Australian adults, he found that pathological dissociation was related to childhood trauma, as expected, but non-pathological absorption showed no such relationship (Irwin, 1999).

Currently mediumship is most generally understood as a kind of dissociation, which is defined as a transient or chronic "disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment" (American Psychiatric Association, 1994, p. 231). A medium can be defined as somebody "with a facility for communicating with unconscious sources during dissociation. This definition is neutral with regard to claims about communicating with the dead or with spirits" (Grosso, 1997, p. 186) Types of dissociation which might be relevant to mediumship are amnesia (without organic cause), depersonalization (where one feels detached from one's own thoughts, e.g. feeling like one is in a dream, or as if one is an outside observer of one's body) and derealization (where one feels a sense of detachment or unreality, as if one was a ghost or an automaton). Transient experiences of depersonalization and derealization are not uncommon in the general population without psychiatric diagnoses (Cardena, 1997). Depersonalization is considered a less severe disorder than Dissociative Identity Disorder (DID; formerly known as multiple personality disorder).

Rhea White emphasizes that dissociation occurring in the trance state can be subjectively perceived as an "exceptional human experience" with life-transforming effects (White, 1997). However, psychiatrists would most likely classify a medium who claims to be channeling messages from discarnate spirits as a person who is experiencing a dissociated state of possession trance, or possibly even a dissociative identity disorder (DID). Dissociative states of trance are now recognized by psychiatry in the DSM-IV diagnostic system, and some clinicians believe they are underdiagnosed (Coons, 1998). When these states are prolonged or cause emotional distress or impairment in social or occupational functioning, they are seen as pathological.

Temporal lobe signs

Some researchers have noted the similarity of subjective paranormal experiences, including mediumistic trance, to the experiences reported by patients with epilepsy originating in the temporal lobes (Neppe, 1990; Persinger & Makarec, 1987). In the disorder known as temporal lobe epilepsy (TLE) or complex partial epilepsy (formerly called psychomotor epilepsy), the patient does not experience convulsions. Commonly there are visual, auditory, or olfactory hallucinations (unpleasant, rotten, or burning odors), feelings of anxiety, fear, or unreality, and stereotyped motor behaviors (automatisms) such as lip smacking, fiddling with clothing, twitching of an arm or leg, or walking about aimlessly (Paraiso & Devinski, 1997). There may be an aura that precedes the attack, involving visual or auditory hallucinations, perception of strange odors or tastes, emotional changes, and feelings of being unreal or being separate from one's body. The attack usually lasts between 1 and 3 minutes, with consciousness in some cases remaining clear, and is often followed by amnesia (Oana, 1998). Symptoms of dissociation, particularly depersonalization and derealization, are characteristic of some patients with TLE (Alper et al., 1997).

Vernon Neppe, a neuropsychiatrist and parapsychologist, has found that in persons who claim to frequently experience paranormal events, symptoms similar to TLE are more frequent than in control subjects (Neppe, 1983, 1990). Subjective paranormal experiences are also more frequent in neuropsychiatric patients with temporal lobe dysfunction than in a psychiatric control group (Palmer, Neppe, Nebel, & Magill, 2001). Neppe developed questionnaires to measure these experiences, choosing symptoms which occurred spontaneously in TLE and which also could be evoked during neurosurgery by electrical stimulation of the temporal cortex. One of the most common of these possible temporal lobe symptoms is that of olfactory hallucinations (i.e. the patient smells odors that no one else experiences; often these are experienced as unpleasant, rotten or burning odors). In an initial study with 4 spiritualist trance mediums, they consistently reported pleasant, flowery odors and in all ten reported instances these were associated with the presence of someone thought to be dead (Neppe, 1983). The subjective experience of seeing an apparition is often accompanied by a feeling of cold; this could possibly be interpreted as a thermal hallucination originating in the temporal lobe.

Working along similar lines, Persinger and colleagues in Canada have developed a personality inventory which identifies a cluster of complex partial epileptic symptoms (CPES) often seen in TLE. They believe that many normal individuals experience these symptoms, perhaps to a lesser degree than do patients, without showing any sign of epileptic disorder. Persinger has suggested that CPES underlie mystical and religious experiences in general, and paranormal experiences in particular (Persinger, 1983; Persinger & Fisher, 1990).

<u>Prior Studies of Mediums and Psychics</u>

Studies of personality and mental health among mediums and psychics are rare. Most of the examples for dissociation in mediums are based on anecdotal observations or 19th century cases where the medium utilized a "control" or "spirit helper" (Braude, 1988; Grosso, 1997; Van de Castle, 1993). If one excludes "channeled entities", it is not clear whether the use of "controls" among mediums is as high as it used to be; this might reflect changing fashions in mediumship. Few formal studies of dissociation in mediums or psychics have been reported. The majority of studies on personality correlates of psi have been conducted with university students or unselected subjects who participate in laboratory research. Five exceptions to this statement are cited below.

A questionnaire and personality study was conducted in Britain of 50 self-styled psychics and mediums, nearly all of whom were female, and 62% of whom were spiritualists (Hearne, 1989). Receiving messages from the dead was a common report (78%) in this sample, equal in frequency to telepathy. Foreknowledge of future events was claimed by 50% of Hearne's respondents. Trance mediumship and physical materializations were also reported by this group. Personality testing found the group as a whole to be "affected by feelings", "undisciplined" and "self-sufficient". This study used the 16PF personality test, and did not test explicitly for absorption, dissociation or temporal lobe signs.

Seven disciples of the channeled entity "Ramtha" who practice specialized meditation techniques said to increase psychic abilities were interviewed and given certain personality tests. (Krippner, Wickramasekera, Wickramasekera, & Winstead, 1998). The Ramtha meditators scored high on absorption, dissociation and evidenced "thin boundaries ". JZ Knight, who claims to channel the entity Ramtha, was one of the participants in the study.

In an early study which focused on the role of the temporal lobes in paranormal experience, Neppe (1983) compared six nonprofessional psychics with six control subjects who claimed no prior paranormal experiences. None of the 12 participants admitted to any previous major psychiatric problems. The six psychics reported between 2 and 11 different possible temporal lobe symptoms (PTLS) experiences for each of their subjective paranormal experiences, with a total of 37 different kinds of PTLSs (mean 6.2). On the other hand, the six controls had no such paranormal experiences and their mean PTLS score was only 0.3. To try to evaluate whether these reported paranormal experiences are artifacts of dysfunction in the temporal lobe, the 17 PTLSs which occurred at the same time as a subjective paranormal experience were dropped from the analysis, and yet the psychics still had significantly more PTLSs than the control group ($p<.01$) .

The role of the temporal lobe was further studied in 20 women who reported frequent psi experiences and were actively involved in a psychic and spiritual development group. These women scored higher than a female control group on items reflecting complex partial epileptic signs (feelings of intense meaning, a sense of presence, and olfactory hallucinations). Scores on other control and psychiatric measures did not differ from the control group or from the normal population (Persinger & Fisher, 1990).

In a study unusual for having actual neuropsychological evaluations of the subjects, 17 sensitives from the College of Psychic Studies in London were matched for age, sex and intellectual functioning with 17 church-going control subjects (Fenwick, Galliano, Coate, Rippere, & Brown, 1985). A history of head injury or serious illness was more frequent in the sensitives than in the control group. Signs of right hemisphere and temporal lobe dysfunction were present in two thirds of the sensitives, and poor visual memory was found in one third. The latter symptom has been noted in patients with depersonalization disorder (Guralnik, Schmeidler, & Simeon, 2000). Dysfunction of the non-dominant hemisphere was suggestively related to reports of mystical experiences.

The Current Study

Recently, the opportunity arose to study a group of self-described mediums and psychics, along with a group of control subjects, similar in age and other characteristics. Brief questionnaires on Absorption, CPES and two measures of dissociation were chosen and assembled into a packet for self-administration and anonymous return by mail.

In any study of this type, it is critically important to be cognizant of the potential for fraud and self-delusion which was (and presumably still is) rampant in the field of professional mediumship (Keene, 1997; Nickell, 2002; Schouten, 1994). In this exploratory pilot survey no attempt was made to verify the authenticity or the source of the respondents' experiences. Neither did the author provide a definition of the term mediumship - that seemed somewhat presumptuous, since a survey like this implicitly assumes that the respondents are better informed about this than the researcher. The approach taken here is simply that these individuals adopt a social role and function in a recognized capacity within a group structure that values and endorses their experiences. That their activity is valued by at least certain segments of society is shown by the continued existence and profitability of psychic hotlines, spiritualist churches, spiritualist training centers (such as Lily Dale in northern New York state), and the like. The question addressed in this paper is whether the self-declared mediums function within the normal range on personality measures, or show signs of psychopathology.

METHODS

In June of 2002, the Academy of Religion and Psychical Research (ARPR) held a conference in suburban Philadelphia on "Mediumship: A Gateway to Other Dimensions of Existence". The ARPR is an affiliate of the Spiritual Frontiers Fellowship International, an organization founded by the noted medium Arthur Ford. The purpose of the ARPR is to encourage dialogue and rapprochement between clergy, educators, philosophers, and scientists and improve understanding of psychic functioning (http://www.lightlink.com/arpr/).

As I planned to attend the conference, I was intrigued by the possibility that the ARPR audience might contain persons who believe themselves to be mediums, as well as others who do not. Those who did not consider themselves mediums, by virtue of their attendance at the conference, would presumably share certain attitudes and characteristics in common with the self-styled mediums, which would make them a useful control group. With this in mind, a set of questionnaires was chosen to provide information on personality characteristics of mediums and their experiences during and following trance states. (This latter data will be presented separately.) Criteria for selecting personality scales were that they should be short and suitable for self-administration, as part of a larger package, so as not to unduly burden the respondents. Permission was received from the ARPR Executive Secretary, Mr. Boyce Batey, to distribute the questionnaires at the conference. He graciously allowed me to make some introductory remarks to explain the purpose of the research and ask for audience participation. For the majority of the conference, attendance was about 60 persons.

Procedure. One hundred packets of questionnaires were prepared and placed in unsealed envelopes. Each packed contained an introductory letter, a complete set of questionnaires, an optional contact information sheet, and a self-addressed, stamped return envelope. Packets were left on a table outside the door of the auditorium with a box for returning completed questionnaires. Respondents were given the choice of completing the questionnaire anonymously, or providing contact information to be notified of their results.

By the end of the conference, 13 questionnaires had been returned, about evenly divided between self-described mediums and controls. 30 more questionnaires were returned by mail over the next 3 months. Two respondents voluntarily distributed a total of about 20 extra copies of the questionnaires to acquaintances in spiritualist churches in Florida and North Carolina.

Tests and Scales

Dissociation.

The first scale, the ***Depersonalization Severity Scale*** (DSS), consists of six items which reflect experiences such as not recognizing yourself in a mirror; feeling numb, detached, or unreal; feeling that you are separated from your body, or that your body is controlled by some other entity. The scale correlated well with other measures of depersonalization and dissociation, as well as clinicians' ratings of severity, and was sensitive to change after pharmacological treatment. DSS scores range from 0-18, and reflect both frequency and intensity of depersonalization experiences. High scores on this scale are characteristic of patients with dissociative disorder (Simeon et al., 1997; Simeon et al., 1998; Simeon, Guralnik, & Schmeidler, 2001) and discriminated these patients from others with depression, anxiety or obsessive-compulsive disorder. I suspect that high scores may also be characteristic of mediums who enter the trance state. In my survey, I labeled this the "Experience Checklist".

The second scale to measure dissociative tendencies is the ***Somatoform Dissociation Questionnaire*** (SDQ-20). The SDQ-20 was developed to measure physical symptoms which are reported more frequently by patients with dissociation disorder than by patients with other psychiatric diagnoses (Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1996). Formerly, some of these symptoms might have been included under the heading of "hysteria" or conversion disorder. Validity of the scale has been demonstrated in several countries including the Netherlands, where it was developed, Turkey, England, and the United States. The SDQ-20 correlates highly with the Dissociation Questionnaire. Possible scores range from 20 to 100 points. While age norms are not available, and there is no accepted "cutoff score" for the presence of somatoform dissociation, psychiatric patients tend to score above 30 (Nijenhuis, 2000). In my survey, I labeled this the "Symptom Checklist." For more information on somatoform dissociation, see the special issue of the Journal of Trauma and Dissociation on this topic (2000, vol. 1 no. 4).

These two scales were chosen over longer, more comprehensive measures of dissociation largely because of their brevity, as being more suitable for exploratory research. If any interesting trends emerged, they could be followed up in a later study.

Experiences.

The *Triangle Personality Inventory* (50 items) was developed by Dr. John Palmer of the Rhine Institute in Durham, N.C. (Palmer, 2001). It combines 34 items from Tellegen's Absorption Scale (Tellegen & Atkinson, 1974) with 16 items from Dr. Michael Persinger's CPES scale (Persinger & Makarec, 1987). For this study, the SR2 version of the TPI was employed; the wording of half the items is reversed in order to control for response bias. The ***Absorption Scale*** reflects the ability to become so absorbed in an experience, e.g. reading a book or listening to music, or so lost in one's own thoughts, that one are unresponsive to external stimuli. A high score on this scale is characteristic of many persons who claim psychic experiences. The ***CPES Scale*** reflects symptoms relating to the temporal lobe of the brain, which seem to be similar to many psychic experiences (Persinger, 1988; Persinger & Makarec, 1987). They include experiences such as experiencing unusual odors or strange sensations, alterations in perception or body image, or feeling as if things are not real. A high score (> 8 of 16 items) indicates many such experiences.

Mental Health.

As a final measure of mental health, a validated checklist called the ***Mental Health Inventory*** (MHI-17) was included. It consists of 17 items, giving overall scores for psychological well being (happiness, emotional ties) and psychological distress (anxiety, depression, loss of behavioral or emotional control). The scale was developed as part of the Rand Corporation study of population health (http://www.rand.org/health/surveys/section5.html) and is widely used in medical and psychiatric research (Stewart, Ware, Sherbourne, & Wells, 1992; Veit & Ware, 1983). Large validation studies have been carried out with the MHI-17 and related scales. It has good reliability and has norms for different age groups, including the elderly. The instrument yields an overall Mental Health score, as well as scores for "Well-being" which reflects positive affects and emotional ties, and for "Psychological Distress", which reflects depression, anxiety, and feelings of loss of behavioral and emotional control. It should be noted that this inventory is not intended as a screening device for psychosis or dissociative identity disorder.

Classification of Respondents as Mediums or Sensitives.

Intentionally, no definition of the term "medium" was provided; that was left to the respondents to decide, in their own terms. A series of questions probed mediumistic experiences (see Appendix 1): "Have you ever seen a ghost? Yes / No." "How often? (never, seldom, sometimes, often, always)." "Do you communicate with spirits? Yes / No." "How often? (never, seldom, sometimes, often, always)." The critical item is the one reading "Do you consider yourself a medium? Yes / No. " Twenty-one respondents answered "Yes" to this question.

After the data was collected, it became clear that the binary classification "Medium: Yes or No" did not provide a very good fit to the sample. Three of the 21 positive respondents provided additional clarification that they function as psychic readers but do not consider themselves mediums. One person answered "not sure", another marked both "Yes" and "No", and two persons answered with a question mark. To make matters worse, these latter two "question mark" respondents were outliers, with the highest scores in the sample on several measures, including DSS, SDQ20 and CPES. One individual had been previously diagnosed with dissociative identity disorder (multiple personality) and the other was a transsexual.

Preliminary inspection of the data using independent t-tests with these two subjects classified in one or the other group , revealed that it made little difference whether these two individuals were classed as mediums or omitted from the analysis entirely. In either case, the same three variables were significantly different between groups: DSS, CPES and Absorption, all with $p<.01$ (41 vs. 39 df, alpha=.01). If they were included as controls, group differences were obscured on all but the CPES variable ($p=.001$). Since these two "question mark" respondents did not describe themselves as mediums, and were not typical of other respondents in the "mediums" category, and on the other hand they had too much overt psychopathology to be reasonably considered "controls", neither approach seemed justified; yet neither did it seem appropriate to drop them from the study altogether.

To accommodate this diversity, a tripartite classification scheme was developed which grouped respondents into Mediums, Sensitives and Controls. Of the 43 respondents, 18 were classified as Mediums for this analysis. The 12 respondents who felt they had had contact with a spirit at least once, but did not describe themselves as mediums, were classed as Sensitives. This group also included those persons who described themselves as psychic readers (n=3), or who were unsure if they had mediumistic abilities (n=4, including the two "question mark" individuals described above). Eleven persons who did not perceive themselves as mediums and did not function publicly as psychics were classed as "Controls".

An important consideration in whether people were classified as Mediums or Sensitives was the degree to which they were professionals: whether they offered their services to the public, for how many years they had been doing this, and whether they accepted payment for their services (see Table 1). Three persons who classed themselves as mediums, but had never offered their services as such, were reclassified as Sensitives. Some in this group nonetheless believe that they sometimes communicate with spirits. Ultimately, the difference between Mediums and Sensitives in this classification scheme is that Sensitives believe they *can* communicate with spirits, or spirit guides, or angels, but rarely or seldom do so, and generally do not offer their services publicly for this purpose.

Data Analysis. Data are reported as mean $\pm$ standard deviation, and in the graphs as mean + standard error of the mean. Demographic and personality variables were analyzed in SPSS v. 11.5 (Chicago, IL). The MHI-17 mental health variables were scored and analyzed using SAS v. 8 (Cary, NC) following instructions in the online manual found at the Rand Corporation website (http://www.rand.org/publications/MR/MR162, last accessed 6/23/2003). Between-group differences in personality and mental health measures were evaluated using analysis of covariance (ANCOVA) with age as a covariate.[1] The assumption of homogeneity of variance was met for all variables except Age and SDQ-20, which were evaluated using corrected p values for unequal variances.

Hypotheses. This being only an exploratory study, hypotheses were kept simple. It was predicted that Mediums would score higher on temporal lobe signs (CPES scale) and Absorption than Controls. Additionally, it was predicted that Mediums would score higher on the two measures of dissociation, Depersonalization Severity Scale (DSS) and Somatoform Dissociation (SDQ-20). In accordance with mainstream thought in psychiatry, it was expected that Mediums would score lower than Controls on overall mental health (MHI-17 Total Score) and Psychological Well-being and higher on Psychological Distress. No hypotheses were formulated relating to the Sensitives group, since this was a post-hoc classification.

[1] Although the three groups did not differ in age according to a one way ANOVA ($F(2,37)=1.863$, NS), given the wide range in ages it seemed prudent to include age as a covariate in these analyses.

RESULTS

Respondents.
Forty-three people responded with completed surveys, which were received from across America and one from Canada. I estimate that about half had attended the ARPR conference; others apparently received the questionnaire from a friend who had been at the conference or through another contact. The sample included 19 people (44.2% of the total) who claimed to have seen a ghost and 33 people who felt they could communicate with spirits (76.7% of the total). The median age of the respondents was 60.5 years (range 25-90 years). The sample was predominantly female (29F, 11M, 3 unspecified), Caucasian, and well educated. All but three had at least some post-high school education. Eight (18.6%) were college graduates and another 18 (41.9%) had post-graduate degrees. Professional occupations included homemaker, cook, nurse's aide, massage therapist, occupational therapist, executive secretary, administrator, librarian, teacher, systems analyst, business man, attorney, college professor, psychologist, and clergy. Given the age of the sample, only 32.6% were working full time; 41.9% were retired.

Mediums (N=18: 17 F, 1 M). Of the 33 people who felt they could occasionally communicate with spirits, 18 were classified as Mediums based on their public activity. About half gave readings only in private, and half in both private and public settings. Three functioned only in a religious setting; 7 only in a secular setting; and 8 in both settings. 13 (72.2%) accepted payment or donations for their services. Practicing mediums ranged in age from 25 to 81 yrs (median 59 yrs). Nearly all these mediums were Caucasian and female; there was only one African-American respondent, who was the only male. All but one medium had at least some college, and 9 had postgraduate degrees. The group had been functioning as mediums for a median of 29 years, range 15 to 57 years. 17 of the 18 felt their abilities had improved over time.

Table 1. Characteristics of Respondents. For categorical variables, differences between groups are evaluated by chi-square with Cramer's V statistic for 3x2 tables or Fisher's exact p for 2x2 tables (where control subjects are omitted). * $p < .05$ ** $p < .01$

	Controls (N=11)	**Sensitives (N=14)**	**Mediums (N=18)**
Age (mean $\pm$ sd)	67.8 $\pm$ 15.0	55.0 $\pm$ 20.7	61.6 $\pm$ 11.7
Female (%)	63.6	57.1	94.4 *
College Graduates(%)	45.4	71.4	61.1
Retired (%)	54.5	42.9	38.9
Divorced, Separated, Or Widowed (%)	50.0	28.6	55.6
Left-handed or Ambidextrous (%)	18.2	14.3	11.1
Seen a Ghost (%)	0	42.9	72.2 **
Communicate with Spirits (%)	18.2	92.9	100 **
Classify Self as Medium (%)	0	21.4 [2]	100 **
Offered Services to Public (%)	0	7.1	100 **
Both Public & Private Setting (%)	0	0	44.4 **
Religious Setting Only (%)	0	0	16.7
Both Religious and Secular Setting (%)	0	7.1	44.4
Accept Payment (%)	0	14.3	72.2 **
Abilities Improve over Time (%)	0	28.6	94.4 **
Duration of Practice (years) (mean $\pm$ sd)	0	15.8 $\pm$ 16.1	28.4 $\pm$ 15.7

Sensitives (N=14: 8 F, 6 M). A number of respondents felt they had seen a ghost (n=6) or had contact with a spirit (n=13) at least once, but did not classify themselves as mediums. Others interacted with the public in a way they characterized as psychic readers or psychic counselors, not as mediums. This

[2] N=3: one wrote a note in the margin that she is a psychic, not a medium, and she saw an angel, not a ghost; one believes in "spiritual science" and "channels light and energy" ; one is working to develop as a medium "but working now as a reader, because others aren't coming through yet" .

group also provided a convenient classification for people who were unsure if they actually had mediumistic abilities (n=2), or who answered with a question mark (n=2). Two of these respondents (the ones answering with a question mark) were truly exceptional individuals. One admitted to carrying a diagnosis of multiple personality, and the other was a transsexual (female to male). These two individuals received the highest scores of the entire group on the SDQ-20 (85 and 49, respectively) as well as on the DSS (18 and 14, respectively) and Absorption scales (both scoring 34) and scored at the top end of the scale on CPES (both scoring 14). Neither of these latter two respondents were present at the conference, but were forwarded a questionnaire by someone else who had attended.

Controls (N=11: 7 F, 4 M). People who responded "No" to the question "Do you consider yourself a Medium" were classified as Controls. This group ranged in age from 41 to 90, median 68.5 yrs. All but one had at least some college, and three had postgraduate degrees. Because only eight "Control" subjects returned the questionnaire, 3 additional controls were recruited by the author to fit the demographics of the overall sample (2 F, ages 60, 90; 1 M, age 84). Two of these were individuals known to have skeptical attitudes about mediumship, the other was known to have a positive bias toward mediumship.

Results on the Personality Measures.

Figures 1-7 present the scores on the personality scales by group. For the results of the MHI-17, mean $\pm$ 1 s.d. is plotted for comparison for the age group 60-74 (chosen because the median age is 60 in this sample, and two of the three MHI scales increased with age).

Age. Two persons did not give their age. For the remaining 41, Pearson correlations (two-tailed) found significant correlations of age with all variables except the Well-being scale of the MHI-17. MHI total score and psychological distress increased with age, yielding the somewhat contradictory finding that overall mental health was higher in the older respondents, while at the same time psychological distress was also higher in the elderly. Depersonalization, somatoform dissociation, epileptic symptoms and absorption variables decreased with age (see Table 2) . Age did not differ between the three groups by oneway ANOVA ($F(2,37)=1.863$, NS). Nonetheless, in view of these significant correlations, and the extreme age range in this small sample, age was included as a covariate in analyses of the personality tests and mental health measures.

Table 2. Correlation of Age with Personality Measures & Mental Health (N=41). Values are Pearson correlations for the full sample, and their associated probability, two-tailed. (NS = not significant)

Age	Absorption	CPES	DSS	SDQ-20	MHI-17	Distress	Well-being
r	-0.565	-0.541	-0.573	-0.508	+0.388	+.377	-.030
p	.001	.001	.001	.001	.015	.018	NS

DSS (see Figure 1). The ANCOVA found a significant effect of age (F(1,34)=9.890, p=.003) and a marginal age x group interaction (F(2,34)=2.758, p=.078). The difference between groups approached significance (F(2,34)=3.023, p=.062). Both Mediums and Sensitives scored higher on this measure of depersonalization than Controls (p=.048 and p=.023, respectively).

SDQ20 (see Figure 2). The three groups were not significantly different by ANCOVA (F(2,34)=0.575, NS) after controlling for the significant main effect of age (F(1,34)=8.179, p=.007). A priori contrasts showed no differences between Controls and the other two groups, contrary to prediction.

CPES (see Figure 3). After controlling for the significant effect of age (F(1,34)=14.355, p=.001) the differences between 3 groups were only suggestive (F(2,34)=2.795, p=.075). The interaction of age by group was not significant. A priori contrasts showed Mediums had more complex partial epileptic symptoms than Controls (p=.024), as predicted, but Controls were not different from Sensitives (p=.147).

Absorption (see Figure 4). After controlling for age, the 3 groups were significantly different (Group: F(2,34)=5.963, p=.006). A significant Age x Group interaction remained (F(2,34)=4.466, p=.019). A priori contrasts showed that Controls had lower scores than Mediums (p=.002), as predicted, and also scored lower than Sensitives (p=.047).

Mental Health Indices (see Figures 5-7). The index of overall mental health was significantly affected by age (F (1,32)=4.73, p=.037). The age x group interaction was of borderline significance (F(2,32)=3.14, p=.057). Group differences also were suggestive but did not quite attain significance (F(2,32)=3.08, p=.059). There were no differences between Controls, Mediums or Sensitives. For the subscale of Well-being, there were no significant main effects or interactions. However, for the measure of Psychological Distress, there was a significant main effect of age (F(1,32)= 5.19, p=.030) indicating an increase in distress with increasing age. Contrary to expectation, there were no differences between groups for Well-being or Psychological Distress.

Correlations between Tests. Intercorrelations between the measures for each of the groups are presented in Table 3. The MHI-17 Total Score correlated so highly with Psychological Distress (r>.9 in all groups) that all correlations here are given only for Total Score. Well-being did not correlate with any other measure in any group, with the single exception of a positive correlation with DSS (r=.526, p=.025) in the Mediums.

A priori, low scores on dissociation would be expected to correlate with high scores on overall mental health, yielding a negative correlation. This relationship was indeed found in Sensitives. By contrast, the two dissociation scales were completely uncorrelated with mental health in Mediums. Upon visual inspection, this was not due to a U-shaped relationship, but to a true lack of correlation.

Table 3. Correlations between scales for Controls, Sensitives and Mediums (Pearson r, two-tailed).

	Controls (N=10)	**Sensitives (N=14)**	**Sensitives (N=12) (omit 2 '?')**	**Mediums (N=18)**
CPES with DSS	.603*	.698**	.624*	.608**
CPES with SDQ20	.415	.539*	.374	.235
CPES with MHI-17 Total Score	-.137	-.475	-.081	-.037
CPES with Absorption	.780**	.805***	.736**	.702***
DSS with SDQ20	.511	.862***	.602*	.372
DSS with MHI-17 Total Score	-.287	-.723**	.101	.010
DSS with Absorption	.568	.733**	.612*	.613**
SDQ20 with MHI-17 Total Score	-.289	-.863***	-.351	-.129
SDQ20 with Absorption	.527	.697**	.648*	.423
Absorption with MHI-17 Total Score	-.019	-.634*	-.513	.019

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

Recall the two extraordinary individuals classified as Sensitives (one dissociative identity disorder and one transsexual) These two subjects are in large part responsible for the elevated correlations in the Sensitives group. If these two individuals are eliminated from the analysis, as shown in Table 2 in the column labeled "Sensitives N=12 omit 2 '?' ", the correlation with MHI-17 total score drops to nonsignificant levels for DSS and SDQ-20. Intercorrelations between CPES and DSS and Absorption remain high and significant, but the correlation of CPES with SDQ20 and MHI-17 total score is reduced to a nonsignificant level. Both measures of dissociation remain highly correlated with each other and with Absorption.

DISCUSSION.

This initial attempt at exploring some of the mental health aspects of mediumship has yielded some interesting results. Of the first four hypotheses, three were supported: Mediums scored higher than Controls on Absorption, temporal lobe signs (CPES) and depersonalization, but not on somatoform dissociation. The three hypotheses relating to mental health were not confirmed: there was no difference between Mediums and Controls on the three scales of the MHI-17, which are mainly sensitive to symptoms of anxiety and depression. Thus, some indication of increased psychopathology was found among the Mediums, consisting mainly of higher scores on depersonalization and symptoms of complex partial epilepsy. It is not clear whether these symptoms are a cause or a result of long-duration mediumistic activity.

There are numerous limitations on any conclusions that can be drawn from this pilot survey. First, no attempt was made to verify or validate the respondents' claims of mediumship or of other paranormal experiences. This was considered a preliminary, exploratory study to see if these personality measures could distinguish between self-described mediums and others. -Second, the sample size is quite small, and participants were self-selected rather than randomly sampled. In a future study it would be interesting to conduct a larger survey using a random sample of spiritualist churches. Third, the respondents may not be representative of the larger population of mediums, channelers and psychics. Not only were these respondents self-selected, but they were attending a conference on Mediumship, indicating a higher than average interest in the subject. For the same reason, the Controls may well have had a more favorable attitude to the paranormal than would be found in a more random sample of the population. This group was also perhaps better educated than general population of sensitives and mediums. It should be noted that higher education is a requirement for membership in the ARPR, through which much of the sample was contacted. The questionnaire items were phrased in terms of mediumship rather than channeling. This is predominantly an East Coast U.S. sample, and the age and social milieu of the respondents lead me to believe that they are spiritualists rather than channelers. Finally, there are always questions about the accuracy of self-report in response to surveys and questionnaires. No explicit correction for social desirability or "lie scale" was employed, although the TPI measures of CPES and absorption attempt to address response bias by phrasing half the items in the negative and reversing them for scoring.

Age emerged as a strong predictor in almost all analyses. This is not surprising, given the extreme age range in this sample. The psychological scales employed often do not provide norms for elderly respondents. The MHI-17 is an exception, since it was explicitly developed to study mental health in the entire population. Norms are provided for each subscale. It is interesting that this sample scores more than one standard deviation below age-norms for overall mental health and more than 2 standard deviations below the mean for Psychological Well-being. This statement holds true whether the age norms used are for the 45-64 or 65-74 age group.

What about mental health compared between the three study groups? The MHI-17 found significant effects of age on Total Score, as might be expected given the preponderance of elderly individuals in this sample, but no specific differences between Mediums, Sensitives and Controls. However, it may be premature to draw the conclusion that there are no group differences in mental health, since the main effect of Group on the total mental health score was of borderline significance ($p<.06$). In fact, Mediums showed a trend towards higher total scores, indicative of somewhat better overall mental health. This finding conflicts with mainstream thought in psychiatry. There were no group differences on the subscales of Well-being or of Psychological Distress. However, no information was collected on actual mental or physical health problems or medication use.

The finding that Mediums but not Sensitives scored higher than Controls on temporal lobe signs lends support to Neppe's (1983) early work with six South African mediums and Persinger's questionnaire-based studies among university students, as well as with the group of 20 women undergoing psychic development training. The present findings corroborate Fenwick et al.'s (1985) results on temporal lobe dysfunction among mediums from London's College of Psychic Studies. The temporal lobe is thus further implicated in the production of experiences interpreted as paranormal, not only in university students, but in practicing mediums.

Dissociation has been frequently noted among mediums and psychics (Alvarado, 2002; Martinez-Taboas, 2001) but it is not generally appreciated that less severe forms of dissociation, including depersonalization, are found in the general population and may be more common in women (Putnam et al., 1996). Estimates range from 4% of normal adults (Putnam et al., 1996) to 15-25% of individuals randomly sampled from the general population (Ross & Joshi, 1992). Dissociation is not necessarily indicative of a psychopathology (Krippner, 1997). Indeed, among alternative healers (Heber, Fleisher, Ross, & Stanwick, 1989) it is a valued and even a sought after experience, which is felt to contribute to the success of their therapeutic work. While experiencing separation from the body is a defining characteristic of depersonalization and dissociative disorder, persons who have had an OBE (Alvarado, 1994) or a near death experience (Greyson, 2000) do not score higher on measures of psychopathology than the general population. Furthermore, Cardeña notes that all these symptoms can originate in neurological dysfunction of the temporal lobes (Cardena, 1997). Trance and possession trance are only defined as pathological to the extent that they result in significant personal distress, or impair social or occupational functioning within the experient's cultural milieu (Lewis-Fernandez, 1992).

The finding that Mediums scored significantly higher than Controls on one measure of dissociation (DSS) but not on another (SDQ-20) requires some reflection. Of course the SDQ-20 tabulates physical symptoms, many of which increase with age (e.g. stiffness, difficulty sleeping, difficulty urinating). In the original sample on which the SDQ-20 was developed ($N=100$, 50 patients, 50 controls, age range 16-79), scores were not correlated with age ($r=-.027$, NS). However in the present sample ($N=40$) a significant negative relationship was found with age, ($r=-.508$, $p=.001$). Differences between groups might thus have been obscured by the geriatric bias in this sample. Norms for different age groups are not available for this scale. The SDQ-20 has been shown to discriminate patients with clinically significant dissociative disorders, especially 'multiple personality', from those with less severe dissociation. High scores are characteristic of those who have suffered physical or sexual trauma during childhood (Nijenhuis, 2000). In this pilot survey, SDQ-20 did not discriminate between Mediums, Sensitives & Controls. The lack of such findings in this sample suggests that a) dissociation among mediums and sensitives is not clinically severe; and/or b) that the etiology is not related to childhood trauma.

A strong connection between dissociative identity disorder and childhood physical or sexual abuse has been repeatedly found (Ross et al., 1990). Furthermore, people with a childhood history of abuse report a higher incidence of paranormal experiences (Ross & Joshi, 1992) This unexpected association reveals a possible mediating variable (childhood trauma), which deserves further research. One intriguing finding is that somatoform dissociation correlates with severity of childhood physical trauma, whereas psychological dissociation is related to non-physical trauma (Waller et al., 2000). Irwin (1999) found that childhood trauma predicted pathological dissociation, but no relationship was found with psychological dissociation (absorption). On this basis one would predict that mediums and psychics would evidence psychological (non-pathological) dissociation and reveal histories of less severe trauma when compared to patients diagnosed with dissociative identity disorder (multiple personality). If the opportunity arises to conduct further research with a larger population of mediums and sensitives, this issue warrants further investigation. Future research should use a more general measure of dissociation in order to capture more information on this multi-faceted phenomenon.

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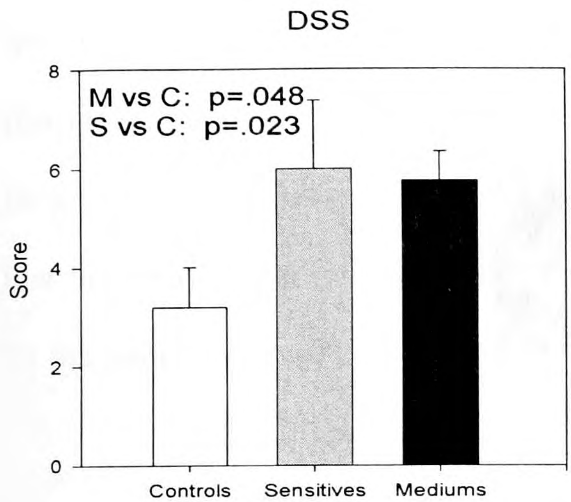

Figure 1. Depersonalization Severity Scale (DSS)

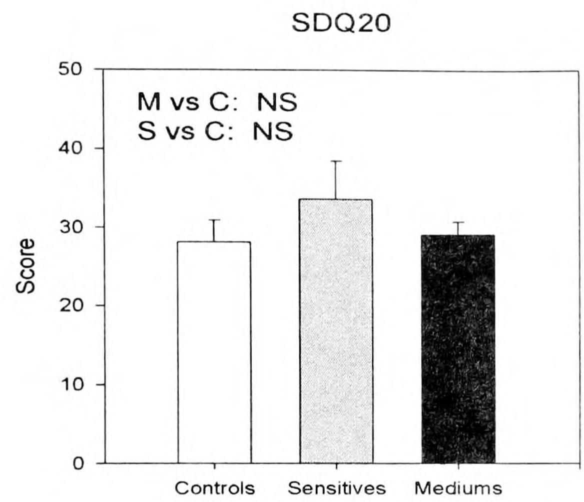

Figure 2. Somatoform Dissociation Questionnaire (SDQ-20)

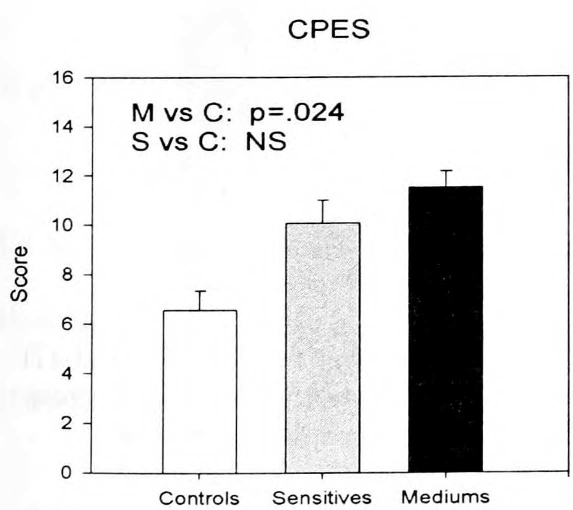

Figure 3. Complex Partial Epileptic Signs (CPES)

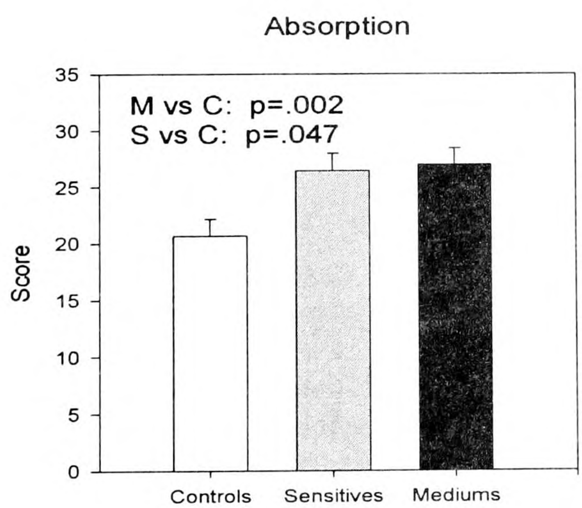

Figure 4. Absorption Scale

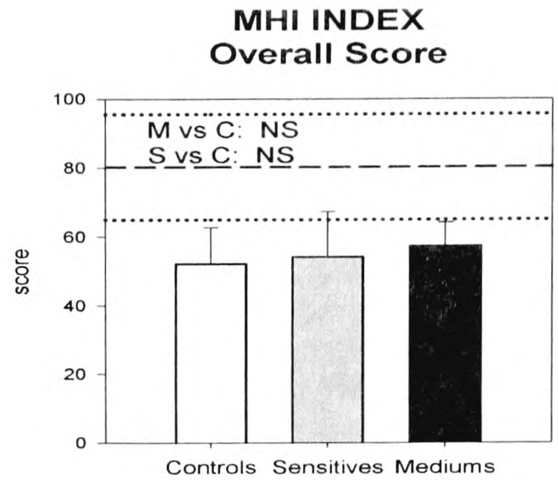

Figure 5. Overall Mental Health (MHI-17)
The mean value (± 1 sd) for the age group 65-74 is indicated by the dashed line. Dotted lines indicate ± 1 s.d.

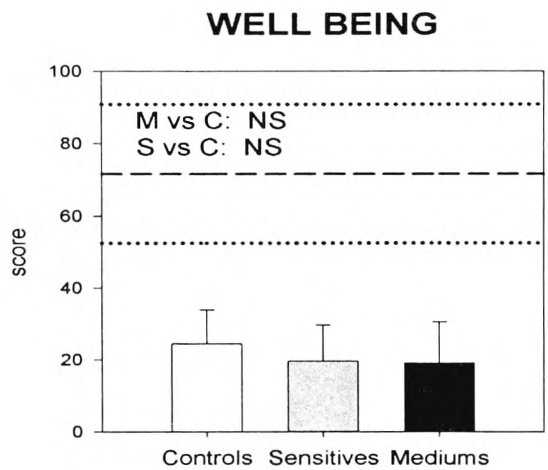

Figure 6. Well-being (MHI-17)
The mean value for the normative age group 65-74 is indicated by the dashed line. Dotted lines indicate ± 1 s.d.

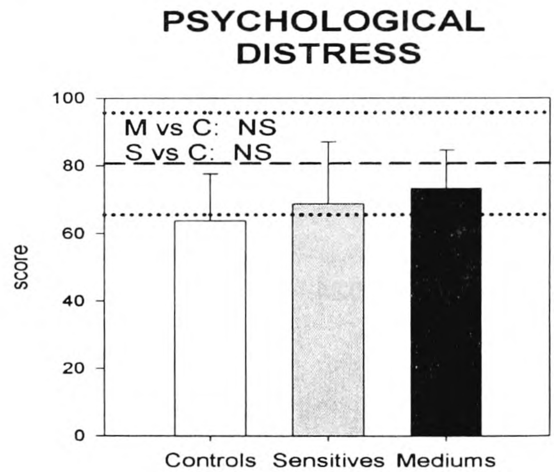

Figure 7. Psychological Distress (MHI-17)
The mean value for the normative age group 65-74 is indicated by the dashed line. Dotted lines indicate ± 1 s.d.

APPENDIX 1. MEDIUMSHIP SURVEY (partial extract)

Have you ever seen a ghost? (circle one) Yes No

How frequently do you see ghosts? (circle one) Never Seldom Sometimes Often Most of the Time

How old were you when you first saw a ghost? ________ years

Do you feel that you can communicate with spirits? Yes No

How frequently do you communicate with spirits? Never Seldom Sometimes Often Most of the Time

Do you consider yourself a medium? Yes No

If you answered "Yes" to the above question, please continue with the rest of the questions on this page and the following 2 pages, "Phenomena That Have Been Reported By Mediums".
If you answered "No" to the above question, please turn to the page marked "Triangle Personality Inventory".

Have you offered your services to others as a medium? Yes No

Do you work as a medium in private consultation or in public gatherings? (circle one)

Private Public Both

Is your work as a medium conducted in a religious setting or a secular setting? (circle one)

Religious Secular Both

Do you accept payment or cash donations for your services as a medium? Yes No

How old were you when you first developed your abilities as a medium? ________ years

Have your abilities as a medium remained constant, or changed over time? (circle one)

Remained constant Improved over time Declined over time First improved, then declined

Comments:

Are ESP and PK aspects of a unitary phenomenon? A further test of the relationship between ESP and PK[1]

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Abstract

This paper describes a second study designed to explore the relationship between ESP and PK performance by testing for both using a common protocol so as to control for expectancy effects and experimental artifacts. Following earlier work (Roe, Davey & Stevens, in press) we were particularly concerned to gauge the effect upon performance of the mild deception inherent in the study design. Forty participants completed a computer-based greyhound racing game. Races occurred in two blocks of 12. One block was presented as an ESP task and required participants to nominate which of the six greyhounds had won a race that the computer had already run silently. The program then replayed the race as feedback. The other block was presented as a PK task and required participants to 'will' a greyhound that was selected for them to run faster than its competitors. The greyhound's movements were determined in real time by an RNG. However, within each block half the races were in fact ESP trials and half PK trials, presented in random order. Participants were randomly allocated to one of two conditions; in the uninformed condition participants were not aware that some trials would be disguised in this way, but those in the informed condition were accurately briefed. Performance was non-significantly below chance for both ESP and PK trials, and for both true and disguised trials. There were no significant relationships between performance in the four conditions, although the effect sizes were of a similar magnitude and direction to those found previously. Participants who had been accurately briefed performed significantly worse than did those who were subject to mild deception (Z = -2.53, p = .01). Only one of the individual differences measures was able to significantly predict task performance, and this seems likely to have arisen as a result of multiple analyses. Reasons for participants' poor performance at the task are considered, some of which will be considered in future research.

[1] We would like to gratefully acknowledge the financial support of the Fundacao Bial (grant no. 58/00), which has enabled us to conduct this study.

Introduction

The use of the umbrella term 'psi' to encompass both ESP and PK phenomena implies that they share some common features and perhaps reflect a single underlying process (see, e.g., Thalbourne, in press). However, this assumption has only recently been subject to any kind of systematic test (Roe, Davey & Stevens, in press). Most empirical evidence that bears on the question of whether ESP and PK are simply expressions of a unitary phenomenon is at best circumstantial (e.g., Kelly & Kanthamani, 1972; Schmeidler, 1973). At worst it reflects a lack of interest in the literature in performance patterns for ESP and more strikingly for PK performance (cf. Irwin, 1985; Schmeidler, 1994). Where patterns have been identified for one domain they may not have been studied in the other domain so that comparisons are limited. Nevertheless there is some suggestion that similar personality types excel at both tasks (e.g., Schmidt & Schlitz, 1989) but that ideal circumstances may be polarised for certain variables (for example, participant arousal and environmental geomagnetic flux — see, e.g., Braud, 1981, 1985; Persinger, 1989). If replicated these patterns seem likely to tell us something meaningful about the nature(s) of these phenomena.

Comparisons between ESP and PK functioning are made more difficult, however, because the mode of testing for ESP is typically quite different from that for PK and apparent differences in the preferred conditions of the phenomena may be artifacts caused by situational factors (Schmeidler, 1988). In a recent paper (Roe, et al., in press) we described a new protocol using a computer game interface that did allow both phenomena to be tested for within exactly the same context. In the game, RNG and pseudorandom data are sampled to determine the movements of six greyhounds from the left to the right of the screen, simulating a race. The program monitors progress and notes the order in which the dogs cross the finishing line. In the ESP condition a race had been run 'silently' so that the outcome was 'known' to the computer. Participants were informed that their task was simply to select one dog from among the six that they felt had performed best on that trial. They then watched a replay of the race and the result was confirmed. In the PK condition the race would be run in real time with the movements of their pre-selected greyhound determined by a random number generator. Participants were informed that their task was to attempt to influence the RNG and thus enable their greyhound to succeed. The program consisted a block of 12 races that ostensibly were all testing for ESP and a further block of 12 testing for PK. However, half of the trials that appeared to be tests of ESP in fact were of PK and vice versa in order to differentiate between characteristics of the phenomenon and participants' expectancies concerning that phenomenon. Despite the apparent promise of utilising an engaging game format, overall performance was at chance levels for both ESP and PK trials, and for true and disguised trials. There were no significant relationships between participants' level of success in the four conditions. Although paranormal belief did not predict task success, some other individual differences measures, notably prior experience and state and trait anxiety, showed some promise that was consistent with previous findings (e.g., Gissurarson & Morris, 1991; Broughton & Perlstrom, 1986, 1992). We intended here to further evaluate the more promising predictors of forced choice ESP and PK performance that might bear on an assessment of the relationship between ESP and PK. As well as measures of belief and anxiety noted above, we intended to consider prior experience, geomagnetic flux and the Feeling-Perceiving dimensions of the MBTI (see Roe et al., in press, for a more detailed rationale for the inclusion of these particular measures).

One explanation for the lack of overall scoring in that study reflected a concern that participants may have been aware at some level of the mild deception that was involved in some conditions. Rather than leading to depressed scoring on only those conditions, this may have given rise to a general disenchantment effect. This was not reflected in participants' comments during debrief, but of course may not have been registered consciously. However, when Camstra (1973) similarly manipulated the briefing given to his participants, with some being accurately told that the task involved PK while others were falsely told that it was a telepathy task, he found that those who were misinformed actually performed better than those who were accurately briefed, which would argue against a disenchantment effect.

Nevertheless, it is an important consideration in parapsychological experiments as to whether one can actually misinform or only partially inform participants in an effort to guard against expectancy effects. It is conceivable that psi is sufficiently boundless to allow participants to be aware of the experimenter's intentions and to react to these rather than to what they have been told. The present study was intended to explore the possible adverse effects of mild deception by having some participants informed that trials would be mixed within each test block while others experience conditions similar to those pertaining previously.

Method

Design

This study incorporated a 2x2x2 mixed design looking at the effects of task type (ESP versus PK), briefing (informed that the task was ESP versus that it was PK), and deception (whether participants are told that they may be misinformed by the program) upon the finishing positions of selected computerised greyhounds in a game format. The first two of these IVs (i.e. task type and briefing) involved within-Ss comparisons, while the last (deception) involved between-Ss comparisons. The primary outcome measure was pre-specified to be the weighted sum of ranks of finishing positions. We also intended to conduct exploratory correlational analyses to determine whether task performance in the four conditions covaried systematically with personality and attitude variables. All analyses were planned to be nonparametric and two-tailed.

Materials and apparatus

A participant information form (PIF) was constructed which asked about basic biographical and contact details. Of particular interest here, the PIF incorporated a version of Thalbourne and Delin's (1993) Australian Sheep Goat Scale (ASGS, adapted after Roe, 1998); the Kiersey Temperament Sorter (Keirsey & Bates, 1978) — a variant of the Myers Briggs Type Indicator; and both forms of Spielberger's (1983) State-Trait anxiety inventory. The PIF is a generic form that also includes various other questions (e.g., about hypnagogic/hypnopompic experiences) that were not planned to be a focus of this study. Copies of the PIF are available on request from the first author.

A computer program was developed by PS that makes use of real-time true random versus pseudorandom data to move six greyhounds from the left to the right of the screen, simulating a race. The number of moves is determined by the output so that over successive iterations some greyhounds move closer to the finish than others. The program monitors progress and notes the order in which the dogs cross the finishing line. The program continues until all six dogs have completed the course. The participant's task is simply (in the ESP condition) to select a dog that they would like to own and that they thought had done well in the race, or (in the PK condition) to have their dog identified for them by the computer and for them to 'will' it to succeed. In either case, the participant 'wins' any prize-money awarded based on the dog's finishing position. Prize money is used as a simple weighted score based on finishing position (100 virtual pounds for first, £50 for second, £25 for third, no prize money for the other placings). After a series of races the participant amasses an amount of overall prize-money. The program consists of 24 races, taking approximately 12 minutes to complete. Races are run in two blocks of 12 races that ostensibly are either tests of ESP or PK. In fact within each block half the trials are of ESP and half of PK, presented in random order. Practically, the four conditions are distinguishable as follows:

True ESP trials: The greyhound race was run silently before the trial using pseudorandom data. The outcome was 'known' to the program before participants freely selected their greyhound, after which the race was 'replayed' on screen

True PK trials: The race was run in real time using RNG data. Participants were allocated one of the 6 dogs using a pseudorandom data file

Pseudo ESP trials: Participants apparently 'select' one of the 6 dogs as for the true ESP condition. But in fact the program switches the data so that whichever they select is exchanged for the one already chosen for them. The trial continues as for the true PK condition

Pseudo PK trials: Again the trial is actually pre-run and outcome 'known' to the PC. Participants 'select' their dog by the timing of their space bar keypress, allowing for a DAT interpretation. Although participants believe they are watching the race in real time it is in fact a replay.

Participants

Forty people participated in this study, of whom 14 were males and 26 females, with a mean age of 22.9 years (std dev = 5.2, median = 21). Participants were drawn from an opportunity sample and so consisted mainly of friends and colleagues and undergraduate students at UCN.

Procedure

Prior to the session participants were given the PIF to take away and complete. They were greeted by the second author (RD) who acted as experimenter. In some cases, participants had not completed the measure (e.g., if they had questions about certain items) in which case they were given time prior to their trial to complete the form. Participants next completed the state form of Spielberger's (1983) State-Trait anxiety inventory.

They were then escorted by RD into a research cubicle containing a PC with the program ready to begin and the nature of the task was explained to them as follows; "You will watch 24 races in which six greyhounds race across the screen from left to right. On some trials the computer will choose a dog for you and labels it on-screen as 'you'; your task will be to 'will on' that dog to win the race. On other trials you are free to choose a dog by simply picking a number from 1 to 6; for these trials, the race will already have been run so your task will be to guess which dog has won. Instructions are given to you on screen as you run through the program." Participants in the informed condition were further told: "Be aware, however, that while the program appears to give you two distinct blocks of ESP and PK trials, these are in fact a little more mixed up so we can see if differences in performance are due to the task or due to expectancies about the task. Hence, while you are choosing numbers for the 'ESP block' where the races are said to have already been run, in fact half of the races will not have been run but instead will be shown in real time so that you could affect the outcome much as you can in the PK or 'owner races'. Likewise, in the 'PK block', in fact only half of the trials are being run in real time as the program suggests; the others will have been pre-run and you will have the opportunity to use ESP to select the winning dog according to the timing of your spacebar keypress." RD spent time with participants to ensure they understood the instructions and to answer any questions they might have.

The program autoran and presented participants with a series of 24 races in two blocks of 12. One block was labelled as 'gambler' races and were ostensibly ESP trials. Here participants saw the onscreen briefing: "For the next 12 trials we'd like you to play the role of a gambler who has a free hand to choose which dog to select. In this session the races will already have been run by the computer but not yet have been played out. Your task is to use ESP to identify which of the 6 dogs won the race. Once you've made your choice you'll see a replay of the race on screen". Prior to each gambler race, participants were prompted to enter a number from 1 to 6 corresponding to their choice of dog for the forthcoming 'replay'. A second block was labelled as 'owner' races and consisted of ostensible PK trials. Here the onscreen briefing was: "For the next trials you will play the role of an owner whose greyhounds are entered in a series of races. Your dog will be pointed out at the beginning of each race, and its speed will be determined by a random number generator in the computer. Your task is to try to use PK to influence the RNG so that your preselected dog wins the race. You'll see the race in real time so you get feedback on how well you're doing". Prior to each owner race, participants were asked to press the space bar to start the race. All participants completed both blocks with the order of completion counterbalanced across participants. Within each block, half the trials were as given in the briefing (e.g., tested for ESP in the gambler block), but half were not (e.g., tested for PK in the gambler block) to gauge the effect of expectation on performance. The experimenter (RD) remained outside the research cubicle during trials but was available should assistance be required. After the program had finished RD debriefed participants, describing the nature of the four conditions within the task and explaining the need to disguise certain aspects of it. Given the mild deception involved, great pains were taken to ensure that participants were satisfied of the need for the study to be designed as it was and to be sure that they were happy for their data to be included in analysis. No participants asked to withdraw.

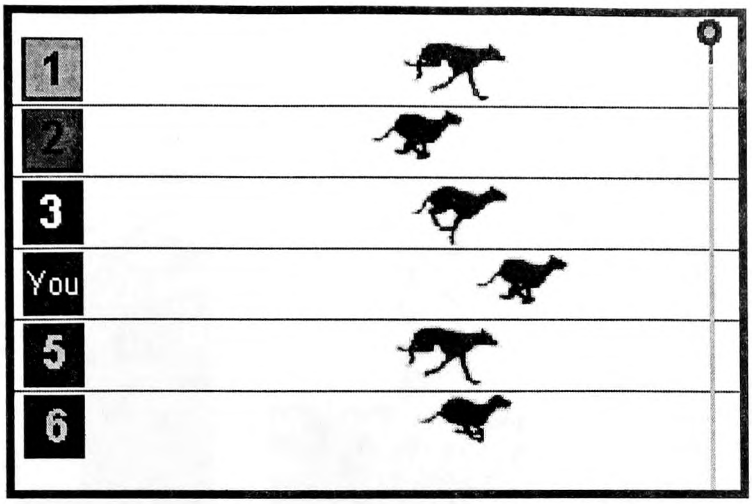

Figure 1: Screenshot of greyhound race

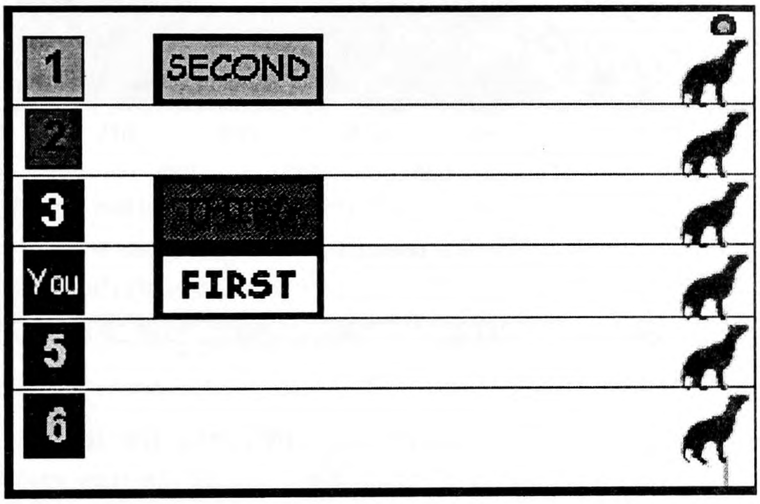

Figure 2: Screenshot of race finish

Results and discussion

The planned outcome measure here is the finishing position of participants' greyhounds in computer races, but to get a sense of whether overall performance was above MCE we shall firstly consider the overall amount won by each participant. The greater the success at the task the greater the amount of prize money that will have been won. If chance alone is operating then a participant will typically have won four times in the 24 trials (1/6 likelihood), and have been second and third four times respectively. This would give total prize money of £700. We can see from Figure 1 that in fact in this study the average prize money is nonsignificantly below this (mean = £660.6, SD = £174.4; Wilcoxon Z = -1.28, p = .201, 2-tailed).

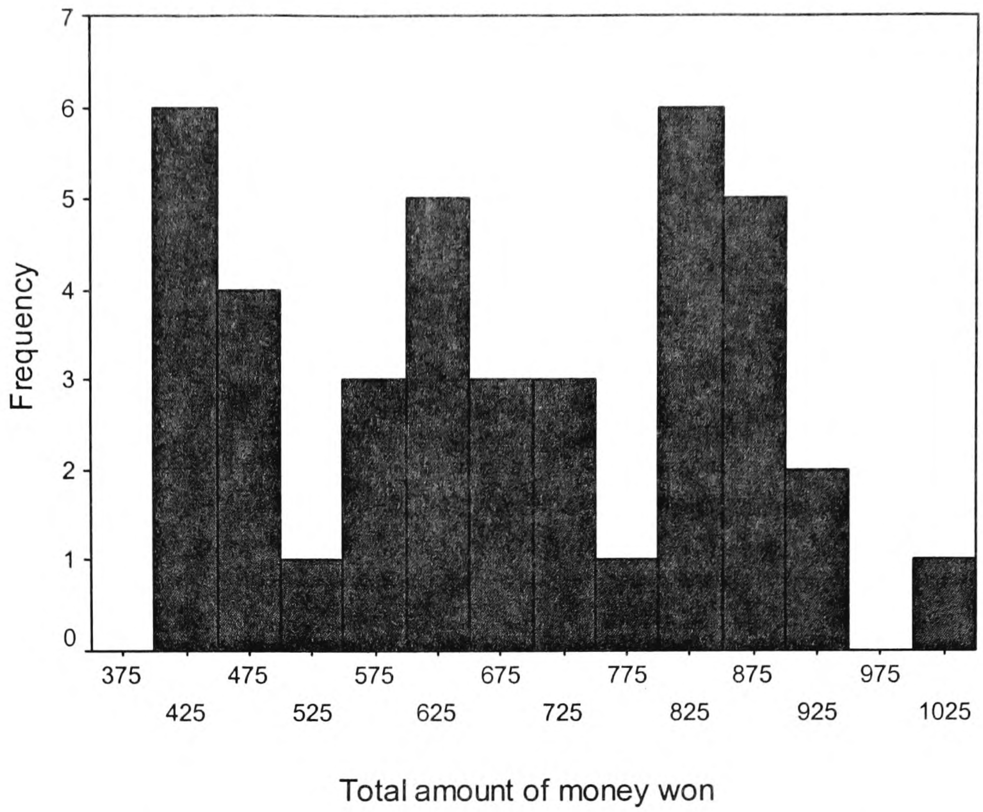

Figure 1: Frequency histogram of prize money 'won' by participants

As previously, it was planned in advance to use sum of ranks for final finishing position as the principal outcome measure. The distribution of ranks for each of the four conditions is given in Table 1. We can see that in terms of overall scoring, results in this study are again disappointing. The overall sum of ranks for target dogs is above the MCE of 840 in all four conditions, suggesting that participants are faring somewhat worse than chance expectation. None of these deviations is significant, and the effect sizes are small (all Cohen's (1988) rs are less than 0.01). There is no difference in performance across the conditions (Friedman's □^{2} = 4.029, p=.258). Although participants fared slightly better in the true ESP condition compared with the true PK condition, the worst performance is with a PK condition disguised as ESP, which does not support the notion of a 'scepticism factor' in relation to PK tasks. We have therefore not been able to replicate Camstra's (1973) finding that participants in a PK study who are falsely told that they were completing an ESP task fared better than those who were accurately briefed. As in our previous study there is a tendency for frequencies to increase as we move from first place through to sixth. Correlating frequency against finishing position gives a significant Spearman's correlation (rho = .928, p = .008), suggesting a general shift towards lower ranks. It is not clear how this should be interpreted.

Condition	Finishing position						SOR	Z score	Effect size (r)
	1	*2*	*3*	*4*	*5*	*6*			
MCE	40	40	40	40	40	40	840		
True PK	39	37	40	35	43	46	864	0.888	.0037
Disguised PK	40	28	39	39	44	50	889	1.833	.0076
True ESP	39	40	36	42	42	41	851	0.397	.0016
Disguised ESP	29	42	49	39	41	40	861	0.775	.0032
Total	147	147	164	155	170	177	3465		

Table 1: Sum of ranks for greyhound finishing position

To consider whether similar patterns of performance across individuals are evident for ESP and PK conditions (either informed or disguised), we considered covariation of performance across the four conditions. Correlations of individual sum of ranks scores are given in Table 2.

	true ESP trials	Disguised ESP trials	true PK trials
disguised PK trials	.162 (.317)	.037 (.822)	-.158 (.330)
true ESP trials		.148 (.361)	.175 (.280)
disguised ESP trials			-.224 (.165)

Table 2: Spearman rho correlation coefficients (with p values in parentheses) for comparisons of individual performances in the four conditions

We can see from this that none of the correlations comes close to statistical significance, indicating that performance in one condition cannot be predicted on the basis of performance in any of the other conditions. Given the relatively low power of this study we may want to consider the effect sizes themselves, and note points of similarity with study 1 in this series. As previously, positive correlations are apparent between disguised PK and true ESP, disguised ESP and true ESP, and true PK and true ESP pairs. There is again a negative correlation between performance at disguised PK and true PK. It is difficult to know what, if anything, to make of these, since they neither suggest a common outcome with task-type nor with perception of the task. Indeed, the strongest positive correlation as in the previous study is between the most disparate conditions of true ESP and true PK! This may be taken as favouring the suggestion that ESP and PK are isomorphic, but the correlation is nonsignificant and amounts to only 3% of shared variance.

Covariation of performance with condition and participant briefing

Previously we speculated that participants may have reacted adversely to the modest deception inherent in the design of the study, such that they were at some level aware of being deceived and this led to below chance scoring. We directly addressed this here by having half our participants complete the study as previously, whereas half were accurately informed that in fact some of the apparent PK trials would be ESP and vice versa. The mean sum of ranks for finishing positions for each condition is given for informed and uninformed participants in table 3.

	True ESP	Disguised ESP	True PK	Disguised PK	Overall
Informed	22.45 (2.63)	22.10 (3.60)	21.75 (5.05)	25.05 (9.27)	91.35 (9.02)
uninformed	20.10 (4.32)	20.95 (2.70)	21.45 (3.91)	21.35 (3.91)	83.85 (8.94)
Wilcoxon Z	-2.747	-1.049	-.041	-1.641	-2.533
p (2-tail)	.006	.301	.968	.102	.010

Table 3: Mean sums of ranks (and standard deviations) for informed and uninformed participants for the four conditions

Perhaps surprisingly, we find that overall performance of accurately briefed participants is significantly worse than that for participants who were not informed of the mild deception involved in the program. This difference is most marked for the True ESP condition, but is in the same direction for all four conditions[2]. This clearly suggests that whatever the reason for our failure to secure above-chance scoring, it is not a function of disenchantment on the part of participants who have experienced mild deception. Alternatively, Storm and Thalbourne (2000) have speculated that tasks that appear to participants to be 'difficult and complex' are likely to be inhibiting. It is possible that our accurate briefing just gives participants one extra thing to have to think about and presents the task as more complex than it appears to uninformed participants.

Table 4 gives the correlation coefficients for the relationship between individual differences measures and performance in the four conditions. It is important to note that the outcome measure here is sum of ranks so that greater scores indicate 'worse' performance at the task. Thus positive

[2] Participants allocated to the informed and uninformed conditions did not differ significantly in terms of belief, prior experience, state or trait anxiety ($p > .15$ in all cases).

correlations with belief indicate that higher scores on the belief and attitude measures are associated with worse performance at the task whereas negative correlations indicate better performance at the task as belief scores increase. As with the associations we have reported previously, these correlations are modest and typically do not come close to statistical significance, so we must be wary of over-interpreting them here. However, our PK 'PK criterion 1' variable ("I will be able to demonstrate any PK ability that I have in a controlled laboratory experiment") does significantly predict Disguised PK performance and correlates positively with True PK (and also True ESP). We should note these associations are in the 'wrong' direction, with greater confidence predicting worse performance. This is in contrast to von Lucadou's (1987) reported positive correlation, but confirms the pattern that we have reported previously (Roe et al., in press). A similar relationship is evident for our 'ESP criterion 1' and for overall sheep-goat scores. Considering the subscales of the ASGS, there is no clear pattern that gives confidence either for or against a view of ESP and PK as aspects of a unitary phenomenon. Clearly, in this study prior belief is not significantly related to performance in any of the psi conditions. This is in contrast to the small but relatively consistent positive correlation between belief and ESP performance described by Lawrence (1993) (mean $r = .029$). For PK it adds to the rather murky picture, as some authors have previously found a sheep-goat effect (e.g., Morris, Dumughn, Gentles & Grice, 1993) while others have not (see Gissurarson, 1990/1).

The strongest negative relationship in Table 4 is with prior experience, which is non-significantly associated with better performance here, but only for the true ESP task — indeed there is a suggestive trend in the opposite direction where the ESP task is hidden. This suggestion of a rather weak and variable effect is reminiscent of Palmer's (1978) review of forced choice ESP studies, in which only 2 of 15 experiments that had considered prior experience had reported a significant relationship. Previously we found that prior experience showed a significant negative association with true PK performance, but no such pattern is evident here, thus failing to confirm Gissurarson and Morris's (1991) most consistent PK predictor.

We should also note an interesting differentiation in the pattern of relationship between anxiety and ESP and PK performance. For ESP we see small positive correlations with state and trait anxiety suggesting a weak tendency for those who are more anxious to go on to perform worse at the task. For PK the pattern is reversed, albeit weakly, with better performance with higher anxiety levels. This latter relationship is in contrast to our earlier finding of positive correlations between anxiety and PK performance, and also with the effects reported by Broughton & Perlstrom (1986, 1992).

Previously we reported a suggestive tendency for performance at the True ESP task to be better when activity is low, which was consistent with Persinger's (1989) review. For PK performance we had found that the strongest effect was with Disguised PK trials and suggested that high activity gave rise to better scoring (consistent with Nelson & Dunne, 1986) However, we were unable to replicate those patterns here. All correlations are close to zero here and none approaches significance.

	True ESP	Disguised ESP	True PK	Disguised PK
PK 'criterion 1'	.223 (.166)	.066 (.687)	.105 (.517)	.368 (.019)
ESP 'criterion 1'	.184 (.254)	.173 (.285)	.075 (.648)	.209 (.196)
Overall ASGS score	.125 (.442)	-.052 (.751)	.056 (.730)	.136 (.403)
ESP factor	.184 (.254)	-.141 (.285)	.094 (.564)	.089 (.586)
PK factor	-.048 (.767)	-.048 (.770)	.076 (.643)	.173 (.285)
Survival factor	-.089 (.586)	.077 (.638)	-.124 (.447)	.025 (.881)
Prior experience	-.216 (.180)	.143 (.379)	-.076 (.641)	.073 (.652)
State anxiety on STAIC	.161 (.321)	.038 (.816)	-.128 (.430)	-.027 (.868)
Trait anxiety on STAIC	.262 (.102)	.033 .839)	-.081 (.619)	-.111 (.495)
3-hour K index value	.004 (.979)	-.024 (.882)	.114 (.428)	-.025 (.879)

Table 4: Spearman correlations between task performance and belief and personality variables (probabilities in parentheses are two-tailed)

Finally we attempted to replicate the claimed tendency for those who present as Feeling / Perceiving on MBTI measures to outperform those who present as Thinking or Judging types on GESP tasks. The mean sums of ranks for Feeling-Perceiving and non-FP types are given in Table 5. Again, note that higher sums of ranks indicate worse performance at the task. We can see that the findings from the two ESP conditions fail to confirm previous suggestions of superior performance for FP types in ESP tasks (e.g., Honorton et al., 1990). Somewhat surprisingly, larger effects are associated with the conditions presented as PK tasks (True PK and Disguised ESP). Although none of these approaches significance, the difference between FPs and non-FPs in the True PK condition is suggestive and conforms to the pattern identified by Schmidt and Schlitz (1989). It will be interesting to see if these are confirmed in two further planned replications.

	True ESP	Disguised ESP	True PK	Disguised PK	Overall
Feeling-Perceiving	21.77 (3.39)	22.62 (3.31)	19.92 (3.30)	22.62 (3.18)	86.92 (5.66)
Other	21.04 (3.91)	21.00 (3.06)	22.41 (4.77)	23.48 (8.62)	87.93 (11.15)
Wilcoxon Z	-.624	-1.324	-1.714	-.058	-.072
p (2-tail)	.549	.197	.089	.955	.955

Table 5: Mean sums of ranks (and standard deviations) for FP and non-FP types for the four conditions

General discussion and conclusion

Participants were not able in this study to score at better than chance levels. In terms of overall prize money won, participants averaged only £660 where we would expect £700 by chance alone. In terms of the sums of ranks analyses, there is no distinction between the four conditions, with overall performance being slightly below chance in all cases. This clearly can be interpreted as suggesting that there is no psi in this study. If we assume that at least under some circumstance participants are able to perform better than chance (as suggested in reviews by, e.g., Palmer, 1978, for ESP and Steinkamp, Boller & Bösch, 2002, for PK) then this begs the question as to how conditions may not have been psi conducive here. One suggestion raised previously is that participants are sensitive to the deceptive element of the study design that was intended to differentiate between actual ESP-PK differences and differences due to participants' perceptions or scepticism concerning the task. But here we found that participants who were accurately briefed fared significantly worse overall, which offers a strong argument against this explanation. It could be suggested that our preference for recruiting from among friends and acquaintances (though relatively few in this study are undergraduate students), so that the sample claims no history of psychic experiences and are not especially strong believers, may not be particularly conducive to success (see, e.g. Parker, 2000). However, those variables that might have been used to screen participants *a priori*, such as belief and experience, again have not proven to be strong or reliable predictors of who is likely to be successful and who not, so that their use as screening aids would in this case have been ineffective and wasteful.

Given the lack of overall success, it may not be surprising to find that there is little evidence to suggest that ESP and PK performance are related to one another; but then neither were true ESP and disguised ESP nor true and disguised PK very highly correlated. Ironically, this evidence of only limited consistency in performance across conditions is one of the clearest replications of our initial study's findings. The lack of practically useful levels of reliability in psi performance continues to be a concern.

One area of possible improvement that might improve performance concerns the mechanism by which decoy greyhounds are controlled in PK trials. In this study — as previously — the target greyhound's movements were determined by the RNG, but the movements of the control greyhounds were determined using pseudorandom data already saved as data files. This raises some concerns over comparability, since it may be possible for the RNG to be influenced in the intended direction, but for this not to be translated into superior performance if the control dogs happen to 'run quickly' on that trial. The correlation between participants' sums of ranks and overall sampled REG output is -.624, which is significant ($p<.001$) but does mean that REG output accounts for only 38.9% of the variance in combined sum of ranks scores for Disguised and True PK trials.

An alternative method that avoids such comparability problems entails having the movements of both target and control animals determined by the same RNG in real time. Although this seems to require a PK effect of exquisite precision, there is a precedent for such a protocol (Hansen, 1990) and this will be incorporated in future replications. One dimension that merits consideration in such a replication is participant arousal level, which is only directly measured here through scores of state-trait anxiety indices. It is generally believed that relatively low levels of autonomic arousal are ESP conducive (cf. Honorton, 1977). When Braud (1981, 1985) looked at reports of gifted PK subjects, however, many described high autonomic arousal when successful. Although not always a reliable indicator of underlying physiological activity, states of suggested muscle tension seem to give rise to superior PK performance when compared with relaxation (Honorton & Barksdale, 1972). This may indicate a point of difference in processing between ESP and PK and will be a focus of future work.

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Interpersonal psi: Exploring the role of the sender in Ganzfeld GESP tasks[1]

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Abstract

The aim of this study was to explore the role of the sender in a ganzfeld ESP task; more specifically it was a conceptual replication of an experiment by Raburn and Manning (1977) that manipulated both the presence of a sender (sender, no sender) and the receiver's expectation concerning sender's presence. There were 40 trials overall involving three experimenters and an opportunity sample of 40 pairs of participants consisting mainly of friends, acquaintances and staff and students at UCN. The ganzfeld sessions were run by an automated free-response testing system that selected one of the four possible conditions at random. Both the experimenter and the receiver were blind to the true nature of the condition. During true no sender trials the designated sender was engaged in an alternative psi task including the use of a computerised PK greyhound task. Overall the mean z score based upon ratings of the target relative to the dummy video-clips was below chance expectations (- 0.10, r = - 0.10). There were no significant main effects of either sender role (p = .676) or receiver expectancy (p = .734) and no significant interaction effects (p = .978) and the associated effect sizes for these were small. Contrary to Raburn and Manning (1977), performance was not significantly better in the sender than the no sender conditions, although did give a trend in support of their finding that conditions in which the receiver expected a sender resulted in better performance than when the receiver did not. Post hoc analysis of absolute z score for ratings suggested that the difference between the expectancy conditions was approaching significance (p = .057) with a medium effect size. These findings are discussed in relation to Palmer's (unpub.) interaction model, which suggests that some variables might influence the direction of psi effects and some might influence the magnitude. An investigation of sender and receiver covariates of performance suggested moderate positive correlations between both senders' (r = .229) and receivers' (r = .242) expectations of being able to demonstrate psi in the experiment and task performance. There was also a modest positive correlation (r = .236) between receiver's having practised a mental discipline and performance, which was not found for senders. Overall, the results

[1] We would like to thank the Perrott-Warrick Fund for their kind support of this project.

suggest that, at least in the ganzfeld context, receiver expectancy might be more important than whether or not there is a sender actually present, although the relatively small effect sizes, the lack of apparent psi effects in the study and the low statistical power mean that this remains uncertain.

Introduction

According to Morris, Dalton, Delanoy, and Watt (1995) "One of the most important theoretical issues in parapsychology concerns the role of the sender in GESP procedures" (p. 246). Indeed, many of the most impressive spontaneous cases do seem to involve an active 'agent' (cf. Beloff, 1993), whereas in the laboratory Palmer (1978, p. 97) notes that "whatever the status of 'pure telepathy', the widespread use of GESP procedures in psi experiments is ample evidence that many experimenters believe the presence of an agent may improve the chances of a successful outcome". One means of assessing this possibility is to compare participants' performance under GESP conditions (where there is a sender) with that under clairvoyance conditions (where there is not). Unfortunately the interpretation of the outcomes of some of these studies is confounded by the fact that participants were aware that there would be no sender for some trials and this may clearly affect their expectancy or motivation — or even the perceived credibility of the phenomenon under investigation — in ways that could lead to what we term a psychological sender effect (cf. Irwin, 1999). Palmer (1978) has similarly noted that "the percipient might be more relaxed, more confident, or more highly motivated if he thinks someone is sending to him, even if no agent actually exists" (p. 97). Among the interpretations of the putative sender/no sender difference offered by Morris et al. (1995) is one that argues that, to many participants, it seems somehow more plausible that someone must first observe the target and send them a signal before they can gain any information about the target, and that having a sender may simply increase the feeling of teamwork or diffuse responsibility for failures (or perhaps more tellingly for successes, reminiscent of the work of Batcheldor, 1966). This is perhaps illustrated *in extremis* by Langdon-Davis (1956), who described a basic clairvoyance study in which he was scoring at chance until he set up an imaginary agent (in fact it was the well-known medium Eileen Garrett, whom he had never actually met) so that he had someone to share success or failure with. His next series of 200 runs exhibited significant hitting.

A number of forced choice experiments have kept the participants blind to the fact that some trials were clairvoyant and others permitted GESP, and these constitute a better test of the influence of the sender. Palmer (1978) reviewed much of the early work of this type, and reports that researchers who tested gifted individuals did tend to find the predicted difference in favour of telepathy (e.g., Birge & Rhine, 1942) whereas those engaged in group testing did not (e.g., Beloff, 1969, West, 1950). This former finding has been replicated more recently; for example, the gifted participant Lalsingh Harribance was misinformed that all trials were GESP when in fact alternate trials were clairvoyant. He scored significantly above chance on the former task but close to chance on the latter (Klein, 1972). (It should be noted, however, that Harribance was able to score above chance on clairvoyance tasks at other times when accurately briefed.) Bender (1970) similarly reported an abrupt drop in performance following an unannounced switch from GESP to clairvoyance. Schmeidler (1961) found suggestive support for better performance on GESP trials compared with clairvoyance trials, and Kreitler and Kreitler (1972) found that percipients who had to identify letters that were projected subliminally tended to perform better on trials for which an agent was attempting to transmit the correct letter. However, Lantz, Luke and May (1994) described a nonganzfeld free-response ESP experiment with five "experienced receivers" (who had all produced significant effects in previous research) in which performance was better in the no sender condition than with an agent, although the difference was not significant.

Senders and the Ganzfeld

In terms of sender effects within the ganzfeld paradigm, it is worth noting Honorton's (1995) meta-analysis of differences in sender and no-sender conditions. This database consisted of 73 studies, of which 61 used a sender, giving a mean effect size [ES] of 0.17 (the probability of the deviation of the combined outcome of the studies from MCE was $6x10^{-9}$) and 12 studies that did not (mean ES = 0.10, p = .095). The difference between the two conditions was not significant (ES = .023, p =.137), but when the comparison was restricted to a subset of five investigators who contributed to both the sender and no sender conditions to allow a more direct comparison, Honorton found that sender studies were significantly superior to no-sender studies (ES = .083, p = .0007).

To our knowledge, seven Ganzfeld studies have directly compared sender and no sender conditions within the same study. In the first of these, Raburn and Manning (1977) manipulated both the actual presence of an agent and also the participant's information about the same, adopting a 2x2 design. Performance on trials when there was a sender was significantly superior to those trials where there was no sender, but also trials where participants *believed* there was a sender (whether or not a sender was in fact present) gave better scoring than when they believed the session to be a test of clairvoyance. This suggests that there may be evidence for an actual sender effect and also for a psychological experimenter effect. To our knowledge no attempt has been made to exactly replicate this interesting finding, which we feel merits further more detailed investigation.

Dunne, Warnock and Bisaha (1977) described a single participant study in which the ganzfeld stimulation period was divided into ten minutes during which the sender remained blind to the target and a further five minutes when they became aware of it. Mentations for the two periods were independently judged. Only six trials were completed, but gave rise to significant above-chance scoring for both periods. Performance improved non-significantly for the second (GESP) period when the sender was aware of the target, but this may have been a function of greater absorption into the ganzfeld state.

Milton (1988-9) briefly describes an unpublished ganzfeld study by Sargent, Milton, Payne and Bennet (1982) that found scoring without an agent to be close to chance and significantly less than scoring in a GESP condition. No further details are given and may be difficult to retrieve (Milton, personal communication, 2003). In Milton's (1988-9) own study scoring was higher with an agent than without, but the difference was not significant. The study was non-standard in that although two of the three conditions involved a sender, on no trials did they actually see the target, which was kept sealed in an envelope. Broughton, Kanthamani and Khilji (1989) briefly describe a ganzfeld study conducted by Kanthamani and Khilji that contrasted two clairvoyance conditions with two GESP conditions. We were unable to find a published report of this study, although Kanthamani and Palmer (1993) describe it in some detail. Kanthamani and Khilji tested 40 participants who were randomly assigned to one of four conditions; in the first of two GESP conditions the agent concentrated on the target for only a brief time at the beginning of the sending period before becoming absorbed in other activities, so that any ESP transmission might take place at an unconscious level; the second GESP condition was more like a typical ganzfeld session, as the sender attempted to actively send throughout the 30 minute sending period. In the two clairvoyance conditions the sealed target was either kept in the sender's room or was left untouched in a filing cabinet that held the target sets. Overall scoring was above mean chance expectation (30%) and was highest for the 'unconscious sending' condition, although none of the condition comparisons achieved significance.

Williams, Roe, Upchurch, and Lawrence (1994) compared three conditions in which there was alternatively no sender, one sender or two senders. Rather than manipulate expectancy by misinforming participants on some trials, Williams et al. attempted to separate out the psychological effects of knowing that there was a sender by keeping the receiver and experimenter blind to the condition, which was randomly determined by the computer during each trial. Unfortunately, the study resulted in overall psi missing so no firm conclusions could be drawn about differences between conditions. It should perhaps be noted, however, that no hits at all were registered in the 12 no sender trials, and a post hoc contrast analysis of the degree of superiority of the sender conditions over the no sender condition gave rise to a suggestive z score of 1.51. Morris et al. (1995) also considered three conditions, but here they consisted of a no sender condition with the receiver and experimenter blind, a sender condition with the receiver and experimenter blind, and a sender condition in which the receiver and experimenter were not blind. They achieved an overall hit rate of 33% giving rise to an effect size (Cohen's h) of 0.18. Morris et al. reported no significant differences between conditions, although it is interesting to note that the reported target ranks give rise to z scores of 1.028, .712 and .237 for the informed sender condition, uninformed sender condition and uninformed no sender conditions respectively, which is in the direction suggested by Raburn and Manning (1977). They also found post hoc evidence for an experimenter effect, with one researcher responsible for the overall above-chance scoring. Given that participants were allocated at random to conditions it is possible that this particularly conducive experimenter may have run more sessions in some conditions than others, which could serve to obscure any actual condition differences.

Sender variables as covariates of psi performance

The importance or otherwise of the sender could be further clarified if variables associated with them could be seen to covary with ESP success at a particular task. To date, research has concentrated on the level of acquaintance between agent and percipient (see Carpenter, 1977, for a review). Schmeidler (1961) reported some success in attempting to predict the performance of agent-percipient pairs on a GESP trial according to 'compatibility' estimates based on Rorschach responses. Honorton et al. (1990) noted an improvement in the hit rate of participants who brought in their own senders as opposed to those who had lab personnel assigned to be their sender, suggesting that the nature of the relationship may be an important factor. However, this was not replicated in later work (Bem & Honorton, 1994). Although these suggest that the agent-percipient relationship can act as a moderator variable for the generation of above-chance results, this again may simply be a psychological factor because the participant knew who would be acting as sender.

Few studies have considered the personality of the sender (cf. Roe, Ali & McKenzie, 2001). With regard to studies of creativity, for example, Dalton (1997) used pairs of creative participants and all parties completed all measures, but no analyses are reported for senders. Other studies concerned with creativity (e.g., Morris et al., 1995) did not take any measures of sender creativity despite their being drawn from creative populations. In one of two reported studies Morris, Cunningham, McAlpine and Taylor (1993) selected participants from among a creative population and did administer a self-devised measure that included items on creativity. However, analyses measuring any association between creativity scores and ganzfeld success are described ambiguously but presumably only refer to receiver creativity. This is disappointing given that there is some evidence to suggest that sender creativity may be influential. Geladie and Harvie (1975) tested 40 sender-receiver pairs. All receivers were artists but only 15 of the senders were. Overall performance was at chance, but artist-artist pair scores were non-significantly higher than the other group (in fact, when Palmer, 1978, reanalysed these data he found a significant difference in relative frequencies). Roe et al. (2001) administered verbal and figural forms of the Torrance Test of Creative Thinking (TTCT, Torrance, 1974) to 24 sender-receiver pairs. Overall performance was non-significantly below mean chance expectation. However, z-scores of receivers' correspondence ratings for targets were not only significantly correlated with receiver figural scores ($r=.374$, $p=.036$) but also with sender verbal scores ($r=.266$, $p=.040$) and also suggestively with sender figural scores ($r=.304$, $p=.074$). When considering subscale scores, Roe et al. report that performance was predicted by figural subscales for receivers but primarily by verbal subscales for senders, which they interpret as implying different roles for senders and receivers in the GESP dyad.

Given that the role of the sender in ganzfeld trials is thus far from clear, it would seem to be worthwhile to consider whether other personality dimensions associated with the sender have any impact upon success. In this study we also have an opportunity to attempt to replicate the most promising correlates of ganzfeld ESP performance, which according to Bem and Honorton (1994) include prior belief and, for novice (first time) participants, reported personal psi experiences, involvement with meditation or other mental disciplines, and extraversion. It will be interesting to see if any of these putative relationships also hold for senders in ganzfeld ESP studies. Bem and Honorton (1994) did report that high scorers on the Feeling and Perception dimensions of the Myers-Briggs Type Inventory may also perform better, but this claim has been queried (Milton & Wiseman, 1999) and we do not regard the MBTI as a reliable personality measure (see Roe, Davey & Stevens, 2002), so did not include it here.

Method

Design

This study adopted a 2x2 factorial experimental design in which the variables of sender status (sender present, sender absent) and receiver's knowledge of the sender status (given true information, given false information) were manipulated. The dependent variable was pre-specified as the z score of the target clip's similarity rating. A series of four pilot sessions and 40 trials were planned[2]. Because the experimenter for any particular trial had to remain blind to the experimental condition, this was randomly determined by the computer program so that it was not possible to ensure exactly equal numbers of trials in each or the four conditions.

Apparatus and Materials

This study used an automated ganzfeld computer system developed by Dr Paul Stevens and written in Microsoft Visual Basic v5 that presented video material via the API for Media Player v7. Video clips are stored digitally as MPEG files, labelled 1a, 1b, 1c etc. Three separate monitors for the experimenter, sender and receiver are controlled by the experimenter PC via separate video cards, which prevents video leakage. Security measures within the program lock the experimenter out of the system completely during a session so that it is not possible to switch to another application or access the computer except by aborting the session. Audio signals are split into left and right channels for sender and experimenter/receiver respectively so that it should not be possible for audio leakage to occur.

The target set consists of 116 minute-long digital video clips arranged in 29 sets of 4. These have mainly been produced at UCN, drawn from popular television programmes and commercial films, although some have been taken from the pool previously used at Edinburgh. Copies of the target pool are available on CD from the first author on request. Randomisation is achieved using the Visual Basic pseudo-random algorithm (rnd), having seeded it using the timer at the start of the program (RANDOMIZE TIMER). Once the "Start" button has been pressed, the computer first selects a target set, then selects one of the 4 clips within that set. The order of presentation of the four clips at judging is similarly randomised.

All trials were completed using specialist facilities in the Psychology Building at UCN. The receiver room is sound attenuated and is separated from a public corridor by two lockable doors. The sender's and receiver's rooms are separated by approximately 38m. The room layout is depicted in Figure 1. A security camera is located outside the sender's room so that any activity there can be monitored by the experimenter and automatically video recorded.

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[2] Previously we had stated that we planned to run 60 trials in this study (Roe & Sherwood, 2001). Because of time constraints, this was revised to 40 trials in the final planning stage, prior to conducting any pilot sessions.

The Participant Information Form (PIF) is a 55-item measure that was constructed for general use with parapsychological research at University College Northampton and includes questions concerning biographical and contact details (11-items); religious and parapsychological background (5 items); computer experience (2 items); practice of mental/physical disciplines (2 items); belief in luck (2 items); clumsiness and punctuality (2 items); competitiveness (1 item); absorption (2 items); sleep and dreams (4 items); imagination and fantasy-proneness (3 items); creativity (2 items); and physical and mental health (1 item). The remaining items relate specifically to knowledge, belief and experience of anomalous phenomena including telepathy, clairvoyance, precognition, psychokinesis, 'communication with the dead' and out of body experiences (18 items); and hypnagogic/hypnopompic experience in a range of modalities (10 items). The form concludes with an open question inviting descriptions of personal anomalous sleep-related experiences. Copies of all in-house measures are available from the first author on request.

Participants also completed the short extraversion and neuroticism subscales of the EPQ-R (Eysenck, Eysenck, & Barrett, 1985). Each subscale has 24 items with a dichotomous yes/no response format. The 18-item Australian Sheep-Goat Scale (ASGS, Thalbourne & Delin, 1993), with a 5-point Likert scale ranging from strongly agree to strongly disagree, was also completed.

Post-ganzfeld measures included a Sender Strategy Questionnaire that asked about the type of sending strategies used, whether this was active or passive, holistic or atomistic, focused on target clip or on the receiver, realistic or associative, and continuous or episodic. A Receiver Questionnaire asked about the receiver's experience.

Participants

An opportunity sampling method was used to draw 40 pairs of participants (mean age of senders = 29.7 [range = 18 – 60], 14 males and 26 females; mean age of receivers = 28.0 [range = 18 – 60], 15 males and 25 females). These mainly consisted of friends and acquaintances of the experimenters, and staff and students at UCN, although attempts were made to recruit participants from the wider community using posters and media appeals. Participants were not selected on the basis of prior belief or experiences, or personality and attitudinal dimensions that may predict psi performance (although such variables were measured). Each participant provided his or her own sender. Lab personnel did not serve as participants. The mean ASGS belief score for receivers in this sample was 44.5 (std dev = 10.4) and for senders was 46.6 (11.27). These figures are somewhat below the theoretical mean for the scale (mean = 54), suggesting that the sample are moderately sceptical. Among this sample, five senders and five receivers had previously participated in formal parapsychological studies, but all were ganzfeld novices; 17 senders and 12 receivers had previously participated in casual testing; 17 senders and 19 receivers had practised a mental discipline such as meditation; and 12 senders and 15 receivers had practised a physical or spiritual regimen such as yoga or tai chi. All three authors acted as experimenters in the running of trials, with NH conducting 17 trials, CR 13 trials and SS 10 trials.

Procedure

Potential participants were sent an information sheet illustrated with photographs that described the nature of the study. This provided a rationale for the ganzfeld paradigm, outlined the stages of the experimental procedure, focusing on the roles of the experimenter, sender and receiver. Thus participants were made fully aware of all aspects of the experiment (except for the necessary deception) so that those who were not comfortable with the procedure had the opportunity to withdraw from the study. Prior to the trial, participants (senders and receivers) completed a battery of measures. A video player was set to record the input from the security video camera as the experimenter prepared for the session and continued recording until after the session was over. Participants were greeted on arrival and escorted to a reception room that had been specially prepared with comfortable chairs, a coffee table, rugs and curtains so as to make participants feel as comfortable and relaxed as possible prior to the trial. Experimenters encouraged an informal and positive atmosphere, discussing the procedure and answering any questions arising while sharing refreshments. Briefing included a description of the sender and no sender conditions, so that participants were aware that there might not be a sender on their particular trial, in which case the nominal sender would complete an alternative task[3]. Participants were then given a guided tour of the facility as the roles of sender and receiver were again explained.

With the assistance of the sender, the experimenter prepared the receiver for the ganzfeld and wished them success. The receiver was seated in a reclining chair and encouraged to relax. They were invited to remove their shoes and cover themselves with a blanket if desired. The receiver wore headphones that had a microphone attached through which they could communicate with the experimenter and be heard by the sender. Halved ping-pong balls were placed over their eyes and held secure with micropore tape. A red light was shone on the receiver's face, positioned immediately in front of them at a distance that was comfortable for them (typically one metre). The receiver was then locked in the room (unless they were uncomfortable with this) and the sender was guided back to their room. At this point the sender was informed of the possibility that the experimenter and receiver may be misinformed as to the true nature of the trial (e.g., be told that it was a no sender trial when in fact there would be a sender) to enable us to look at the effects of expectancy.

Once the experimenter had returned to the experimenter's room and established contact with the receiver the trial commenced. The receiver began by listening to and following a series of progressive

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[3] This was a computerised PK task in which participants were to attempt to affect the outcome of each of a series of greyhound races in which the movement of greyhounds was determined by an REG. This task was chosen because it was thought to be engaging but rather simple thematically (obviously, no target clip involved greyhounds or races) but still involved a parapsychological topic so those 'unused' senders would feel that they had actively participated in a parapsychology study.

relaxation instructions. At the end of the relaxation period the computer program determined whether the session would be a sender or no sender trial, and whether the experimenter and receiver would be accurately or falsely briefed. The receiver and experimenter heard a pre-recorded message indicating whether the trial would involve a sender or no sender condition. At this stage the receiver was not aware that the computer briefing may be false. For no sender trials the sender received an on-screen message asking them to remove their headphones and move over to the other computer in the sender's room to complete an alternative task. The monitor in the sender's room did not show the target clip during no sender trials. For sender trials the sender watched a randomly-selected video clip that was played fifteen times with one minute intervals between plays. Drawing materials were provided for the sender should they wish to sketch elements of the target clip during these 'quiet' periods. During this thirty-minute mentation period the receiver listened to white noise being played through their headphones and reported on any impressions or sensations that they experienced. The experimenter listened to the receiver's mentation via headphones from the experimenter's room and took notes. In the sender condition, the sender could also hear any comments made by the receiver during the mentation period.

Following the mentation period, the experimenter read the receiver's mentation back to them and asked if there was anything further that they would like to add or elaborate upon. The receiver was then asked a series of questions regarding their experiences in the ganzfeld. Simultaneously, the sender completed a questionnaire concerning their interaction with the target and sending strategies employed. At the judging stage the receiver was asked to remove their eye-shields but was encouraged to remain in a relaxed state as they watched four video clips, giving each one a percentage similarity rating. After viewing all four clips, they were able to view any or all of them as many times as they wished and to alter their ratings if necessary. The sender was able to listen to the clip soundtracks and the interaction between the receiver and experimenter during the judging stage, but did not view the dummy clips[4]. Once the receiver was satisfied with their ratings, these were confirmed and saved as a permanent record. Only after the data were saved was the target clip revealed and replayed. The sender, experimenter and receiver then convened for a discussion and debriefing session in the receiver's room. The receiver was only made aware of the possibility that they had been misinformed concerning the experimental condition during debrief, at which stage they were free to withdraw their data from any or all of the study. None chose to do so. A copy of the trial data record was printed off and signed by all parties to confirm the details of the session.

[4] Despite being instructed otherwise, on two or three no sender trials, the sender did listen in to the judging phase after having completed the alternative task. Of course, they were at this stage still blind to the nature of the target.

Results and discussion

Our primary psi measure was pre-specified as the z score of the target clip's similarity rating. However, for completeness and to facilitate future meta-analyses, Table 1 gives the number of direct hits and sum of ranks data for sender and no sender conditions. Note that sums of ranks for sender and no sender trials cannot be directly compared since there were 23 sender trials and only 17 no sender trials. Nevertheless, it can be seen that, based upon ranks, participants performed slightly worse than chance expectation in the sender condition and slightly better than chance in the no sender condition. Overall performance is well within chance expectation.

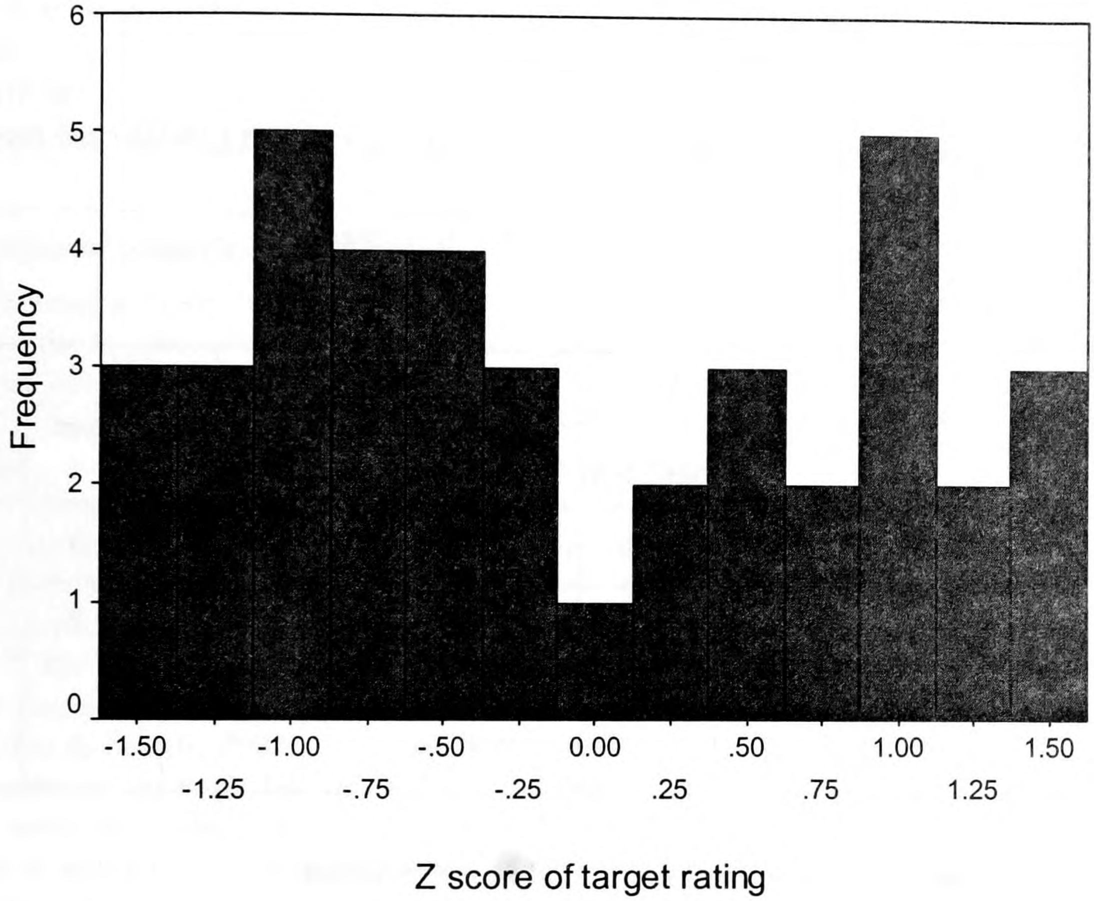
Table 1: Target rank frequencies for the receiver in sender and no sender conditions

	Rank						
	1	2	3	4	SOR	MCE	Mean z for ratings
Sender	6 (26.1%)	3 (13.0%)	5 (21.7%)	9 (39.1%)	63	57.5	- .16
No sender	4 (23.5%)	8 (47.1%)	0 (0.0%)	5 (29.4%)	40	42.5	- .03
Overall	10 (25.0%)	11 (27.5%)	5 (12.5%)	14 (35.0%)	103	100	- .10

To assess our first prediction, that irrespective of condition participants would award a similarity rating to the target that was higher than the average rating for the three dummy clips, z scores were calculated. The distribution of z scores is given in Figure 2. We can see from this that the hypothesis is not supported. The overall mean z score was actually slightly negative (mean z = -.10, SD = .95) but did not differ significantly from zero (one-sample t(39) = -.66, p = .52, two-tailed[5] r = - 0.10).

[5] This prediction was originally one-tailed, but in the opposite direction to that found. The two-tailed probability is given for information only.

Figure 2:Frequency histogram of target similarity rating z scores



Considering covariation of performance across conditions

To assess whether performance was affected by the presence or absence of a sender and by the receiver's expectancy of whether a sender was actually present, target rating z scores for each of the four conditions are summarised in Table 2. We can see from this that the only overall positive value (i.e. where the target is rated higher, on average, than the decoys) occurs where there was no sender but participants were misinformed that there was a sender and worst performance was where participants believed there wasn't a sender when in fact there was. Taken together, these suggest that receiver expectancy is more important than whether or not a sender was actually present. However, the mean differences are relatively small in comparison to within-group variance and there is no overall difference between sender and no-sender conditions ($F_{1,36}$ = .178, p = .676, η^2 = .005, power = .069) or between receiver expectancy that a sender will be present or absent ($F_{1,36}$ = .117, p = .734, η^2 = .003, power = .063). There is no evidence of an interaction between actual sender role and receiver expectancy ($F_{1,36}$ = .001, p = .978, η^2 = .000, power = .050). Given the small effect sizes and the relatively small sample size, statistical power is low. As a guide to the magnitude of effect sizes, $\eta^2 = .01$ is considered small, $\eta^2 = .059$ is considered medium and $\eta^2 = .138$ is considered large (Cohen, 1988, as cited by Clark-Carter, 1997, Appendix XV).

Table 2: Mean z scores for target similarity ratings by sender role (present / absent) and receiver expectancy (believes sender present / absent)

		Sender role						
		Sender			No sender			Row Mean
		Mean	Std Deviation	Count	Mean	Std Deviation	Count	
Receiver expectancy	Sender	-.09	1.11	9	.03	1.08	9	-.03
	No sender	-.21	.97	14	-.07	.74	8	-.16
Column Mean		-.16	1.00		-.01	.91		

Covariation of performance with personality and attitude measures

In this study we also planned to consider the most promising correlates of ganzfeld ESP performance as identified by Bem and Honorton (1994). Measures of prior belief, reported personal psi experiences, involvement with meditation or other mental disciplines, extraversion and creativity were correlated with success at the ganzfeld task. These analyses are given in Table 3. We can see that none of the correlations is significant, offering only weak support for these variables as predictors of performance[6]. We might note that for both senders (r = .229) and receivers (r = .242) there is a modest positive correlation between performance and expectancy of success (a variant on Schmeidler's Criterion 1). Although clearly non-significant, this compares with Lawrence's (1993) estimate of the mean sheep-goat effect (mean r = .029). Interestingly, there is a modest positive correlation (r = .236) between receivers'

[6] Univariate analyses are rather simplistic, and ideally we would go on to conduct multivariate analyses to further consider the possible interaction between variables. With a sample of only 23 sender trials, this would not be appropriate here, but is planned for the end of the project when more data will be available.

having practised a mental discipline and performance, which is not found for senders. For creativity there is a suggestive negative correlation that would seem to weaken the case for creativity as a predictor of ganzfeld success (contra Roe et al., 2001). However, the case for creativity is primarily based on creative populations performing better than non-creatives and where measures of creativity have been correlated with performance they have been relatively disappointing (see, e.g., Dalton, 1997; Morris et al. 1993; Schlitz & Honorton, 1992).

Post hoc analysis of magnitude of effects

We were interested to note that the distribution shown in Figure 2 appears to be somewhat bimodal, suggesting that the target clip is either rated relatively high or relatively low compared with decoys. This brings to mind Palmer's (unpub.) interaction model of psi (see Eysenck & Sargent, 1993, pp. 91-93; Palmer, 1997) that treats the magnitude and direction of any psi effect as distinct. Within this model, Palmer (unpub., p. 3) argues that some factors may be associated with the *magnitude* of an effect (deviation from chance expectation) irrespective of its *direction* (above or below chance). Variables that Palmer has proposed as potential correlates of magnitude include participant lability (e.g., creative persons) and motivation to succeed (e.g., having a strong belief in psi). Variables that he hypothesised to be potential correlates of direction include comfort, with positive scoring where the participant is most comfortable in the surroundings (e.g., high scorers on measures of extraversion). Two of the present authors have recently reported on a study that might offer circumstantial support for the model (Roe, Sherwood, Luke & Farrell, 2002). We speculated in the current study that the magnitude of deviation from chance expectation might be affected by the experimental condition that participants completed; in other words, some conditions may be more psi-conducive than others but for some individuals this may lead to positive scoring but for others negative scoring. We therefore also looked at performance in terms of the mean absolute z score for the ratings.

Table 3: Pearson correlation coefficients between individual difference measures and ganzfeld task success (and two-tailed probabilities)

	Receiver (Max N = 40)	Sender (Max N = 23)*
ASGS belief score	.055 (.745)	.159 (.490)
Believe able to demonstrate psi in a controlled experiment	.242 (.137)	.229 (.332)
Prior experience of the paranormal	.074 (.657)	.054 (.816)
Practised a mental discipline	.236 (.149)	-.066 (.775)
Extraversion	-.054 (.755)	-.159 (.491)
Creative	-.273 (.093)	-.152 (.511)

*N.B. reported significance levels may differ between receiver and sender correlations of the same magnitude since the latter consists only of those trials on which a sender was actively involved

Table 4 summarises the magnitude of effect in terms of absolute z scores such that higher scores indicate that target ratings deviated more markedly from the average rating for the decoy clips (either positively of negatively) and low scores indicate that target ratings were similar to the average rating for decoys. Note that the overall pattern now conforms (albeit weakly) to the trends predicted, with least deviation from the mean where participants were accurately informed that there would be no sender and greatest deviation where accurately told that there would be a sender. Deviations are somewhat larger where the receiver believed there would be a sender even where there wasn't compared with trials where they believed there would be a sender but in fact there was not. The effects are fairly small, however, and, given the low statistical power, there is no overall statistically significant difference between sender and no-sender conditions ($F_{1,36} = 1.783$, $p = .190$, $\eta^2 = .047$, power = .255) or between receiver expectancy that a sender will be present or absent ($F_{1,36} = 3.866$, $p = .057$, $\eta^2 = .097$, power = .482), though the latter difference has a medium effect size and is approaching significance and is suggestive of a greater effect when a sender is expected. There is no evidence of an interaction between actual sender role and receiver expectancy ($F_{1,36} = .907$, $p = .347$, $\eta^2 = .025$, power = .153). Receiver creativity correlates significantly with absolute z score ($r = .349$, 39df, $p = .029$) but none of the others comes close to significance.

Table 4: Means of absolute Z scores for target similarity ratings by sender role (present / absent) and receiver expectancy (believes sender present / absent)

		Sender role						
		Sender			No sender			
		Mean	Std Deviation	Count	Mean	Std Deviation	Count	Row Mean
Receiver expectancy	Sender	1.00	.36	9	.95	.40	9	.97
	No sender	.86	.42	14	.57	.43	8	.75
Column Mean		.92	.39		.77	.44		

Conclusion

Overall, the results suggest that, at least in the ganzfeld context, receiver expectancy might be more important than whether or not there is a sender actually present, although the small effect sizes and low statistical power and the lack of apparent psi effects in the study mean that this remains uncertain. The presence/absence and expectation of a sender might have a greater influence on the magnitude of any psi effects rather than the direction. The results do not replicate Raburn and Manning's (1977) finding that sender trials were significantly better than no sender trials though they do confirm their trend that trials in which a sender was expected were more successful than those in which a sender was not expected, particularly when considering participants' absolute rather than their directional rating deviations. It might be useful for future research to consider what the role of the sender means to receivers in order to try to tease out the nature of any possible expectancy effect. The results from this study also suggest that expectations of success in the experiment on the part of both senders and receivers are moderately associated with subsequent success.

The lack of association between sender variables and task performance is disappointing but perhaps not surprising given the small number of sender trials. However, we plan to examine the same relationships again, using the same measures, once we have obtained data from two further studies. We also plan to look at the different sending strategies reported by our senders to see if some are more successful than others. Perhaps there might be a difference between active versus passive strategies; for example it is interesting to note that Kanthamani and Khilji (as cited in Kanthamani & Palmer, 1993) found that the use of subliminal sending in the ganzfeld resulted in suggestive psi-missing. We also plan to continue our investigation of the different roles within the ganzfeld context by looking at the experimenter effect in terms of his/her interactions with participants, and participants' perceptions of it, before the ganzfeld session begins and to see whether these variables are related to subsequent task performance. In our next two studies we also intend to recruit more participants with previous psi experiences from New Age rather than student populations given Parker, Grams and Pettersson's (1998) recent finding that the former populations performed better than the latter in a ganzfeld task.

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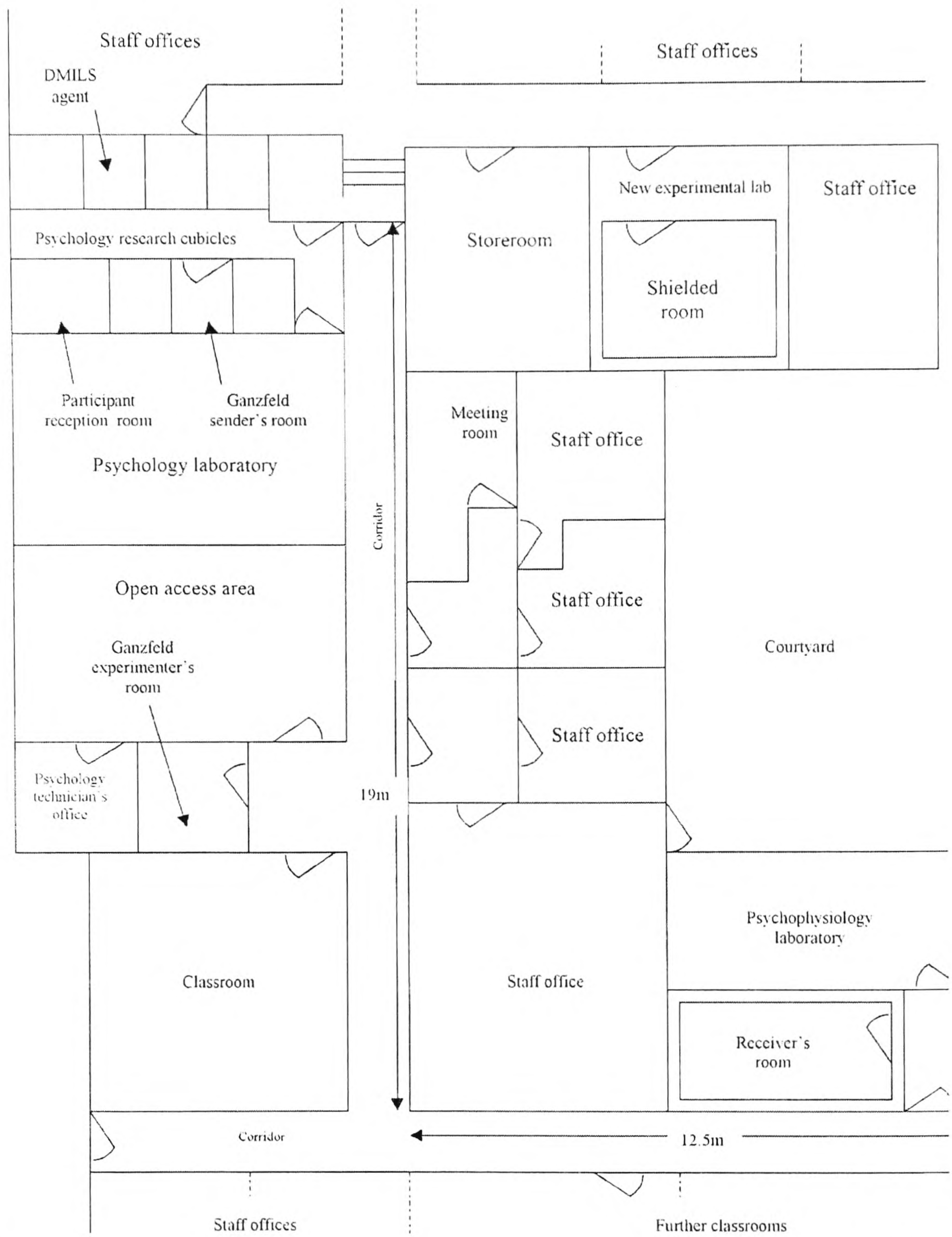
Figure 1: Schematic plan of the UCN ganzfeld facilities



Does Precognition Foresee the Future? Series 5: A Laboratory Replication. Series 6: A WWW Replication.

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Abstract

The two studies presented here are the final two in a series of six that investigated the possibility of true precognition. The aim of the research has been to discover whether precognition is possible in an experimental situation even when the use of real-time psi is rendered relatively unlikely. Consequently, the experiments in this series have determined which of four target possibilities (static postcard-sized pictures) to show to a participant as feedback by using the final digit of the closing prices of a number of stocks on a prespecified future date to determine the entry point in a random number table. The closing prices of stocks rest on many human decisions. Hence it is unlikely that a participant could psychically know real-time how many stocks all these people would decide to buy by the given day. Moreover, participants would presumably be unlikely to be able to exert PK successfully on the stock market, due to those with real investments having greater incentive to use their PK. Series 1-3 each compared participants' performance on a free-response clairvoyance trial with their performance on a free-response true precognition trial. Series 1 was conducted by post, series 2 was conducted in the laboratory, and series 3 was conducted over the WWW.

The results were somewhat contradictory. Series 1 yielded chance results for precognition, series 2 gave almost significant results for precognition, and series 3 provided almost psi-missing results in the precognition condition. It was unclear whether all these results were merely chance results, with the almost psi-missing cancelling out the almost psi-hitting, or whether the difference in results was due to the difference in experimental setting. Series 4 replicated the initial postal experiment, but this time each participant performed only one trial, this trial being one for true precognition. The results were at chance. Series 5 and 6, presented here, were conducted to see if the results from the previous laboratory and WWW studies could be replicated, hence giving insight into whether the type of experimental setting affects participants' performance in a true precognition psi task with a precognitive interval of several days. Series 5 and 6 tested for true precognition only. The laboratory experiment used a free-response protocol similar to the ganzfeld. Whereas the previous laboratory series had provided almost significant evidence in favour of true precognition, this replication series produced only chance results ($N=140$, $z = -0.42$, $p(1\text{-}t) =$ n.s.). The WWW series tested 159 participants. It, too, yielded only chance results ($N=159$, $z = -0.28$, $p\ (2\text{-}t) = .78$), whereas series 3 had found almost psi-missing results. These findings suggest that using a complex, indeterminate system for determining a future target may be psi inhibitory and may even point to a limitation to psi. Alternatively, studies in which hourly-updated stock market figures are used in which target feedback can be provided more quickly may show that the limitation is due primarily to temporal constraints. This area still provides much potential for further research.

General Introduction

The Concept
The two studies presented here are the final two in a series of six that investigated the possibility of true precognition. The aim of the research has been to discover whether precognition is possible in an experimental situation even when the use of real-time psi is rendered relatively unlikely. Although many studies have investigated precognition (see Honorton & Ferrari 1989 for an overview of the forced-choice literature), relatively few have been designed with the explicit aim of making it as unlikely as possible that real-time psi could account for the results. Early studies, naturally, still grappled with the problems in testing for precognition. For example, the successful results from early experiments in which participants had to guess the future order of a pack of ESP cards could be due to the shuffler shuffling the cards to match the cards to the participant's guesses, rather than the participant correctly guessing the future order of the cards (Rhine, 1938; Rhine, Smith & Woodruff, 1938). The Mangan (1955) method established itself as the best way to test for true precognition. Here, the future target was determined by means of complex calculations using, for instance, sines and square roots, on the throw of some ten-sided dice. This procedure was thought to be too difficult for the person determining the target to be able to psychically calculate which dice to throw so that the resultant target would match the participant's guess. It was thought that participants would have to use precognitive psi to gain good results. However, the Mangan method is purely deductive after the dice throw and is, as a consequence, determined purely by that one dice throw. If precognition is difficult because the future is complex and arises from many non-purely determinate decisions, the Mangan method does not really capture the problem with precognitive psi. Consequently, this experimental series has specified the future target by using the final digit of the closing prices of a number of stocks on a prespecified future date to determine the entry point in a random number table. The closing prices of the stocks will rest on many human decisions, which themselves will be relatively unstable and open to change. Hence it is unlikely that a participant could psychically know real-time how many stocks all these people would decide to buy by the given day and which precise factors will sway their buying habits. It is similarly unlikely that PK could be used on the stock market to make it conform to what the participant would need for them to obtain a hit, for if PK were possible, people with real investments in the market would have far greater incentive to use it. Consequently, by using stock market performance to determine the future targets, the studies in this series hoped seriously to diminish the likelihood of real-time psi operating within them.

The Previous Findings. Series 1-3 each compared participants' performance on a free-response clairvoyance trial with their performance on a free-response true precognition trial (Steinkamp, 2000, 2001). In each trial participants were asked to gain impressions about a picture they would see on a prespecified future date. Participants did two trials each, one using a clairvoyance protocol, in which the target had been randomly selected beforehand and stored, unread, onto a computer file, and one trial with a true precognition protocol, using stock market performance on a prespecified future date to determine the target. All participants were told that both trials were precognitive; the experimenter was blind as to which trial was clairvoyance and which trial was precognitive.

Series 1 was conducted by post. Participants in this series had taken part in a survey of precognitive experiences conducted by the experimenter and had volunteered to take part in the experiment, too.

Hence all participants lived in the UK and had claimed to have had a precognitive experience. They were each sent two sealed target sets (marked A and B) containing four postcard-sized pictures as target possibilities through the post (one set for each trial) and two empty "feedback" envelopes (marked A and B). Participants were asked to gain impressions at home about which picture they thought they would later receive through the post in empty feedback envelope A. After gaining their impressions, which they wrote down on a form, they were to open target set A and to write down on the form how their impressions corresponded to each of the four pictures. They rated the pictures as to their likeness to their impressions and hence to their likelihood of being the picture they would later receive in feedback envelope A. The following day, or later, they were asked to go through the same procedure for target set B and then to return all the materials to the experimenter. The targets were then selected on the prespecified future date as described above for the relevant condition and the relevant pictures were sent as feedback in envelopes A and B.

Series 2 was conducted in the laboratory. All participants had to claim to have had a psychic experience. The procedure was similar to the ganzfeld, with participants listening to a relaxation tape beforehand, suggesting that they could see into the future, followed by 17 minutes of white noise, during which participants tried to gain impressions about a picture they would later receive through the post. Participants were asked to shut their eyes, and they were left in a dark room lit only by a red light, but, unlike the ganzfeld, they did not wear ping-pong balls over their eyes. They were free to open their eyes if that felt more comfortable. They held an empty envelope A during the mentation period, which was the envelope in which they would receive their feedback. They were then given their target set A of four pictures (which they had not seen beforehand) and rated the pictures as in the postal experiment. After a coffee break, participants did a second trial with target set B and feedback envelope B. Again, trials were counterbalanced and in the laboratory experiment the experimenter did not know which trials were precognitive and which trials were clairvoyance. Likewise, on the prespecified future date the target picture for each of the two trials was selected as described above for the relevant condition and they were sent as feedback in envelopes A and B.

Series 3 was conducted over the WWW. All participants had to claim to have had a precognitive experience and had to submit an account of a precognitive experience before being accepted onto the study. They were then emailed information about their own participant number and about how to take part. They were asked to sit at home in peace and quiet and to try to gain impressions about a picture they would be shown over the WWW. When they had gained their impressions, they were asked to enter their participant number on the website so that they would be taken to their own set of four pictures. They typed by each picture any likenesses between that picture and their impressions and, as in Series 1 and 2, they rated each picture accordingly and submitted their guess. The following day, or later, they followed the same procedure for the second trial. Again, clairvoyance and precognition trials were counterbalanced. The guesses were emailed to a colleague and the experimenter was notified when both trials had been completed. On the prespecified future date, the target picture for each of the two trials was selected as described above for the relevant condition and then posted on a feedback website. The participant was emailed the address of the website so that they could obtain feedback.

The results were somewhat contradictory and are summarised in table 1. Series 1 yielded chance results for precognition, series 2 gave almost significant results for precognition, and series 3 provided almost psi-missing results in the precognition condition. It was unclear whether all these results were merely chance results, with the almost psi-missing cancelling out the almost psi-hitting, or whether the difference in results was due to the difference in experimental setting. For instance, perhaps the postal series yielded chance results for precognition because participants already had a target set in their possession. Thus participants may have been psychically focusing on the target set instead of their future target. The laboratory series may have yielded promising results because participants listened to a tape beforehand, which suggested that they could travel forwards in time. The WWW series could have yielded results in the psi-missing direction because participants did not like having to wait for pictures to load up on their screens.

Series 4 replicated the initial postal experiment, but this time each participant performed only one trial, this trial being one for true precognition (Steinkamp, submitted). Participants in this experiment were sent a relaxation tape and an empty feedback envelope that they were asked to personalise by drawing or writing on it. They were asked to listen to the tape and then take ten minutes or so to gain impressions about a picture they would later receive through the post in their personalised envelope. Only when participants posted the tape and the written account of their impressions to the experimenter, did the experimenter send them a sealed target set and ask them to assess the pictures and to rate them as in Series 1. These changes were made in an attempt to make this second postal series more similar to the relatively successful laboratory one. The results, however, remained at chance.

Table 1 Summary of Results from Series 1-4

	Precognition				Clairvoyance			
Series	N	z	p (2-t)	ES ($z/\sqrt{N}$)	N	z	p (2-t)	ES ($z/\sqrt{N}$)
1. Postal*	75	-0.67	.50	-.08	74	1.72	.08	.20
2. Laboratory	80	1.85	.06	.21	80	0.15	.88	.02
3. Web	100	-1.74	.08	-.17	100	0.85	.39	.09
4. Postal	80	-0.2	.84	-.02	n/a	n/a	n/a	n/a

* Results were actually preplanned as 1-tailed

It was difficult to understand how to interpret the results. It may be that true precognition cannot operate in a postal experimental setting; alternatively perhaps true precognition, if possible within a postal setting, can function only over very short time intervals.

Series 5 and 6 were conducted to see if the results from the previous laboratory and WWW studies could be replicated, hence giving insight into whether the type of experimental setting affects participants' performance in a true precognition psi task with a precognitive interval of several days.

Series 5 – A Laboratory Replication[1]

Method.

Target Materials. One hundred and forty target sets, each set containing four different postcard-sized pictures, were compiled for this study. The pictures were mounted on grey cardboard and were varied in theme (e.g., cartoons, abstract art, photographs). Some of them had been used in Series 1-3 and in other experiments (e.g., Delanoy, Morris, Watt & Wiseman, 1993), others were newly collected for this study. Each picture was allocated a random four-digit number. Pictures were placed in random order within each pool, although the pictures for each pool were selected so as to be as different as possible from each other, yet judged by the experimenter to be of similar complexity/simplicity to avoid the bias of participants always selecting the most complex picture. For ethical reasons, violent or sexual images were not included. Each target pool was placed in a brown, opaque envelope. These were stacked in a large pile in the experimenter's office. They were used in the order in which they were stacked (which was in no particular order).

Participants. One hundred and forty adult participants of all ages were recruited from appeals and articles in local newspapers, advertisements in listings magazines, and posters round the city centre and the university. The articles and advertisements requested people to come forward who believed they had had a psychic experience of some kind (e.g., telepathy, clairvoyance). There was no financial incentive for taking part. No check was made to see whether participants really did have a psychic experience when they phoned up, although all participants were given an optional questionnaire to fill out about their experience before starting the experiment and it is believed, from conversations with the participants, that most of them did indeed claim to have had such an experience.

Experimental Procedure. All sessions took place in the Koestler Parapsychology Unit at the University of Edinburgh. Before each participant arrived, the experimenter got the computer randomly to select the five stocks that would later be used to determine the point in the random number table for that participant and to store these numbers in a file. The experimenter did not know which stocks the computer had chosen. When participants came to the Unit, they were given an empty "feedback" envelope to personalise. Participants were told that they would later receive a picture through the post in that very feedback envelope and that this picture would be randomly selected on a prespecified future date (usually two working days later, bar Mondays). Participants were asked to draw, or write, on the empty, feedback envelope so that they could bond with the envelope in some way and feel interested in what they would find in it the following week. They also, optionally, completed a questionnaire about their claimed spontaneous psychic experience. The questionnaire also included Eysenck, Eysenck and Barratt's (1985) reduced neuroticism scale.

When participants had personalised their feedback envelope, they were taken into a sound attenuated room in the Unit and were invited to sit on a reclining chair, keeping their feedback envelope in their hands. They were given headphones to wear and they were shown how to adjust the volume. The doors were closed and the participant was left in the darkened room with just one red light on.

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[1] I would like to thank the Perrott-Warrick fund for supporting this research.

Participants subsequently listened to a seven-minute relaxation tape, which asked them to close their eyes, talked them through a brief physical relaxation routine, and then asked them to imagine themselves at a timeless point in which the target picture for their envelope was coming to greet them. The relaxation tape led directly on to a thirteen-minute tape of white noise, during which participants were asked to say out aloud any impressions that came to them about the picture. The experimenter listened in next door and noted down the participants' impressions. If the participant did not say anything at all during the white noise, the experimenter asked the participant if they had any impressions once the white noise was over.

After the white noise, the experimenter went into the sound-attenuated room and gave the participant their target pool envelope containing the four target possibilities and a ratings form. The experimenter did not know which target set the participant had. The experimenter left the room and spoke to the participant via a microphone from the room next door. The experimenter went through the participant's mentation, using the notes.

The experimenter then asked the participant to look at the first picture in their set of four and to let the experimenter know which number was on the back of that picture. Participants were asked to explain aloud any similarities between that picture and their impressions during the white noise. The experimenter then asked them to give the picture a percentage rating as to how similar the picture was to their mentation. Participants were told that the higher the rating, the more likely they thought it was that this picture would be the one they would later receive through the post. The experimenter noted the picture number and the rating down on the computer and the participant wrote these details down on their ratings form. The procedure in this paragraph was repeated for the second, third, and fourth pictures in the set.

Once all the pictures had been rated, the participant was given the opportunity to compare the pictures and to change their ratings if they so desired. Participants were not allowed to give two pictures the same rating. When the participant was happy with their ratings, the experimenter stored the data on the computer and the participant signed and dated their ratings form. Afterwards, the experimenter gave the participant's rating form to a colleague (CW) to store.[2]

Determining the Target. On the prespecified future date, the experimenter retrieved the five randomly selected stocks from the computer and looked up the closing price of those stocks as printed that day in a specified newspaper. The final digit of these closing prices, by referring to various columns and rows in a random number table, determined an entry point into the table, which in turn determined which of the four pictures should be sent to the participant. The stock figures and the resultant target number was noted on a database. The experimenter then asked CW independently to double-check the entry point and the target number and, once confirmed, CW kept the written copy of the entry point and the target number.

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[2] I would like to thank Caroline Watt for storing the data for both series. She also double-checked the entry points into the random number table, as did Paul Stevens in her absence. I am grateful to both of them for their help.

Feedback. The experimenter placed the target picture into the participant's personalised feedback envelope, along with a letter explaining to the participant whether the target picture had been ranked their 1st, 2nd, 3rd, or 4th choice in the experiment; if participants had given the target picture their highest rating, the target had been ranked as their first choice, if they had given it their lowest rating, it had been ranked as their fourth choice.

When the experiment was over as a whole, participants were sent a letter explaining the outcome of the study. A colleague (JS) double-checked that the data in CW's possession was the same as on the experimenter's computer and that the experimenter had correctly converted the ratings to ranks.[3]

Results

Initially it had been planned to test 200 participants for a power of 95%, based on the results from series 2, and to use a 6Hz electronically-generated drumming tape in the hope of further improving the results. However, after 35 sessions it became clear that many participants did not like the drumming. These 35 sessions yielded non-significant results (N=35, z=-0.76, p (1-t)= n.s.). The study was paused and redesigned so as to be conducted as described in the Method section above after session 35. The redesign more closely matched the previous experiment and to this extent is a better replication of it. The main results include those from these initial 35 sessions, which do not affect the overall outcome of the study.

Preplanned analysis. Analyses were preplanned to be one-tailed, given that this was a replication attempt.

The main analysis was to see whether there was any overall evidence for true precognition. There was no such evidence (sum of ranks (SOR) = 356 (MCE = 350), z = -0.42, p(1-t) = n.s., ES= -.036).

Post-hoc analysis. Series 1 found a significant correlation between neuroticism scores and psi performance. In this laboratory series, there was no such correlation (N=119, r = .003, n.s.)

Discussion

This experiment failed to provide any evidence for true precognition using the procedures explained above. This study was a relatively direct, higher-powered replication of Series 2, which had gained almost significant results. Both studies used similar participant populations, the same target set, the same experimenter, and both studies were conducted over a fairly long period of time. Although it is always possible to think of differences between studies because replications will never be truly exact in studies using human participants giving mental feedback, there is no obvious reason why the two series should have provided disparate results other than, perhaps, that the initial results from series 2 were themselves just due to chance.

[3] I would like to thank Jo Smith for performing the double-checking in both experiments.

Series 6 - A WWW Replication.[4]

Method

Target Materials. Before the experiment started 250 pools of four pictures were either downloaded or scanned in so that they could be put up on an internet Web site. The pictures were either the same as, or similar to, those used in series 1-5 (see above). Some pictures were collected solely for this series, due to the greater number of participants. The pictures were surrounded by a grey frame so that they closely resembled the targets used for the other series. They were arranged in groups of four according to the same criteria as the previous series and the pools were allocated to participant numbers (1-250) in no particular order.

Participants. Two hundred and fifty participants were recruited from the internet. Advertisements were placed on parapsychological mailing lists, newsgroups interested in the paranormal, meditation, dreams, science, or alternative religions or beliefs. All participants had to claim to have had a precognitive experience at some point in their life. They had to be able to understand English and have access to the WWW and email, but no other criteria were in place. Participants came from a wide range of countries. Recruiting, and the experiment, took place from September 1999 – February 2003.

Experimental Procedure. Once a participant had contacted the experimenter with an account of their precognitive experience, the experimenter allocated them a participant number and got the computer randomly to select five numbers representing stocks in the stock market. These five numbers were stored directly onto the hard disk, unread by anyone. The experimenter emailed participants the same optional questionnaire given to those in Series 5 (including the neuroticism scale) and, in a separate email, sent them their participant number along with details about how to take part in the experiment.

Participants who did not take part in the experiment after being sent their introductory email were sent a maximum of three reminders, and, if they had not taken part after three reminders, they were informed that they were being removed from the database. There were at least 14 days between reminders, and usually a month.

Participants were told to try to select a time when they had some peace and quiet to gain some impressions at home about a picture that would later be randomly selected for them to be shown over the WWW. It was hoped that this would best replicate the conditions of the postal and laboratory settings; a ten-minute online relaxing screen display may have been costly in terms of connection times for some participants and may have put some people off taking part.

Once participants had gained some impressions, they went to the experimental web site, the address of which was given in the introductory email, and they entered their participant number. This took them to their own experimental page where they saw a set of four pictures, automatically presented in random order each time the page was loaded. Each participant had a different set of four pictures.

[4] I would like to thank the Bial Foundation for supporting this research.

Participants looked at each of the four pictures in turn and compared it to the impressions they had gained beforehand. They had to type in a box by each picture what resemblance they could see between that picture and their mentation.

After writing something by each picture they had to rank each picture (1-4) as to which one they thought most closely resembled their impressions and which was therefore the one most likely to be randomly selected for them to see on the prespecified future date. A rank of 1 was the picture they thought most likely to be selected; a rank of 4 was the picture they thought least likely. Finally, at the end of their page, participants were asked to rate (1-5) how irritated they had been at having to wait for pictures to load up on their screen.

Consequently, this study was a direct replication of the precognition part of series 3 (Steinkamp, 2001). The only differences were:

1. The use of trial-by-trial feedback (series 3 had tested both clairvoyance and precognition and had given feedback of both trials at the same time).
2. There had been an upgrade in the server between series 3 and series 6, so pictures may have possibly loaded up more quickly in this study.
3. In this series participants additionally rated how irritating it was for them to have to wait for pictures to upload.

On submitting their guesses, the computer automatically noted on a file on the experimenter's directory that a response had been sent by that particular participant, along with the date. The experimenter checked this file daily. The completed electronic form with the participant's guesses was automatically sent to a password-protected experimental account held by a colleague (CW). Thus the experimenter had no access to the participants' guesses at this stage.

Two relevant days (usually two working days, bar Mondays) after the participant's guesses had been submitted, the experimenter retrieved from file the five stocks that the computer had randomly selected. The experimenter then looked up the closing price of each of these five stocks, the last digit of each closing price determining an entry point in a random number table that in turn determined which of the four pictures should be shown to the participant. The procedure for determining the entry point into a random number table was double-checked by a colleague (CW) and a record of the calculations was given to CW to keep before she let the experimenter know the details of the participant's guesses by forwarding the relevant email.

The experimenter then prepared the feedback website for the participant, showing them the correct picture and letting them know whether the selected picture had been their first, second, third or fourth choice. The participant was told by email the address of the relevant website so that they could see their feedback and how they had performed.

At the end of the whole study, a colleague (JS) checked that the information on the experimenter's database was the same as that held by CW. JS also checked that the experimenter had correctly determined which pictures to email to the participants. All participants still at their original email addresses were given feedback about the overall results of the study.

Results

Results were planned to be 2-tailed, for it had been hypothesised that the indication of psi-missing in the previous study may have been due to the slower server. The main analyses were all preplanned.

Participation Rate. It had originally been planned to test 250 participants. However, this proved to be over-ambitious for the time available, so the criterion was changed to recruiting 250 participants. The data regarding the participation rate are as follows:

159 out of 250 participants (63.6%) completed the test (57% in postal series 4)
Of those 159 participants, 68 (43%) needed a reminder (34% in postal series 4)
46 needed 1 reminder
15 needed 2 reminders
7 needed 3 reminders

The participation rates do not differ very much from the postal experiment in series 4; although the web participants needed more reminders, they also provided a better final participation rate.

Main Analyses. The main aim was to see whether or not true precognition was possible using the experimental conditions of this study. The results did not provide any evidence of an effect.

SOR = 402 (MCE = 397.5), z = -0.28, p (2-t) = .78, N=159, ES = -0.022

A second aim was to see whether the previous psi-missing results were due to participants' irritation at how long it took for the pictures to load on their website. This time, participants were asked how irritated they felt on a scale of 1-5. There was no significant correlation between participants' performance at the precognition task (measured by the rank they gave to the target) and how irritated they were at having to wait for the pictures to load (N=159, r = .104 [n.s.]).

Post-hoc Analyses. It may be that participants who need more reminders are less motivated than those who do the experiment straight away. However, as in the postal experiment, there was no correlation between the number of reminders participants needed before taking part and their success in the experiment (N=159, r =-.052 [n.s.]). Thus if there was a lack of motivation among those who needed more reminders, it does not appear to have significantly impacted upon their performance in the psi task.

As previously, participants who completed the optional questionnaire also completed Eysenck, Eysenck and Barrett's (1985) reduced neuroticism scale. The postal study in series 4 showed a correlation between neuroticism as measured by this scale and participants' performance at their psi task. This correlation was not replicated in the current study (r = .008 [n.s.]) and supports the conclusion that the correlation in series 4 may have been a statistical artifact due to multiple analysis.

Discussion.

The two web studies (series 3 and 6) do not show any convincing evidence that true precognition is possible. Both series provided results in the psi-missing direction for true precognition, but neither series provided significant results and the near-missing effect found in series 3 is now more likely to be indicative of a chance result. Series 6 did not find any correlation between participants' self-rated irritation and a decline in their performance, so it would be hard to conclude that the slightly closer-to-chance results in this series was due to the server upgrade.

Conclusion

The results from all six series are summarised in Table 2. For ease of comparison, all p-values have been presented as 2-tailed, although series 1, 4, 5, and 6 were preplanned as 1-tailed.

Table 2. Summary of results from all 6 series testing for true precognition.

	Precognition				Clairvoyance			
Series	N	z	p (2-t)	ES (z/√N)	N	z	p (2-t)	ES (z/√N)
1. Postal	75	-0.67	.50	-.08	74	1.72	.08	.20
2. Laboratory	80	1.85	.06	.21	80	0.15	.88	.02
3. Web	100	-1.74	.08	-.17	100	0.85	.39	.09
4. Postal	80	-0.20	.84	-.02	n/a	n/a	n/a	n/a
5. Laboratory	140	-0.42	.67	-.04	n/a	n/a	n/a	n/a
6. Web	159	-0.28	.78	-.02	n/a	n/a	n/a	n/a

It may be that the use of stock market figures and the consequent intervening complexity and indeterminacy before the target is finally determined in these studies are inhibitive to precognition; indeed this complex indeterminacy may play an important role in demonstrating a limitation to precognition. As Morris (1982) has noted, other studies using stock market figures on a prespecified future date have yielded nonsignificant results, too, which further supports the data provided by the six series I have conducted.

Studies using fewer intervening indeterminacies to specify the future target may be useful in determining the point at which psi no longer operates. For instance, a direct comparison between the use of the Mangan (1955) procedure and the procedure used here for determining the future target may be of interest. If it is the additional indeterminacy that inhibits psi, one might expect the Mangan procedure to be successful and the use of stock market figures to yield non-successful results.

Additionally, or alternatively, a temporal factor may play a role. Surveys (e.g., Sondow, 1988) and forced-choice experimental data (Honorton & Ferrari, 1989) appear to indicate that precognitive ability may decline the longer the precognitive interval. Consequently a study using stock market figures but with hourly updated figures so that the precognitive interval is not so long may still yield successful results. If a comparison study is undertaken to examine this, psychological factors regarding the increased perceived impossibility of success with the longer time interval will have to be accounted for. Many forced-choice studies examining temporal distance have not considered this possible confounding factor (Palmer, 1982).

This line of research still has many potentially interesting twists and turns to take. It may turn out that the apparently negative results produced here are, in fact, a step towards success.

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TELEPATHY: OR, HOW DO I KNOW THAT THIS THOUGHT IS MINE?

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Abstract

Telepathy is defined here as "ostensible direct mind to mind communication between two rational human individuals". This paper begins by homing in on a particular definition and type of telepathic experience and on a particular definition of communication, in which it is characterised in its positive, Western sense. Consequently, this paper is correspondingly limited in its scope. I argue that because one develops one's thoughts through communication, one's thoughts cannot always properly be said to originate from oneself. Additionally, telepathic experiences suggest that an otherwise rational person can have a thought in their head and claim that it does not belong to them because they cannot integrate that thought into their perspective. Normal communication can cause us to question whether we originate a given thought; telepathic communication can cause us to question whether we can integrate a given thought. Questioning either origination or integration casts doubt on the attribution of ownership of a thought. Origination and integration are crucial to determining the attribution of thought ownership. However, a person who claims to have a telepathic thought may deny that thought as their own once they find a person whose perspective better marries with that thought. A subsequent analysis of telepathy characterises it as communication in reverse. For instance, an alleged telepathic thought is initially understood as perspective-independent and is only later ascribed a perspective to which it belongs (i.e., that of another person), that perspective now understood as having been shared. In normal communication, thoughts usually have to be placed within a shared context first and then, perhaps, differentiated. Although most scientists dispute the possibility of telepathy, normal communication is itself mysterious. It is difficult to understand why normal communication is necessary unless one assumes privacy of thought. Yet this alleged privacy is not something that we can explain. The analysis of communication given here suggests that thoughts are never entirely private and hence the hard question in the philosophy of mind should be to ask why there are informational barriers. If an answer is not forthcoming, there is no a priori reason to reject the possibility of telepathy. The analysis provided here suggests that thoughts are not located in space but may be relational; they are part of a communicative network and always already presuppose the existence of other people. If there is a network, it might be possible for some thoughts to be accessed directly through some unusual routing in the structure. Despite the initial implausibility of telepathy, it is equally implausible to assume complete privacy of thought. Normal communication and telepathic communication exhibit similar relations, but in reverse. An analysis of telepathy may give us some answers to the puzzle of normal communication too, and normal and telepathic communication may not be as distinct as some assume. Each reflects the other, and normal communication always already reflects the other person.

INTRODUCTION

Telepathy is the purported ability to communicate directly mind to mind - that is, it is an ostensible exchange of information without the use of any of the known senses. Although, arguably, there is some experimental evidence for telepathy (see, e.g., Bem & Honorton 1994; Milton & Wiseman 1999; Storm & Ertel 2001), there is no evidence that it can operate either reliably or on demand. Therefore, "telepathy" here will mean "ostensible telepathy" throughout.

Conceptually, telepathy can be understood in a variety of ways. One way is to regard it as a direct mental influence on someone else's mind. That is, one person at will *makes* another person have a particular thought. It is the sender who is the active person. For instance, someone who is lost on a mountain top may try mentally to will someone to come to where they are. Stanford (1974) has characterised this form of telepathy as MOBIA (mental or behavioural influence of an agent). Telepathy may alternatively be conceived as the reception of information about another person's thoughts through the mediation of God or some other spiritual entity. One receives a message from God about what another person is thinking. The definition of telepathy in the glossary of the *Journal of Parapsychology* is different again. Here it is defined as "the paranormal acquisition of information about the thoughts, feelings, or activity of another conscious being". By focusing on the *acquisition* of information, this definition implies that the receiver is the active person – for instance, someone waiting to hear about the outcome of an important decision tries to get the information by tapping directly into the decision maker's mind.[1]

It is not feasible to discuss all possible approaches to telepathy. Instead I shall limit myself to the definition of telepathy as ostensible direct mind to mind communication. This definition does not presuppose the primacy of either sender or receiver.

Telepathic experiences differ substantially and I will give some examples here. They are intended for illustration only. I am not making any claim to their veracity or otherwise; this is not the focus or aim of this chapter. After citing examples of the various types of alleged telepathic experience, I will, for simplicity, limit myself to discussing just one of them throughout.

In some telepathic experiences, people report that they knew at the time of their experience to whom the original thought supposedly belonged. The following experiential account is an example of this: "... The rest of the household had retired for the night ... I knew my son would soon be in... As I lay waiting and listening for him I suddenly saw their vehicle, a light break-cart, turn over, my son jump out, land on his feet, run to the struggling horse's head, his friend hold to the lines, and in a moment it was gone and I knew it was right and felt no disturbance. I met my son as he came in ... He said: 'We tipped over mother'. I replied 'Yes. I know it, I saw you,' and described what I saw as I have to you, which he said was just as it happened. ... I did not see them before they started out ... and I did not know in what style they went." (Sidgwick 1962, p.149). Here, the mother apparently has a clear impression of what her son is experiencing at that moment in time, even though there is no obvious reason for her to have this precise impression.

In other cases, the percipient claims to know that they are having a telepathic experience, but they do not know whose thought it is. Here is another example from Sidgwick's (1962) collection: ".. while resting, late in the afternoon, I suddenly experienced a constrictive sensation in my throat, … which increased for some time, and finally became so distressing that I bathed and rubbed my throat several times … I could discover no cause within myself for such a sensation … It occurred to me that it might be due to some influence outside of myself, and I thought of my husband … also of a friend who was stopping with me at the time". Later, the percipient discovers that her husband had unexpectedly had an operation performed on his throat that afternoon. (p.94). Here, the woman understands the pain in her throat as not having anything to do with her, but at the time she is unable to attribute the experience to a specific person.

In other instances of ostensible telepathy, the person does not think they are in telepathic contact until later circumstances seem to indicate that they had been. The following is a case in point: "… busy and preoccupied as I was that morning, Joey Fisher suddenly, without the slightest cause or outside suggestion, obtruded himself upon my mind … I had neither seen nor heard anything of him for about a year. His face seemed to rise up before me, and the thought of him occupied my mind for a minute or two. … I thought no more about it until … a parcel containing a large pike was brought in to me from Joey Fisher. I … learned that he had caught the pike himself that day in our Reservoir, and had been standing fishing down below the road at the exact time I had passed (but quite out of sight of the road)." (Sidgwick 1962, p.125) Here, the woman clearly thinks of Joey Fisher and hence identifies the person, but she does not regard the thought as telepathic until later.

There are also "motor impulse" examples, in which people appear to react physically in accordance with what they understand to be an unconsciously received telepathic impression. For instance, a woman writes: "I suddenly thought of the Beethoven Trio Op. 1 No. 1 so vividly that I got up to look for the music, which I had not touched for nearly 20 years … The next day but one the enclosed card came; it had been written, as we established by subsequent correspondence, on the same evening and at the same hour." The enclosed card read: "After playing Beethoven Op.1 No. 1 we send you hearty greetings in remembrance of happy hours spent together in the past". (Sidgwick 1962, pp.111-112). Here, the person appears primarily to act for no apparent reason and one could interpret this action as having been prompted by a telepathic impression from the author of the card.

Because telepathic experiences are so varied in character, it is not possible to cover all possible permutations here. Thus for simplicity I will limit my discussion primarily to cases in which person X ostensibly gains a telepathic impression from person Y but in which person X does not know at the time of the experience that it was ostensibly from person Y. Consequently, I will be focusing on the example above with the woman who bathed her apparently sore throat. This type of experience neatly differentiates between having the thought and ascribing it to someone else, which is the main focus of interest for this chapter. Also for simplicity I will consider only *human* communication and communication between two rational people only.

I will begin by outlining a characterisation of normal communication. This has two aims. First, it will make plausible the idea that our thoughts need not originate from ourselves. This should subsequently lend some initial plausibility to telepathy. Second, I will later use this specific characterisation of communication to illustrate how telepathy is a reflection, or inversion, of normal communication.

COMMUNICATION AND PERSPECTIVE

Communication is a necessary part of human life; most of us take it for granted. It assumes some shared basis (for communication to work) and it also assumes that there are experiences, and/or items of information, that are not shared (there is no point in me communicating to someone something that they already know). That is, communication assumes both individuality (I have a different point of view from you, both literally and metaphorically) and similarity (but we talk the same language, again both literally and metaphorically). Communication is puzzling because of this tension between the different and the similar, and this tension has commonly formed the basis for constituting selfhood in respect of the Other (person) – for example, the Fichtean distinction between the I and the not-I, Levinas's formulation of the Same and the Other, and Sartre's use of the Look.

It is possible to divide communication into subsets. For instance, warnings differ from small talk, and communication in a tribe will differ from that at the Queen's garden party. For my purposes I will be defining communication only as the subset that is communication in a positive Western sense (defined below) and that is between two rational human beings. This subset is the one that most closely resembles telepathy as defined here and that will therefore form the best comparison for it. Thus just as the discussion of telepathy is restricted to a specific definition and to a specific experiential type, the discussion of communication will be likewise restricted.

Communication in its most positive form is between equals; in positive communication each person retains their individuality and neither limits the other. Empirically, not limiting the other means not making someone else feel awkward (e.g., limited in how they feel they can behave) or not dominating them. In the metaphysical sense, not limiting means not limiting the other person's being (e.g., making them realise that their freedom is a limited one) and instead making potential in the other possibilities that they may not have comprehended hitherto (e.g., making them realise they are free to do otherwise if they so desire or so choose).

Communication in this positive sense is based on a shared world of possibilities, a shared perspective. A perspective encompasses the assumption of the existence of the physical world, one's current relationship to that world and one's understanding of others' relationships to it, as well as how one understands interactions to be possible or to be best conducted within it. A shared perspective is the extent to which two or more perspectives appear to overlap, relate, or connect. Thus communication in its most positive form not only does not limit the other; it has the potential to expand another person's perspective, to further the other's outlook (and, of course, one's own).

COMMUNICATIVE INTERACTION

Communication requires there to be a person who is actively communicating - the giver - and a person with whom the giver is interacting - the receiver. The terms "giver" and "receiver" are not ideal, for "giver" suggests that the receiver is not giving (which is not the case) and *vice versa.* Typically, giving and receiving will take the form of speaking and listening respectively; the more general terms of giving and receiving are used here to reflect communication in a broader sense (e.g., the use of sign language with the deaf, picking up on non-verbal cues, etc.). The roles of giver and receiver are ordinarily understood to alternate, although the two roles are actually not as distinct as seems at first blush.

Receiving supposes interest in the communication. Interest is aroused when both the giver and the receiver recognise that they share a perspective, at least in part. This mutual recognition is sharing. The giver needs the receiver to recognise the shared perspective if any communication is to take place at all. If the receiver is unable to share or, in negative communication, refuses to share or to accept the giver's perspective, the giver will fail. Thus although communication may naively be thought of as initiated by the giver, it is the receiver's agreement to sharing the perspective that truly engages communication. Establishing a shared perspective together is fundamental to communication.

The receiver does not just receive; the receiver communicates, too. For instance, a listener can communicate with facial expressions or by gestures. This communicative aspect of receiving - largely unintentional - is an important feature of communication. If a giver is faced with no response from the receiver, they may regard their communication as having failed. People who are physically unable to make facial expressions report themselves as feeling isolated and as being misunderstood (Cole, 1997). That is, in order to facilitate sharing, the receiver also has to be a giver.

Receiving involves putting oneself into what is communicated - weaving it into one's own perspective and weaving it into one's understanding of the other's perspective, which one can understand to the extent that it is related to one's own. Receiving is also the demonstration – either verbally or non-verbally – of that integration. Roughly, receiving involves taking on board what the person has communicated, understanding it within the perspective that has been established, this latter perspective being related in some way to one's own, and understanding not only what has been communicated but also its implications for oneself and for the other (as appropriate). Receiving as part of communication entails demonstrating that understanding in some way by giving back, ideally at the same time as receiving. Communication is a meeting and meshing of perspectives and also a meeting and meshing of the giving and receiving roles in that perspective.

This brief characterisation of receiving suggests a need for some similarity of perspective for communication in a positive sense to take place. It also indicates that receiving is not a passive role.

The receiver is at the same time a giver. Strictly speaking, it is neither receiving nor giving for it is engagement in sharing a perspective.

Likewise, the giver is not entirely distinct from the receiver. The giver might look for feedback - e.g., an interested look on the receiver's face, appropriate gestures etc. – to confirm that a perspective has been shared. This confirmation is a form of receiving. Communication is easier the more the giver and the receiver share perspectives, the more the two merge.

Although sketchy, this characterisation of communicative interaction shows that the distinction between giver and receiver may not be clear cut. Giving involves receiving and receiving involves giving. Moreover, if communication in the sense described here involves incorporating at least part of what one understands to be another person's perspective into one's own – e.g., taking on board another person's point of view – the distinction between the perspectives will become obscured. That is, my integration of that view into my own perspective will form a further point at which we can test the extent to which our perspectives merge. And if I embrace the other person's view, whether that view is mine or that of the other person becomes ambiguous.

The aim of this preliminary outline is not to provide a cohesive account of communication. Rather, it is to introduce the idea of a shared perspective, and to show that a shared perspective is a foundational aspect of communication. In normal communication this shared perspective is engaged by the receiver, and the giver seeks confirmation that this engagement has taken place. Ultimately, the roles of giver and receiver merge to some extent. This outline should therefore give some credence to the idea that the content of one's thoughts may not necessarily originate from oneself. As a result, the following question, which forms the main interest of this paper, is a natural consequence.

HOW DO I KNOW THAT THIS THOUGHT IS MINE?

This question is not one of how I can know that all thoughts belong to the same self; it is the more primary one of how I come to think of any given thought as belonging to me rather than to someone else. To answer this question, this section has two goals. The first goal is to show that we can indeed doubt that our thoughts are our own. The second goal is to determine the necessary criteria for attributing thought ownership.

So: How can I doubt that this thought is mine?

If I am a normal person who has had positive communicative interactions with other normal people, my thoughts will have been influenced by my social milieu and by the people with whom I have had interactions. Some thoughts I may possibly never have had were it not for my interactions with others. My thoughts, therefore, need not originate from myself. To some extent my thoughts are a product of society and of the perspective(s) from which they have been formed.

But perhaps my thoughts do originate from myself; perhaps only the content of those thoughts does not. But without content, it is debatable whether there is a thought at all. Meditative states in which a person attempts to clear their mind might be regarded as an example of thought without content. But clearing one's head of content is commonly understood to be the same as clearing one's head of thoughts.

At first blush, if the content of a thought does not originate from me, I cannot regard it as my thought and if a thought has no content, I cannot regard myself as properly having a thought at all.

On a naïve level, I regard thoughts as my thoughts if they are inside my head, so to speak. That is, even if the content does not originate from me, I regard it as my thought because it is in my head. However, in the case of telepathy a person identifies a thought as being in their head but as not being their thought. For instance, in the example above of the woman bathing her throat, the woman's throat felt sore despite the fact that she knew it was not. Consequently, she tried to find someone else from whom that thought or sensation came. Although the thought was in her head, she did not think it was her thought. If one argues, again, that she is merely denying the content of that thought as her own, it becomes ambiguous as to precisely what it is that she is calling her own. Thus it appears that the being-in-my-headness of a thought is not a sufficient criterion for me to think that a given thought is mine. What is more important is that I should regard the thought as originating from me.

Possibly a thought is mine if it is integrated into my perspective. For instance, in the telepathy example the woman presumably thought it was odd that she had a constricted feeling in her throat because it did not make any sense from her current perspective – she was healthy, otherwise occupied, and had no reason to have that thought. In thinking it odd that she should have such a thought, the thought then became the subject of her thoughts, just as a prior thought of any kind can become the subject of further thoughts. She is not debating her husband's mental impressions; she is debating her own feeling of being unwell when she was not. The thought is hers only to the extent that she debates it in her head and wonders about it – to the extent that she tries to integrate it into her perspective.

The importance of a thought being integrated into one's perspective for thought ownership can be clarified further by considering inspirational thoughts. Inspirational thoughts often come unbidden and seem to appear from somewhere other than oneself. Yet an inspirational thought is inspirational only if the person later applies it in some way; it becomes *my* inspiration to the extent that I work with it, integrate it into my perspective and draw new connections using that inspiration. A telepathic experience, however, is in part regarded as telepathic because the individual *cannot* sensibly integrate the content of that thought into their perspective. For instance, the woman can find no reason for having the sensation in her throat and the sensation itself appears to be redundant – for example, it is not warning her of an impending cold. The soreness in her throat cannot be expanded or drawn upon in her life. Thus a telepathic experience is initially believed not to be one's own because one cannot integrate it. An inspirational thought, however, becomes one's own thought because one can integrate and work with it.

Thus something can be regarded as *my* thought on two accounts. First, I can regard a thought as my thought because I believe I was the originator of the content of that thought. Second, I consider a thought to be my thought because I can integrate it into my perspective. In the following I will argue that both origination and integration are required for one to claim that a thought is one's own. I will start by considering normal communication.

Normal communication casts doubt on whether origination of thought content alone is sufficient for someone to claim ownership of that thought. In normal communication the contents of my thoughts originate from society insofar as my social interactions have been responsible for the thoughts I have. The contents of these thoughts are nevertheless mine to the extent that I integrate them into my perspective. Consequently, I can still make a thought content mine by integrating it into my perspective. Here, ownership of the thought becomes obscure because although the thought content does not originate from me, I have nevertheless integrated it into my perspective. That is, ownership of the thought is ambiguous because only one of the conditions for ownership (origination of content) is undermined, whilst the other (integration into one's perspective) holds true. Here, ownership is merely obscure; it is not wholly denied.

Telepathic communication casts doubt on whether the integration of a thought into one's perspective is sufficient for someone to claim ownership of that thought. Normally, when I say that a thought is my thought, I mean both that it appears to me phenomenologically to be in my head and that it has been integrated into my perspective. When a telepathic experience first appears in someone's consciousness though, such as the woman who felt she had a sore throat when she does not, the experience is in her head but she does not have a perspective for it. She can integrate the thought by wondering about it, but this still does not necessarily make the original thought (the sore throat) her own. Thus what telepathic experiences appear to do is to cause a conflict between the being-in-my-headness of a thought and its integration and this conflict makes the integration of the telepathic thought ambiguous. Telepathy points to the underlying assumption that the being-in-my-headness of a thought itself is a phenomenological expression of the need for origination and integration of a thought before one can regard a thought as one's own. By casting doubt on the integration of the thought, telepathy casts doubt on its ownership, too, and consequently, on its being-in-my-headness (now understood primarily as origination) as well. That is, in telepathy ownership of a thought becomes obscure because one of the conditions for ownership (integration) is undermined and as a result the other (origination) remains unclear. The thought is in my head but I cannot integrate it and thus I am not sure if I own it.

Telepathy raises doubts as to whether thoughts in my head can necessarily be integrated into my perspective; my normal communicative interactions raise doubts as to whether the contents of the thoughts I have integrated originate from me. Normal communication ultimately questions the origination of thoughts; telepathy ultimately questions the integration of thoughts. Origination and integration form the basis of thought ownership and to the extent that normal and telepathic communication question one or other of these bases for thought ownership, both forms of communication can call into question whether a particular thought is properly mine.

HOW CAN I DENY THAT THIS THOUGHT IS MINE?

Although I have argued that origination and integration are necessary for attributing ownership to a thought, and although I have shown that normal and telepathic communication can call into question whether a thought is mine by questioning origination and integration, respectively, at this stage neither normal communication nor telepathy raise enough doubt for me to forcibly deny that a given thought is my own. There is ambiguity of ownership, but not denial of it. It is this subsequent denial of a thought as being one's own that renders telepathy particularly interesting. This section will examine this additional aspect in some detail. In so doing I will be drawing extensively on the outline of positive communication that I gave above to show how telepathy of the kind discussed here is the inverse of normal communication.

I have argued that a person denies a telepathic experience as their own because that thought does not fit in with the perspective of the rest of their mental life and because the person cannot integrate it into that perspective. Nevertheless, even if a thought initially appears not to fit in with one's perspective, that thought does not have to be interpreted as telepathic. This was illustrated by the example of inspirational thoughts. Inspirational thoughts originally appear to come from outwith one's own perspective. Thus initial lack of perspective alone is not a sufficient reason for someone to deny a thought as their own. In fact, an experience that does not initially seem to fit in with one's own perspective is characterised as telepathic only once the experiencer believes for some reason that the thought belongs to *another* person.

Nevertheless, this additional criterion of having a reason to believe that a thought belongs to someone else before one can deny an experience as one's own means that a rational person can identify a thought as not their own (i.e., here, as telepathic) only once they are aware of the other person's perspective. If the woman had never discovered that her husband had had a throat operation that day, she would probably have dismissed her experience as an illusion.

This has a number of repercussions. First, the roles between giver and receiver seem to be reversed in telepathic communication. In my earlier characterisation of normal communication, the receiver engaged the act of communication. If no-one agrees to share a perspective, no communication will take place. The giver implicitly seeks confirmation that their words or gestures are being received (i.e., integrated) by looking at the other person's face, watching their reactions etc.

In telepathic communication, though, it is the receiver who seeks confirmation. Only once an appropriate perspective is found - here, the husband having the throat operation - can the woman place what she has received into a perspective. To this extent telepathic communication is the reverse of normal communication. In normal communication I receive another's communication and then take it on board by incorporating it appropriately into my own mental life; in telepathy, as characterised here, I allegedly have another person's thought in my own mental life, but only later can I attribute it to the other person. In normal communication the giver looks for confirmation that their communication has been received; in telepathy the receiver looks for confirmation that the communication was given.

Thus telepathic thoughts of this type are experienced as perspective independent communication - that is, the received thought is initially devoid of any known perspective. One makes sense of the experience by understanding it as that of *another person.* Only when someone understands the other person's perspective do they understand the experience as telepathic, and in understanding the other person's perspective, the perspective becomes shared and telepathy also becomes understood as a kind of communication.

Again, this is the reverse of my description of normal communication. In normal communication the receiver engages by understanding the shared perspective first and only later (perhaps) offering their view as distinct; in telepathic communication the receiver has a thought that has no currently known perspective and only later does the receiver understand its proper perspective as being that of another person and that therefore that perspective is now shared. Normal communication begins with thoughts placed in a shared perspective; telepathy starts from a thought that is independent of perspective.

A second consequence of needing to attribute another person's perspective as more fitting for the thought before one can regard the thought as not one's own is that often there will be a time lag between one's having the experience and one's understanding it, here, as a telepathic experience. For a while one may not be able to find a perspective for the experience at all. If integrating one's own thoughts into a perspective is part and parcel of determining whether a thought is one's own, then if finding that perspective is delayed, so too is one's ability to know whether that thought is one's own, even if that thought is in one's head. That is, the later knowledge that her husband had had a throat operation encourages the wife to interpret her experience as telepathic; at the time of her experience, though, the experience retains some ambiguity. She asks herself: Is it her thought? Is it her husband's thought? Is it her friend's thought? Information that does not fit at the time of the experience is put on hold until it can be fitted in to a perspective or discarded.

I have argued that one can deny that a thought in one's head is one's own if one finds that another person's perspective better fits that thought. Before one can find the perspective, the thought is merely ambiguous as to ownership. Yet denying a thought in one's head is more peculiar than one might imagine from the description I have given so far. Normally, in cases in which there is some doubt as to whose thought a given thought is (e.g., in cases of plagiarism), one may turn to determining the perspective around which that person embedded the thought to see if there are reasonable grounds for thinking that this person could have had this thought independently or that the person had applied the thought in a novel (and hence not necessarily plagiaristic) way. Thus, in normal communication, too, the perspectival integration of the thought enables a person to agree (or deny) that a particular thought belongs to a particular (other) person. What is unusual in the telepathy case, though, is that an individual denies that a thought that is *in their own head* is their own. This individual, too, uses perspective, or lack of it, to determine whether the thought in their head is theirs or someone else's. For instance, the woman cannot integrate the sore throat into her own perspective, but she can see a perspective for it in her husband's life. And because thought ownership requires both integration and origination, in assigning the proper integration of that thought as belonging to her husband's perspective, she will presumably also in some sense assume that her husband was the originator of the thought. The thought in her head thus becomes understood as her husband's thought. Similarly, in plagiarism, if one can find a perspective from which a person could reasonably have independently, and sufficiently richly, integrated the allegedly plagiarised thought, the integration is sufficient indication that the thought was not really plagiarised. Consequently one assumes that this person also originated the thought too in a sufficiently rich sense. The telepathic instance is strange because a technique for assigning thoughts to others from a third-person perspective (querying that perspective) is used in cases of alleged telepathy from an essentially first-person perspective (querying one's own perspective).

Again, telepathy masquerades as an inverse form of communication. In normal communication usually one knows first-person if a thought in one's head is one's own; it is usually the thoughts of others that are in doubt. In certain cases of telepathy, however, one views the so-called telepathic thought from the third-person perspective; it is a thought that is in one's own head that one doubts is one's own. That is, in telepathy one questions whether a thought in one's head is necessarily a first-person one, whereas in normal communication one can question whether another person's thought is really theirs. If the thought cannot be integrated into that (first or third) person's view, the origination of that thought is also doubted regardless of whether the thought is understood as first or third person by the person querying that thought.

The difficulty with telepathy might be thought to stem from reflection upon a thought. Normally, as we reflect upon any thought of ours, we regard this act of reflection as an objectification of that thought. The thought thereby becomes alienated from us because, as we reflect upon it, we try to strip it of the perspective in which we normally situate it. We try to understand that thought from other possible perspectives. The thought consequently loses a specific perspective and hence also to a certain extent loses its specificity of ownership. What is peculiar in reflection upon a possibly telepathic thought is that the thought is not stripped of its own perspective, but rather the reverse. The telepathic thought is initially without a known perspective, but on reflection is assigned one (e.g., it was the husband's pain the woman felt). Hence the thought is assigned an ownership that had not been assigned to it before. In acquiring a perspective, a telepathic experience is regarded as subjective because the thought is understood as situated within that specific perspective and as first-person from that perspective. In normal communication a thought is received (heard) by me and is to a certain extent objectified (i.e., placed in a shared, or shareable, rather than particular, perspective) to enable that reception; in telepathic communication a thought without perspective, or at least with an unattributed perspective, is led back to another person and thereby becomes subjectified.

Yet, though different, telepathic and normal communication do share similarities. Often the alleged telepathic thought is not identical to the other person's thought – for instance, it is unlikely that the husband had merely a constricted feeling in his throat (he presumably had an anaesthetic or otherwise his throat probably felt far worse) – yet the thoughts are similar enough for a connection to be made. This is similar to normal communication where people's perspectives have to be similar enough to engage communication, but not necessarily identical. Communication assumes similarity and difference, and so does telepathy. In telepathy two people originally have different perspectives but have a similar thought content, only one of which is located in an appropriate perspective. In normal communication two people have a similar perspective, but differing thought content. When telepathy is successful, the perspective, too, becomes established and shared; when normal communication is successful, thought content, too, becomes shared.

I have argued that for me to say that a thought is mine, I need to say both that I originated the thought and that I have integrated it. If either integration or origination is in doubt, so too is my claim to ownership of that thought. Nevertheless, my ownership is only in doubt; it is not denied as such. In this section I have claimed that to deny a thought as mine, I must additionally ascribe that thought to someone else. In instances of alleged telepathy, a person denies a thought as theirs by understanding it as better integrated into another person's perspective (and as not at all fitting with their own). By understanding the thought as integrated into another person's perspective, the other person also comes to be understood as the originator of the thought. Thus telepathy starts by questioning integration (it does not fit into my perspective) and proceeds by integrating that thought elsewhere. The ascription of the origination of the thought to the person in whose perspective the thought is integrated then naturally follows. Whereas telepathy initially questions integration, normal communication initially questions origination. In normal communication if I deny that thought content originates from me, I claim that this content originated from someone else. In academic discourse this claim is common – one refers to the sources from which one is drawing and hence one implicitly stresses that this particular thought (content) was not strictly speaking one's own. In this claim there is the implicit understanding that the person who is said to have originated the thought content also had that thought in their own perspective, just as in telepathy assigning the integration to someone else resulted in one also believing the thought originated from that person. Normal and telepathic communication exhibit the same relations, but in reverse.

CONCLUDING COMMENTS

I claim that normal communication starts out from a shared perspective, whereas alleged telepathic communication starts out from shared thought content. Normal communication breaks down the distinction of who owns particular thought content; telepathic communication breaks down the distinction between perspectives of thought. Yet, at another level, normal communication and telepathic communication are the same. Owning or ascribing a thought to someone requires one to ascribe origination and integration of the thought to one person. Normal communication and telepathy both ultimately establish a shared perspective and they both break down the distinction between the giver and the receiver. It is just the direction of the process that is different. Telepathy begins by promoting an initial ambiguity as to who is the giver and who is the receiver, and between a first and third person view, and it ends by establishing a shared perspective. Normal communication begins by establishing a shared perspective and subsequently merges the roles of giver and receiver as the communication progresses.

Most academics, contrary to the general population, do not accept the possibility of telepathy[2] and, yet, normal communication is itself just as mysterious as telepathy. It is difficult to understand why normal communication is necessary unless one assumes some privacy of thought, i.e., unless one assumes that not all thoughts have been communicated and that some thoughts remain unknown to others. Where are these private thoughts located? The natural answer to give is that they are in my head/brain. Yet normal communication suggests that there is some doubt as to whether at least the content of any thought can be regarded as truly my own, for thoughts are influenced by the external – for instance, either by other people's views or by the physical world. If one separates out thought content from a thought in one's head and one claims that I can know the being-in-my-headness of my thought, one returns to the problem of location, the mysteriousness of this privacy and its general lack of philosophical viability. The claim to knowing the being-in-my-headness of my thought applies only to the fact that one has integrated it into a perspective; one's doubt is based on the recognition that at least some of the content of that perspective has come from without.

The problem with discussing thought ownership is that it encourages us to think of thoughts as having a location, or as some kind of object that exists somewhere in space. By discussing thought ownership in terms of communication, one can think of a thought as part of a network, or a process. I have claimed that thought ownership involves integration and origination of that thought. Integration and origination usually occur hand in hand. In the act of integrating a thought, I come to understand it as originating from me, at least if I have integrated it to some sufficiently rich extent. The integration places that thought into my perspective and hence I feel it becomes mine. Likewise, origination often implies integration. For instance, if I originate a thought content, very often it will originate from my perspective and hence be integrated into that perspective, too. Because of the close relationship between origination and integration, it can be unclear whether a thought has originated from oneself or been integrated into one's perspective; the problematic highlighted by normal and telepathic communication shows that origination and integration are nevertheless distinct.

Coming to own a thought is similar to entering a dialogue with oneself. *Integrating* a thought is its *reception* into one's perspective, its *origination* is the *giving* out of its content. The distinction between origination and integration is not always clear, just as the giver-receiver distinction was also ambiguous at times. Yet one cannot enter this dialogue with oneself, one cannot come to own a thought, without presupposing the ability to communicate. One has to appreciate other perspectives before one can contrast them to one's own, before one can think of oneself as an originator, or before one can think of a thought as integrated into one's *own* perspective. Because ownership of a thought presupposes – and is hence influenced by – communication, ownership of thought is necessarily always ambiguous, despite the phenomenological certainty that one has of one's ownership of one's thoughts – of privacy of thought.[3] Ownership is ambiguous because thought always has already been influenced by others.

The "hard question" may not be that of how the world, my brain, and other people's views that are communicated to me, all mesh together to provide me with what I phenomenologically come to regard as a thought from a perspective that I alone have; the truly hard question may be quite different. Namely, if we understand a thought not as an object but as part of a network of interactions, why do there appear to be informational barriers? That is, someone who holds the view that a thought is a networked process in the physical world ought to be theoretically sympathetic to the possibility of telepathy, for a network suggests that there could be some, perhaps circuitous, route to gaining information elsewhere in that network by means other than those usually used.

Thus, although telepathy appears to be implausible to many, this may in part be due to a failure to recognise that our claim to have thoughts that we call solely our own is itself implausible. Attempts to account for our claim to have our own thoughts may either rest on grounds that are just as mysterious as telepathy (e.g., on the privacy of thought) or on grounds that would actually theoretically render telepathy possible (e.g., by hypothesising a network) and/or that would otherwise fail to stipulate why there are barriers to certain information transfers.

The possibility of telepathy opens up some central issues for the philosophy of mind. It appears that to think a thought is mine requires this thought to be embedded in a perspective and I also need to be able to understand that there are other perspectives that I can share. I need to understand that these other perspectives exist if I am to be able to differentiate myself from others and my thoughts from those of other people. Consequently, thinking a thought as mine networks thought in a larger sphere. The ability to communicate suggests that this sphere is larger than just me alone, perhaps a network. If telepathy were possible, it would suggest that relations can work in the reverse way to which we are normally accustomed – they are reflected back and inverted. Similarly, the content can be reflected before the perspective; in telepathy I find a short-cut to another's content without first needing to get the map. Thus, perhaps the network is like a hall of mirrors, each mirror reflecting a slightly different aspect of the same world and some mirrors occasionally reflecting their content directly to other distant mirrors if those mirrors momentarily shift in an unusual and yet advantageous way. Of course, if this metaphoric shift is an unusual one, this suggests that telepathy is not the norm and that usually the illusion of privacy is retained. The challenge for the philosophy of mind that telepathy raises is either to show why communication is limited, why certain thoughts are totally inaccessible to others, or to take on the possibility of telepathy. The surprise may be that assuming the latter may be the same as assuming its reverse.[4]

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[1] A longer exposition of theories about telepathy is available in Ejvegaard (1976).
[2] See Edge, Morris, Palmer & Rush (1986), pp.371-2, for an overview of survey findings.
[3] Jaynes (1976) argues that millennia ago there were merely voices that had to be obeyed rather than people having thoughts that they understood as belonging to themselves.
[4] I would like to thank Bob Morris and the Durham University Philosophy Society for their helpful comments on an earlier version of this paper. I am also grateful to the Perrott-Warwick and the Bial Foundations, whose funding supported this work.

Dualism, Causal Loops in Time, and the Quantum Observer Theory of Paraphysical Phenomena

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Abstract

Since this writer first proposed the Quantum Observer Theory (QOT) of paraphysical phenomena, PA philosophers have voiced objections over dualism and the "causal loop" problem. Hoyt Edge in his "Dualism and the Self: A Cross-Cultural Perspective" takes John Beloff to task for his espousal of Dualism. Beloff defends dualism, holds that pararnormal phenomena prove the reality of dualism, and attacks the QOT as a physicalistic theory intending to explain away parapsychological evidence for dualism. He argues that causal loops show QOT theory to be wrong. In this, Beloff cites Stephen Braude's work on the causal loop question as his proof. Braude argues against "observer theory" and exposes flaws in some of these OT presentations that have been offered subsequent to the introduction of the QOT.

This paper reviews the narrow scientific position regarding dualism. It covers the common position on dualism within philosophy, that is, why dualism is philosophically impossible and absurd. However, we note that today all of modern science stands on three pillars of physics: Quantum Mechanics, Relativity Theory, and the Standard Model; with these, science describes everything we see and everything that conventional scientific laboratories can test. All this knowledge makes it now possible to give proof that duality (as a characteristic) is necessary and a scientific fact, namely: 1. Consciousness is something real. 2. Physics defines what constitutes physicality. 3. Measurement is the cornerstone of physics; if something is not physically measurable, it is not a part of physical reality. 4. It is not possible to measure consciousness. 5. Thus, the fact that consciousness exists, but is not physically measurable, means the consciousness is real but nonphysical. Thus, Edge's and Beloff's concerns are addressed and Beloff's apprehension shown to be misplaced.

Next Braude's arguments on causal loops is considered. We support Braude's position against causal loops. However, Braude's arguments are incompatible with the established facts of teleologicality in the least action principles of classical, quantum, and relativity theories. Braude mixes causality arguments with formal logic and deviates from the formalism given for QOT.

Finally, we present the proper interpretation of the QOT. Two variants of this are mentioned, as both are instructive. One holds that the events are "forward constrained teleological" events in which the psi observer constrains the future development of the state vector. The other understanding holds that time elements are quantized, of variable length, and have differing information content as perceived. That is to say, a psi event is teleological over a span of time that includes the observers of the

system. Moreover, the part of the observers' consciousness that is involved is generally extremely small. An observer's present moment, therefore, appears as if limited to the few milliseconds of ordinary observation.

Introduction

Hoyt Edge in his "Dualism and the Self: A cross-cultural Perspective" (2002) takes John Beloff to task for his espousal of Dualism. Neither Edge nor Beloff espouse classic philosophical arguments regarding Dualism. Each, however, harbors strong feeling about the question and hold these feelings to be relevant to the overall problem of parapsychological phenomena. Both seem to feel that the question of dualism has something to say about the Quantum Observer Theory [QOT, a.k.a. Observer Theory (OT)], and *that something* is a rejection of the QOT on philosophical grounds. Beloff defers to Braude in his arguments against the QOT. Stephen Braude does not take a position on the basis of dualism, but addresses logical problems he finds in the OT presentations. It is my position that Braude's position is significant, exposing flaws in OTs that have been offered subsequent to the introduction of the QOT. As regards QOT, these arguments fail.

Scientific Position Regarding Dualism

Science had its beginnings as "natural philosophy." Hoyt Edge (1990) gives a good history of this and of the importance of Descartes in breaking out scientific thinking from the heavy hand of the Church—separating the world of the spiritual and divine from the secular, material world, a world where science might have a free hand to dabble. And in the process he created dualism. Science, therefore, defined itself in terms of this strictly physical reality. Questions of some spiritual reality were left to the Church, later to philosophical argument, and finally, with mounting scientific successes, to the status of irrelevance. Now science has little tolerance for anything but a material reality with physicalistic explanations of all phenomena.

The Interest of Science/Physics Regarding the Nature of Reality

Today, all of modern science stands on three pillars of physics: Quantum Mechanics, Relativity Theory, and the Standard Model. With these three, physics describes all that we see, from the earliest discernable moment of the Big Bang, to the vast structure of the entire universe, from the bodies that hold our mind, down to the smallest quarks and leptons that form every bit of matter that exists. Everything we see! Everything that laboratories can test!

As a consequence, most scientists regard any question of another reality beyond the physical reality as absurd. This makes it difficult to discuss the measurement problem, its significance for dualism and relevance to parapsychology, even with physicists. Matter is everything.

The Classic Philosophical Argument against Dualism

The argument is elementary. Mind-like substance and physical substance must derive from a single substance since what we experience comes from our participation in the world. The mind sees the material world. Our minds are a part of our brains. Mind is embedded in matter. It must therefore be a part of the material world. The one acts on the other and this interaction is reciprocal. Thus while consciousness may be a feature of physical matter (or the physical may derive from the ideal or mental substance) they cannot be distinct. QED, seemingly.

The Arguments for Dualism

I give three arguments. To the extent that physics is accepted as the basis for understanding what physical reality means, any one of these, I feel, constitutes a *proof* of a duality.

1. Duality is already a part of physics in the form of the equations. The classical idea of space, used in the equations to describe matter yet being nothingness itself, is now known to be both incorrect quantitatively and untenable physically. This duality not identical with mind/body dualism, but does severely limit any possibility of a viable monism.

2. Dualism is already a part of physics *a la* quantum theory:

   (a) The Schrödinger equation, $\mathbf{H\Psi=E\Psi}$, has, for any given problem, many solutions, alternate possibilities. But the Schrödinger equation is ***linear***, and so the sum of the solutions is also a solution.

   (b) We can prove that the sum has to be the solution and be present ***before*** observation.

   (c) But the ***sum is never seen***! Only one of the possible solutions is seen. That is what the observation problem is all about.

   (d) We know that the Schrödinger equation cannot be replaced with a mathematics that removes this "dispersion of states." This fact makes quantum theory dualistic. This results in a severe physical/non-physical dualism with observation as a contingency.

3. Physical/Consciousness Dualism is *provable* in 5 steps.

(a) Consciousness exists. It has, whatever it is, a delimitable phenomenology. (It does not exist in the way "Wednesday" exists. It is not a reference to a referent. Consciousness is not another term for neural activity to which one could reasonably claim it to be identical.)

(b) Physics defines what is physical. There is no more successful and complete definition of "physical."

(c) What physics defines as being physical is determined by what is physically measurable. (All physically real things in physics have this property. The experience of 20th century physics taught that the detailed aspects and limitations on measurability defined and constrained the detailed physics of all physical phenomena, relativity, quantum theory, statistical mechanics, and particle physics having been outgrowths of measurement limitations.)

(d) Consciousness cannot be measured. It is impossible by physical measurement techniques to answer the question, "Does an ice cube feel pain when it melts?"[1]

(e) Therefore, consciousness exists and it is not physical.

Thus, reality is dualistic. QED. To sweep consciousness under the rug of materialism or of a naturalism (see Edge, below) ignores that there is no way to accomplish this in the scope of a single logic system (e.g., physics).

To conclude this fact is of fundamental importance in understanding consciousness. As a consequence of this *proof*, we do not seek an understanding of consciousness by looking for the neural network that gives us consciousness, but we look for the fundamental physical-world correlate of consciousness—the interface between physical processes and conscious being (see also Walker, 2001).

Because we have indicated that consciousness is not measurable, it might seem that we have ended any hope of treating the question scientifically. The trick here lies in the fact that we have used "measurement" in the strict sense as it is used in physics. This does not mean that we cannot obtain quite good numbers that characterize this phenomenology (Walker, 1970).

Beloff's Dualism

Dualism is Beloff's defining issue. Dualism is his basis for belief in psi—or *vise versa*. Dualism is his basis for his rejection of QOT. He states (1990),

> However, I have come increasingly to the conclusion that the possibility of a physical explanation of psi phenomena is not just doubtful... but ... an absurdity that can be ruled out on *a priori* considerations. ... most scientists who reject the parapsychological evidence do so primarily because they see no way of reconciling it with physical theory. However, my position is, in a sense, the reverse of theirs: they assume that what cannot be explained in physical terms does not exist; I believe that since psi phenomena do exist not everything in nature can be explained in physical terms.

Contrary to Beloff, QOT provides an understanding of psi and it is dualistic. Except for his rejection of QOT, Beloff and I are engaged in the same pursuit. The QOT needs and is built on the existence of a duality, it defines that duality, and it shows that a duality is not only possible as a part of an understanding of physical reality, but is essential to the fulfillment of that understanding.

Beloff not only rejects QOT but any explanatory theory. And it is clear that Beloff considers the QOT to be a physical theory. He says (1990):

> Having, I hope, made clear what I understand by a physical explanation I would like next to turn to the attempts that have actually been made to explain some instance of ESP or PK... Fortunately, for our purposes, there is no need to survey each of these proposals since they can conveniently be classified into two main categories. These I shall call respectively "communicational theories" and "observational theories."

Thus on dualistic grounds, Beloff opposes QOT. The final argument against the QOT, however, defers to the causal loop problem. He states (1990):

> What worries me much more, however, is whether these theories are logically tenable... They imply the existence of a casual loop in time, since observation and feedback must necessarily come *after* whatever effects are registered and observed. Hence we seem committed in the end to saying that the cause of my *scoring* above chance in a given test of PK or ESP is the fact that I subsequently observed that I had scored above chance and, equally, of course, the cause of my *observing* that I had attained such a score was the fact that these events had already taken place!

This causal loop problem is Beloff's sole legitimate question regarding the QOT. We deal with the causal loop problem below.

Edge's position on Dualism

Edge holds to what he terms "a naturalist position." (Edge, 1990) He notes that Western dualism is the product of a tact introduced by Descartes to sidestep the oppressive powers of the Catholic Church during the 17th century. By introducing a dualism dividing mind, soul, and the domain of God from the secular world of the brain, body, and natural philosophy, he contrived and achieved an arena in which science and much of philosophy could develop without hindrance. Edge sees much of the monism/dualism problem as being artificial. Evidence of this comes to him from his dealings with non-western cultures he feels do not have this problem with dualism.

This particular aspect of the dualism problem lies outside the present discussion in that it does not represent any direct obstacle to the QOT. Let me comment, however, that the vestiges of the dualism problem are manifest in most cultures in the guise of the particular religious beliefs. While this division is not usually of great concern to the ordinary practicing Buddhist, Hindu, or most other religious layman, the question is nevertheless of as much concern to the priest or intellectual of these societies as it is to such people in western societies, even though the problem is manifest in widely differing forms. That is to say, many in these cultures, such as Buddhists and Hindus hold that the physical world is an illusion. In this, they agree with Berkeley and Hume, thus participating in the same intellectual conflict (often with their own laity) as to what constitutes reality that Descartes initiated. The argument is not absent in these cultures, but has changed power brokers.

Now, Beloff attaches himself to parapsychology in the belief that it proves dualism, surely for the satisfaction that such a reality would warm the cockles of his heart. To have this satisfaction, he feels he must argue against physicalistic explanations of psi phenomena. He correctly argues against the "communication theories" but falsely thinks that QOT is physicalistic. Edge suggests in his argument that Beloff need not worry, that he can taste the fruits of dualism, without having to choke on physicalism. Neither I not Beloff, I feel, would be comforted by the argument.

Braude's position on Dualism

Braude's position on dualism is somewhat more opaque than those of Beloff or Edge. Braude (1998) says:

> Popular writings (and some philosophical works) on parapsychology often assert that the existence of paranormal phenomena would be evidence against materialist theories of the mental, and… [favor]… dualism... But that claim is somewhat contentious and in need of clarification.
>
> There are at least two major forms of dualism. The first is Cartesian (or substance) dualism, according to which nature consists of two distinct kinds of stuff: mental… and physical… A somewhat weaker form of dualism is a level-of-description dualism, according to which nature may be described by means of either mentalistic or physicalistic vocabularies that are not entirely inter-translatable… that different aspects of nature can be characterized relative to different vocabularies, or at different levels of description... Proponents of these two sorts of position

> could be thought of as substance-monists but level-of-description dualists. They illustrate how one can hold that mental phenomena generally are not adequately described or explained in physical terms, without claiming that the mind is a distinct kind of substance or thing. One might even say that 'the mind' is merely a general term for the class of mental events...

To me, this is parsing[2] philosophical terminology, losing relevance in the bargain. Braude's depiction suggests he holds no compelling conviction that would drive him to take any particular stand on QOT. The arguments against dualism held by the philosophical community and the apparent compelling nature of these arguments, I feel, drive Braude to hold to the weaker form of a dualism, and it is in this that I feel Braude sees a need for something other than what is generally considered to be a physicalistic explanation of psi phenomena.

Quantum Observer Theory—Beloff's position

Beloff says (1990):

> Some philosophers today would deny that physics occupies any privileged position in our understanding of nature, insisting that such a view is no more than a reductionist fallacy. ... Psi phenomena are problematic precisely because they involve events in the real world and thus become candidates for a physical explanation, yet at the same time they are critically bound up with certain states of mind. Thus they cross the dividing line between objectivity and subjectivity... Classical physics ... took great pains to eliminate the observer ... Modern physics, however, taking its stand on quantum theory, contrives to bring the observer into an intimate relationship with the objects of observation. It is this that has led many contemporary parapsychologists to try again to reconcile psi and physics in a way that was not open to those operating within the classical framework

Comment: The success in understanding reality achieved by physics far outstrips the achievements of any philosopher. This observation is not pejorative. The finest carpenter in the world could not build a Boeing 747 alone. The statement merely acknowledges the vast collective accomplishments of the theoretical and experimental scientists who have put together this picture as to what "physical" means. It stands up to an enormous number of objective tests—quite literally millions. To say that it is a "reductionist fallacy" fails to be constructive or to suggest any approach that would add to our present understanding. It is not substantiated by objective, physical evidence, certainly not of the same caliber or extent that supports the scientific claim. Physics has demonstrated an extreme level of persuasiveness in its ability to prove as fact things that would otherwise have been unimaginable. Quantum mechanics is described by some as the philosophy that would never have been dreamed of. No single individual has any hope of dismissing the teachings of physics and concluding a replacement philosophy that will outstrip what physics accomplishes in the form of two short equations and one brief list of particles.

Quantum mechanics did not, as Beloff says, "***contrive***" to bring the observer into an intimate relationship with the objects of observation. Quantum mechanics was carried kicking and screaming into this position. The "measurement problem" exists because physicists wish to find some way out. This fact attests to the power of physics that this forced inclusion of consciousness/observer is a by-product of Quantum mechanics, whether one likes it or not!

Beloff also says (1990):

> ... we seem committed in the end to saying that the cause of my *scoring* above chance in a given test of PK or ESP is the fact that I subsequently observed that I had scored above chance and, equally, of course, the cause of my *observing* that I had attained such a score was the fact that these events had already taken place! Cause and effect here chase each other in a temporal loop rather like a dog chasing its own tail. Now I have, in the past, defended the idea that there is nothing logically vicious in the idea of backward causation (Beloff 1977), but I am not at all sure that I would be prepared to defend the logical propriety of a causal loop. There must, one feels, be a more convincing answer to the question why a given subject guesses correctly on a given trial than the mere fact that he was subsequently *found* to have guessed correctly!

Beloff's prejudice against the QOT derives from his leanings toward dualism and justified by noting the causal loop problem. As to the charge that QOT is "rather like a dog chasing its own tail," the short answer is that this is instead a teleological phenomenology. I remind Beloff that physics is already teleological. A detailed discussion of this is given below.

The Edge on QOT

Edge gives the following statement (Edge, 2003):

> Now for the quotable part: I've never been convinced that the notion of observation gives us a robust enough concept of consciousness to get us very far (and certainly not into dualism). My understanding is that measurement by a machine can "collapse the state vector," so "observation" should not contain all of the traditional notions attributed to conscious observation, and hence should not imply conscious activity in any robust sense. "Observation" is too broad in OT to give us a traditional, robust consciousness.

The concept of the observer in OT, indeed, does not give a robust concept of consciousness. This is the reason that it is essential to have the quantum consciousness theory (QCT), the original form of this theory, the one that I proposed. There we have the quantum tie-in to the brain; how much of the brain, what parts, and what mechanisms of the brain are involved; why it is local to the brain, the mechanism of will caused state vector collapse, its tie-in with the brain and consciousness, both phenomenologically and quantitatively, and why it is non-local. This together with the QOT and the machinery of quantum mechanics sets realistic bounds on the mechanism.

Edge's statement brings up three questions that we restate and answer as follows:

1. Why not just accept that "measurement by a machine can collapse the state vector"? The brief answer is that the machine can also be included in the Schrödinger equation solution. When this is done, the same measurement problem is still present. Something other than physical interactions must be introduced to stop the Schrödinger equation's propensity for ever expanding the number of states.

2. Therefore, we must introduce something that lies outside of the ordinary physical world. That is the reason that we must have a *duality*. That is the answer to Hoyt Edge's second question: "Where does any dualism come in?" The Schrödinger equation, because it is constructed out of mathematically "complex" quantities, quantities consisting of both real and imaginary numbers, is already dualistic in the full sense that philosophers have used that concept. These states of the state vector consist of components that lie outside the "real" plane, outside ordinary physical reality. They have this property not only as mathematical instruments used for calculations, but as representations of an overall reality in which physical reality is but a part.

3. What is the tie-in among: observation, consciousness, and traditional notions of conscious observation?

Without a theory of consciousness that embraces the known characteristics of consciousness and accounts for these characteristics, an answer is impossible. There is no theory of consciousness that has been proposed that even attempts to do this other than the quantum consciousness theory (QCT) that I have proposed (see Walker, 2000).

This quantum consciousness theory associates consciousness with an ongoing continuum of quantum mechanical interactions in the brain that serve as the interface between consciousness and physical phenomenology.[3] At any moment of this consciousness, this quantum interaction couples a subset of the brain's synapses. The specific interaction envisioned takes place by means of quantum mechanical tunneling that produces successive "state vectors" (or wave functions) followed, alternately, by successive individual states describing specific synaptic firing events. The quantum states are the basis for consciousness, the particular configurations of the synaptic firing potentialities provide the content of the consciousness.[4]

Quantum theory tells us that this quantum coupling is a local process. That is why we are conscious of what is going on in the brain. These states are defined by the conditions of the brain. The number of synapses that are so coupled provides a measure of how much information is carried. This information data rate $C \approx 5\times 10^8$ bits/sec.

Quantum theory is mute as to what causes specific synaptic firings to occur out of these quantum possibilities. The cause cannot be physical in the conventional sense. Quantum theory itself fails to give any mechanism describing what causes a specific state of the state vector to occur. Specific synaptic firings, however, do occur. Quantum mechanics tells us how to compute the probabilities, and it tells us that these probabilities are not classical probabilities that arise from an ignorance of an actual real single state. Quantum theory insists that the state vector before measurement is the ***complete physical description*** of the system. The cause of specific synaptic firings, therefore, cannot be physical in any conventional sense.

One state will occur. Because this state selection happens in association with consciousness, has a range of potentialities that could happen, and that one specific "course of mental action"[5] does happen as a result of the state vector collapse, this cause (the nonphysical thing that causes the state selection) satisfies the requirements of a philosophical definition of "will."[6] *Will* causes the collapse. Details as to how this state selection can be triggered and as to its structure are given elsewhere by Walker (1988).

Now, we know how to calculate the Shannon information measure involved in the state vector going from the potential for any one of the collection of synapses firing to one specific synapse firing. The amount of information associated with this ***will*** is $W \approx 6\times 10^4$ bits/sec as an ongoing process.

Whereas quantum theory is mute as to what causes specific events to occur, it is not silent about what is to be included in this process. Everything is included. State vector *collapse* is non-local, and for that reason and the requirements of relativity theory, atemporal. That means that the will is non-local and atemporal.

How does it fit in with the Hoyt Edge question? Observation in quantum theory involves state vector collapse in specific system configurations. In the case of the observation, state vector collapse is tied to the will that is one part of the mind, the other being the local consciousness. These two are intertwined.

Now, what of those traditional notions of conscious observation? After we have observed in the quantum mechani-cal sense,[7] we then will experience consciously what we have willed quantum mechanically. What we will in the conscious mind, however, is not necessarily the same as what happens quantum mechanically. We may desire something consciously, but it is our *quantum will* that brings it into being, or fails to. That $W \approx 6\times 10^4$ bits/sec can do a lot. Nevertheless, W is balled up with the consciousness $C \approx 5\times 10^7$ bits/sec (Walker, 2000) part doing the wishing, and it alone cannot deliver.

Braude Lops at Loops

"A motley progeny, the latest of which is really a multiple birth... called the *observational theories*." That is Braude's (1979, pg. 349) charge.

I would have to agree. There has been some effort by people to separate quantum theory from QOT. Doing so severs the theory from its scientific foundation and logic. Schmidt offered one version that is just that the observer biases probabilities. In this, he reproduces the "biased probabilities" theory of T. N. Gridgeman (1959). Both Millar and Schmidt attempt to create a causal flow explanation for the OT concept. Braude shows it does not work. Only in the case of the theory founded in quantum theory itself do we find the logic and physical phenomenology we need. Since quantum mechanics has been adequately proved to be correct; parapsychology is not in the position to do anything but accommodate to that reality. It is this approach that carries us to a correct view.

Braude makes this odd statement (1988, pg. 275): "The OTs were developed to analyze the results of a particular set of experimental situations originally conceived by Schmidt." Braude's statement is entirely fictitious. The experiment carried out by Schmidt was a replication of an experiment originally envisioned and conducted by Bierman and Houtkooper (1975) to test a prediction by this author based on the QOT.[8] The QOT was developed to explain the results of the extensive experimental findings originally conducted by J. B. Rhine and his associates (following work of Charles Richet (see 1923)).

Braude (1979, pg. 349) continues with the charge that the theory is "nonsensical and lacking in explanatory power." I love it when philosophers say a working scientific theory does not have explanatory power. It reminds me of the argument between Isaac Newton and his famous detractor Robert Hooke that his theory did not have explanatory power. Newton did not explain how one body produced the gravitational effect on another distant body through the intervening vacuum. How can there be a pull of one body or the other when there is nothing in between? And indeed as Isaac Newton was the first to acknowledge, the theory did not explain this. Newton's theory ***described*** this reality. We have learned that scientific theory is not required to explain its foundation assumptions, only show that they account for the observations.

Braude characterizes his understanding of the theory stating (1979, pg. 351): "According to the OT, subjects can first of all exert a psi influence only on random events, and then only if the subject receives feedback of the result of his effort." Both are incorrect. First, it is not the randomness that is important, but the fact that there exists a quantum state vector, the collection of possible outcomes. Secondly, it is not necessary to have the same observer both initiate the psychic action and observes the outcome. The theory is not one about the individual reading his own mind! This point is fundamental. This comes out of what is known in quantum theory as the "Wigner's friend paradox."

Now in order to solve this dilemma, I proposed that *all* observers bring about the collapse into a single final state. This resolves this problem and it predicts that a subject in a psi experiment can achieve extra-chance, paranormal results on targets that he never subsequently observes. I told the story about Puthoff and his experiment with Pat Price at the 2002 Paris meeting of the PA:

> I remember Puthoff telling me his psychic had a perfect run. This was right after Pat Price died. "Because he has died," Puthoff said, "he will never get to see the targets."
>
> I thought Puthoff knew that I had predicted that result. It comes right out of the physics! There is no first observer according to relativity theory! I had made the prediction to Bierman at the 1972 PA conference in Edinburg! It is clear also from my papers.
>
> So, I answered, simply, "Right!" I found out later Puthoff thought Observer Theory meant Price had to read his own mind sometime in the future. With his death, there was no future Pat Price to be read! He never saw the targets. I found out later he was telling people he had disproved this Observer Theory! — *my theory*!

In regard to this statement, Braude says: "Notice that the OT do not *simply* permit a kind of retrocausation. They actually *require* it." Braude says: "The subject's PK effort, for example, is effective only after observing feedback of earlier results. A PK effort made during target generation but before observation of feedback will, on this view, be totally ineffective." Having misunderstood and misinterpreted the QOT, Braude leaps to that false conclusion. The fact is all observers participate in state selection. They all share this occurrence as if it were, as it is, one moment of time. It is one moment of time for the experience of the event selection.

Braude seeks to show a logical inconsistency in the OT by means of the following demonstration (1979, pg 353ff).

1. ***Cba*** & ***Cab***, that is that the OT requires that ***a*** causes ***b*** and ***b*** causes ***a***.

2. The transitive law says: $(x)(y)(z)[(Cxy \ \& \ Cyz) \rightarrow Cxz]$ i.e., for events ***x***, ***y***, and ***z*** where ***x*** causes ***y*** and ***y*** causes ***z***, we conclude that ***x*** causes ***z***.

3. $(x)(y)Cxy \rightarrow x \neq y$.

4. $(Cba \ \& \ Cab) \rightarrow Cbb$.

5. 1.&4. give us ***Cbb***.

6. 3.tells us that $Cbb \rightarrow b \neq b$.

7. 5. and 6. give us $b \neq b$, which is not tolerable.

This argument fails on 3 grounds:

1. In quantum mechanics there already exists—as one means to handle the strange behavior of quantum systems—what is called the "three valued logic" [see Reichenbach (1944)]. This says that one can have not just the usual 2 choices: ***a*** or ***not-a***, but it can be that one has 3 choices: ***a***, ***not-a***, and both ***a&not-a***.

That is to say in different words that some "***a***" thing exists, or its negation exists, or both that it exists and that it does not exist—at the same time.

2. This use of "***Cab***" is a misplaced adaptation of true logic. It pretends to be Aristotelian Logic, but it has nothing to do with logic. It is simply an adaptation of classical "cause-effect" inference that has been superceded by the discoveries in classical mechanics, quantum mechanics and relativity theory over a century ago.

That is to say, Braude would have us think he is making a logical statement of the type:

x implies ***y***; ***y*** implies *z*; therefore ***x*** implies *z*

This is an example of true logic. However, the statements:

x causes ***y***; ***y*** causes *z*; therefore, ***x*** causes *z*

is not a statement of formal logic and it also is not true. Formal logic does not imply the same formality for causality. The application to causality does not follow.

3. This is not a representation of the logic or the physical process represented by the QOT. We do not, in the case of QOT assume Braude's statement 1: ***Cba*** & ***Cab***, that "***a*** causes ***b***" and "***b*** causes ***a***."

The "viscous circle of an event ***E*** both causing and being caused by the event ***E***'" is the foundation of all the remaining arguments of Braude's case.

In further discussing the problem, Braude make other statements at variance with the correct nature of the QOT. He states (1979, pg. 354): "Now since S's PK effort is on an earlier state of his own brain, and not on the target generator…" Not true. The PK that happens to the state vector can include *parts of the brain* and/or *elements of the target generator*—either or both.

But in making this error, Braude gives us the following outline of a PK effort:

(i) A target ***T*** is generated.
(ii) ***S*** guesses correctly that ***T*** is the target.
(iii) ***S*** learns after his guess whether he guessed correctly.

(iii) must have been caused by (ii), but for (ii) to have been paranormally correct, (iii) must have caused (ii). We seem forced to relay on a viscous circle:

(ii) Φ (iii)

We are then led to other examples of this circularity:

(ii) → (iii) → (iv) → (ii)

supposed optional routs OT theorists might propose (or indeed have proposed, in the bodies of Schmidt or Millar) include:

(***C***) (i) → (iii') → (iv) → (ii)
(***T***) (i) → (ii) → (iii') → (iv)

(***T***) (ii) → (i) → (iii') → (iv)

only to return, of course, to the fact that:

(ii) → (iii) → (iv) → (ii)

That is that this rout does—as it must—return to just one more circularity—must, indeed, because it is the wrong understanding of the QOT as it is the wrong understanding of quantum mechanics and as it is the wrong understanding of the nature of time itself.

Braude elaborates on his objections to the understanding of OT that has in fact been proffered by others than myself. He points out that in the case of, say, ESP:

> "S makes his guess at time t and that at time t'> t he observes feedback of his hit and uses the appropriate retroactive PK… thus at time t' S *has already guessed*, and nothing done at that time can change this."

Braude thus makes appeal to the proverb: *Even God cannot change the past.* Alas, we can change the past! The experiments done by Joop Houtkooper and Dick Bierman (1975), later replicated by Schmidt, confirm this fact, this prediction of the QOT. And indeed QM affirms that we can.

Braude's difficulty with the QOT is to be found in an understanding of time based on classical ideas, ideas that have been superceded by relativity and quantum theory.

Questions of Logic

First: This "causal loop" fallacy argument, that QOT appears to require a foreknowledge of the consequences of present actions, fails as an acceptable logic even on grounds of classical mechanics.

Our ideas of causality ***as an absolute necessity in all natural phenomena*** grew out of the *F=ma* equations of Isaac Newton. They argue that there must be a cause for each effect. All this was overturned by the work of Hamilton. In the 19th century, Hamilton developed a different approach to the basic equations of classical physics. It is known as the Least Action Principle. This approach shows that any object moves so as to select the path, the *total path*, that minimizes its ***action***, the quantity $\int H dt$. This is as though the object first looks at the entirety of all possible paths and then chooses to take the one that minimizes this integral. It does this in a time independent fashion. Arnold Sommerfeld (1950) gives an excellent discussion of this teleological nature of classical physics in Volume I, *Mechanics*, of his well-known college physics textbook series.

When the revolution of quantum mechanics came, it was this Least Action form of physics in the guise of the Hamiltonian that provided the basis for the reformulation of mechanics. If you wish for an easily accessible presentation of quantum electrodynamics, go to Feynman's book, *QED: The Strange Theory of Light and Matter* (1988); there you will find this same teleological basis used by Feynman to explain this otherwise most difficult subject of modern physics.

Second: The "causal loop" fallacy argument fails even to be an acceptable logic in the face of the already accepted physics of relativity. In relativity theory, there is no absolute space, no absolute space-time. There is in general no *first observer*. That is what relativity means.

Third: Timeline causality is violated in quantum mechanics by there being no limitation on any causality within the limits of the uncertainty principle. There, the limitation is given by $\delta E\ \delta t \approx \hbar$. Any time element less than that given by this expression has no meaning. Within that causality limit, even impossible things happen—that is at least, in the guise of violating energy conservation, particle number conservation, etc.

Fourth: The argument against QOT is not acceptable logic. Are we to suppose that there would be some additional observer that travels on the back of the actual observer who goes out with *me* to look at what will be, so that *I* can pick and choose? This is not what the theory says at all. Are we to suppose that the nature of time cannot be anything but this hackneyed idea of the instantaneous moment that has already fallen before the advance of quantum theory and that has been violated by relativity theory?

But if psi events happened this way—travel forward in time to make and then back to make it so, no one could ever know anyway—memories, records, knowledge of the virtual past, would be gone. It does not happen this way; it is not an acceptable presentation of the theory or acceptable argument against the theory.

Fifth: It is not acceptable science. When we have all the data that we do have now showing that the theory works, when it accounts for these data from within the formalism of physics as it does, it has always been the case that facts, experimental results, take precedence over preconceptions. Armchair philosophy yields to the shiny laboratory bench.

What is the Correct Picture of Quantum Observer Theory?

Now let us go to the correct conception of the QOT that allows us to picture how psi phenomena happen.

I said *picture*, but there are *two pictures* I would suggest: a "future constraint picture" and a "variable time-span" picture. I will describe here only the second

The variable span-of-time picture:

There has always been a problem with the concept of the *present* moment of time. The *now* of the present has always problematically been imagined to be infinitely brief. We do not exist in the present—it is infinitely narrow. It is a zero present.

While relativity theory is still bridled with this harness, quantum mechanics has managed to slip the yoke just a bit—to carry the imagery too far. In quantum mechanics, the time element has a minimum span. The Heisenberg relation $\delta E\ \delta t\ \approx \hbar$ specifies this minimum time element δt. This relationship makes clear that the length of the present moment varies from one interaction to the next.

However, this conception of time is further complicated. There are two kinds of time: the continuous time-flow in the basic equations of physics, and discrete time in state vector collapse. Von Neumann (1955) called these type-I time and type-II, respectively. To resolve these problems with the fundamental nature of time, one must take into account the machinery that gives rise to state vector collapse.

The necessary machinery is presented by Walker (1988). The paper shows how, given certain unique physical interactions typical of physical measurements and of human and animal observations, the modified Schrödinger equation transforms from an imaginary collection of states into one real state. This process is not instantaneous, but involves a finite interval of time that spans the measurement events in type-I time. Thus the type-II time interval spans a time period in type-I time. It is assumed in this variable span of time picture of QOT that all the associated consciously observed events *essential* to state vector collapse span this time interval.

Now, most observations span only milliseconds. However, for psi, time intervals are tied to the call-hit state. The state is "selected" *in toto* by our *will* and it is experienced as *one moment.*

The causal loop is broken; there is no loop. The present moment extends from the beginning to the end of the events over which the psi event lasts. But it does not include everything that we experience. For a single Zener card call, the psi event would involve 2.3 bits of information. It is just one millionth of the usual 40 ms present-moment's consciousness.

Now let us return to Braude's earlier PK argument mentioned above.

1. From classical physics, all three events can be regarded as teleological.

2. In relativity theory, ***T*** and ***S*** each have their own clocks; the order of the events depends on who observes the events.

3. The target ***T*** may have been generated by a quantum event in which the Heisenberg uncertainty places constraints on the temporal uncertainty.

4. ***S*** has a mind that observes what happens. Each element of what ***S*** experiences and causes to happen by means of observation of the overall state has its own type-II clock that measures out the length of that experience's moment. Whereas most bits of ***S***'s experience of these events will happen in the 40 ms time-per-event framework, buried in ***S***'s experience will be maybe one or two bits that extend from target ***T*** generation, ***S*** guessing, to ***S*** learning the outcome. All happen as one type-II moment pulled together as if there were no intervening type-I time-flow.

Conclusion

We have surveyed the arguments concerning dualism and shown both the scientific and philosophical basis for dualism. We have shown that the philosophical concerns for rejecting the QOT stems from a misunderstanding as to what the theory says. We have examined the causal loop difficulty and shown that the arguments are not based on concepts that are consistent with modern physics findings as to the nature of time. Finally, we have presented the proper conception of temporal order in QOT, showing that it is consistent with concepts in modern physics.

Notes

1. One can measure neural activity, but not the consciousness behind that activity. We must not overlook the present abilities to measure directly all the physical contributors to brain functioning, either in fact now or conceptually at some time in the future. Advances in physics have come from improvements in our ability to measure the things that we already understood as being the elements of physical measurability in Isaac Newton's time—intervals of time, lengths, weights. To say we might someday be able to measure consciousness as a physical thing is like saying we might be able to achieve absolute zero, devise a perpetual motion machine, or measure any of the things that physics has already concluded cannot be measured that serve as the underpinnings of modern physics.

Our knowledge of physics allows us to understand why we cannot make a perpetual motion machine. That knowledge tells us the consequences that would follow if that were possible. Our understanding of physical measurement as such allows us to understand that no such measurements, limited as they are to time, distance, and force, can give us any number that we would recognize as being the *direct* measure of consciousness itself.

2. *Parsing*, as in President Bill Clinton's grand jury testimony: "It depends on what the meaning of the word 'is' is"

3. Despite the fact that consciousness is associated with the ongoing quantum mechanical process in the brain, any physical measurement on any part of this, i.e., to determine what an electron in a synapse is doing, collapses the state, gives only a single "byte" of information, not the entire state, and does not yield the "other side" of the phenomenology. No physical measurement measures consciousness itself. We can, however, measure physical correlates of consciousness. This is not a trivial difference. It is fundamental in that it shows that these two, consciousness and physical reality, are separate.

4. Generally, these quantum state vectors give a configuration of the possible firings of the synapses and, as a result, imprint onto our consciousness a portion of the information the brain handles at that moment. However, this configuration may itself be a potentiality, as yet uncollapsed, encoding onto our consciousness some potentiality for altering the external world the mind observes.

5. The state vector describes the interaction of a subset of the neuronal/synaptic activity of the brain at any moment. That mental activity can be altered by the particular synapse that *does* fire. This would then alter the "course of mental action." Depending on the particular synaptic firings that happen from

out of a range of possibilities, the consciousness and the brain's behavior is caused to take one course rather than some other course. This is the usual concept of *will* in philosophy.

6. Webster defines *will* as: 1. the faculty of conscious and especially of deliberate action; the power of control the mind has over its own actions: *the freedom of the will.* 2. power of choosing one's own actions: *to have a strong or weak will.* Stephen Palmquist in his *Glossary of Kant's Technical Terms* defines *will* as "the manifestation of *reason* in its *practical* form (see *practical*). The two German words, 'Willkür' and 'Wille' can both be translated in English as 'will'. Willkür refers to the *faculty* of choice, which for Kant is just one (*empirical*) function of the more fundamental faculty of practical reason (= Wille). As used in this paper, *will* is taken to be substantially the same as Kant's Willkür, the will being the 'faculty of deliberate action' associated with *consciousness*, together constituting *mind*, with mind being the nonphysical side of the ongoing state-vector/state-vector-collapse involving synaptic brain processes. In quantum mechanics, people such as von Neuman and Wigner have typically separated out the state vector "set-up" from the state vector collapse or state selection. The state vector itself is *complex* (not exactly something real) sometimes described as being *rotated out of the real plane.* State vector collapse on "measurement" or observation gives one (1) real physical outcome from the range of possibilities allowed by quantum mechanics.

7. The expression, "observed in the quantum mechanical sense," covers the technical conglomerate of both what the physical brain has to do to instigate state vector collapse (see Walker, 1988), consciousness that experiences the state vector, and the resulting collapse of the state vector brought on by the *extraphysical* will.

8. Bierman (1996) lists 26 retro-PK experiments in his meta-analysis database with an overall *z*-score of 5.31.

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Conversation analysis and parapsychology: experimenter-subject interaction in ganzfeld experiments

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Abstract

This paper introduces the methodological and substantive approach of conversation analysis (CA), and argues that it can be used to analyse potentially significant linguistic practices during research in parapsychology laboratories.

CA is a rigorous, qualitative method for the study of naturally occurring talk-in-interaction. It investigates how turns in interaction collectively form highly regular patterns: sequences of interactions. These sequences are analysed as vehicles through which interpersonal activities are managed collaboratively by participants. In this sense, talk is treated as having an action orientation.

To establish the relevance of CA, three arguments are presented. First, it is observed that a typical ganzfeld trial is managed through everyday discursive activities, from the moment the subject arrives at the laboratory to the point where they leave at the end of the trial. The work of a parapsychology laboratory thus relies upon on a largely unexamined set of interactional moments. Second, the paper discusses aspects of the methodology of CA, a key feature of which is the use of distinctive transcription techniques. These have been developed to capture aspects of interaction omitted from records of the spoken word, such as the organisation of turn-taking and characteristics of speech delivery. It is argued that CA methods, aided by detailed transcripts, can identify important patterns in the routine practices of laboratory research. Finally, the paper illustrates the empirical approach of conversation analysis. Using data from ganzfeld experiments conducted at the Koestler Parapsychology Unit during the mid 1990s, the paper discusses some properties of experimenter - subject interaction during the mentation review period.

During the review, the experimenter goes over the images and sensations reported by the subject to remind them of key moments, or to encourage further recollections. There are various ways in which the experimenter can introduce an item (the subject's report of a sensation or an image) in the review. The main components seem to be some combination of the report of the item, the modality of perception/knowing ('saw', 'sensed', 'heard') and a temporal marker which

connects that item to the flow of the original mentation ('next', 'and then').

One way in which an item can be introduced is by a 'you said' preface:

```
E:    ....Shapes in this funny house and shapes look
      like bunny rabbits with weird ears.
->    Then you said sheep lots of sheep.
P:    I didn't know what it was
E:    Okay. Something in the ceiling
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There is a puzzle here: given that the subject's original mentation was a verbal report, *any* item could be introduced by the experimenter as something that the subject had said; however, 'you said' prefaces occur irregularly. It is argued that 'you said' prefaces may be performing a particular kind of interactional work: identifying and addressing possible 'trouble' arising from the experimenter's confusion about the item when it was reported in the original mentation.

The paper concludes by raising some methodological and substantive areas in which CA might be of use in parapsychological research: identifying the interactional characteristics of laboratory practices; providing the basis to investigate the interactional correlates of anomalous communication, and as a model for the analysis of anomalous communication in everyday life.

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Introduction

Conversation analysis (hereafter CA) is a formal, qualitative method for the analysis of naturally-occurring interaction. It developed out of the pioneering studies of Harvey Sacks and his colleagues Emmanual Schegloff and Gail Jefferson, and is now widely acknowledged as the pre-eminent method for analysing the socially organised, tacit sense-making activities through which participants in all kinds of verbal interaction produce intelligible, meaningful conduct (Hutchby and Wooffitt, 1998; Sacks, 1992). CA seeks to show how turns in interaction collectively form highly regular patterns: sequences of interactions. These sequences are taken to be the site in which interpersonal activities are managed collaboratively by participants.

While CA shares many concerns with pragmatics, speech act theories and sociolinguistics, it emerged initially to address substantive concerns in sociology. In this it can be said to stand at the intersection of sociology and linguistics. But it has implications for psychology too: cognitive scientists working in artificial intelligence and human-computer interaction have drawn extensively from CA findings about the organisation of everyday interaction in the design of speech based interactive computer systems (Luff *et al*, 1990); and in the past fifteen years, it has become extremely influential in radical developments in European social psychology, such as discourse analysis, discursive psychology and rhetorical psychology (Potter and Wetherell, 1987; Edwards and Potter, 1992; Widdicombe and Wooffitt, 1995). But why should CA be relevant to *para*psychologists? Why should parapsychologists be interested in a social scientific method for analysing the orderly properties of how people conduct interaction through talk? To make a case for the relevance of conversation analysis, we will discuss some findings from ganzfeld research, and then go on to consider the extent to which the ganzfeld procedure relies on verbal interaction.

Interaction in parapsychology laboratory settings: the case of the ganzfeld procedure

Ganzfeld ESP experiments have consistently reported significant results (Bem and Honorton, 1994; Radin 1997). Indeed, some more recent experimental results suggest that the autoganzfeld method allows the prediction of significant results (Parker *et al* 1998), and therefore offers the possibility of a replicable demonstration of anomalous communication (see also Schlitz and Honorton, 1992; Bierman, 1995; Morris *et al*, 1995; Broughton and Alexander, 1995). However, there is still disagreement within the parapsychological community regarding the ultimate status of the ganzfeld method (Milton, 1999; Schmiedler and Edge, 1999; but see Storm, 2000, and Storm and Ertel, 2002). One major concern is that the ganzfeld methodology does not in every instance produce significant results.

In the light of the promising yet variable performance of the ganzfeld method, attention has turned to the psychological characteristics of the successful/unsuccessful experimental subjects. Evidence suggests that certain personality or psychological characteristics, such as a predisposition to believe in paranormal phenomena, a history and expectation of personal achievement or tendencies towards extraversion, may be associated with successful ganzfeld trials (for example, Parker *et al*, 1998; Honorton, 1997; Schlitz and Honorton, 1992). There is strong evidence, then, that psychological factors have an impact on anomalous communication in ganzfeld conditions.

However, there has been little systematic investigation of the research into the social relationship between the experimenter and the subject, especially during the experimental procedure. This is a curious omission, for three reasons. First, experimental evidence from ganzfeld and other psi experiments suggests that broadly 'positive' experimenters who believe in psi obtain better results that negative experimenters who do not (Honorton *et al*, 1975; Watt, 2002; Wiseman and Schlitz, 1997). Second, the importance of the rapport between experimenter and subjects, and the experimenter's 'warmth', regularly informs more general accounts of the ganzfeld methodology (for example, Schlitz and Honorton, 1992; Parker, 2000; Schmeidler and Edge, 1999). Finally, general discussions of the characteristics of psi conducive laboratories draw attention to the effect of the experimenter's relationship with the subject (Giesler, 1986; Honorton *et al*, 1975; Schneider *et al*, 2000). There are, therefore, long-standing concerns within parapsychology about the effect of the experimenter on experimental outcomes. With respect specifically to the ganzfeld methodology, the broad tenor of these discussions is that a supportive or sympathetic relationship between experimenter and subject may have a significant bearing on the outcome of the subjects' performance (Morris *et al*, 1995). Yet, apart from anecdotal experience, little is known about the way the social relationship between experimenter and subject is developed, maintained or negotiated.

What is clear, though, is that any relationship between experimenter and subject will be based on talk: ordinary verbal interaction.

Consider the ganzfeld experimental procedure. There has been considerable discussion of various aspects of the ganzfeld methodology (Dalton *et al*, 1996; Honorton, *et al*, 1990; Hyman and Honorton, 1986). However, there has been little attention to the fact that the entire process largely depends on the participants - subjects, experimenters, assistants - using everyday language to conduct a variety of interactional tasks. (In the following discussion, I will base my remarks on the ganzfeld procedure developed at the Koestler Parapsychology Unit at Edinburgh during the mid 1990s. However, I hope that the wider relevance of these observations will be apparent.)

There are various interactional episodes which accompany a single ganzfeld trial. It is likely that the subject will be met by one of the experimenters, or a representative, when they present themselves to the laboratory at the arranged time. There will be greetings, and, in all likelihood, activities such as inquiries about health, discussion of travel problems, comments in the weather, and so on. Thus the experimenter and subject will have been involved in various social activities prior to the experiment: discussion of the ganzfeld procedure, talk about the broader activities of the laboratory, general 'small talk', and so on. During these moments, a relationship, however temporary or superficial, will be established.

The mentation review, however, merits special as it is a key part of the ganzfeld procedure. During this stage, the experimenter reviews the subject's verbal reports of the images and sensations experienced during the sending phase. This review will be conducted through a series of interactional episodes. Thus the experimenter might list images or sensations reported during the mentation, waiting for the subject to confirm them, or expand upon them. Moreover, the subject has had a chance of reconsider their mentation, ensuring that potentially salient images will be fresh in the mind prior to the judging phase.

Unlike the mentation period, in which the experimenter passively monitors and takes notes of the subject's verbal report of images in consciousness, the review period is properly interactional: both experimenter and subject take turns to talk as they review the earlier mentation. Indeed, this part of the procedure may be mediated exclusively through verbal interaction: the data to be used to illustrate the CA approach come from the Koestler Parapsychology Unit ganzfeld experiments (Morris *et al*, 1995), in which experimenter and subject communicated through headphones from separate rooms, thus eliminating nonverbal cues such as body posture and facial expression. The verbal conduct of experimenter and subject in the mentation review phase will therefore be underpinned by their tacit knowledge of everyday interactional practices: the organisation of turn-taking, the management of clarification and correction, the coordination of non-verbal activities such as laughter, and so on.

Conversation analysis: the study of actions in interactional sequences

First, a warning: the term 'conversation analysis' may lead to confusion, as researchers study many kinds of interaction which would not be considered conversational: one of the growing areas of research in CA is the study of institutional talk such as courtroom interaction, doctor-patient consultations, calls to radio talk shows and political interviews broadcast on television (Boden and Zimmerman, 1991; Drew and Heritage, 1992). Increasingly, then, CA is regarded as a method for studying all kinds of naturally occurring interaction.

Second, a distinction: although CA is a qualitative method, it should not be classified along with other interpretative approaches; it has clear and formal methodological procedures which mark it out from more loosely formulated qualitative methods. Moreover, it is not to be confused with relativist approaches such as social constructionism and postmodernism: it seeks to establish formal, rigorous and cumulative knowledge claims about the structures through which social action is conducted.

Third, a declaration: in CA studies, interaction is viewed as a domain of activity in its own right: it is not regarded as a simple expression of psychological idiosyncrasies or personality, nor as a canvas onto which the significance of sociological factors, such as participants' relationship, class, gender, status, and so on are projected. The analyst does not begin research with a series of pre-established and theory-led questions to be explored in the data. It is taken that the world is already interpreted by the participants themselves. It is important to investigate *their* interpretations of what is happening in interaction, rather than to impose somewhat arbitrarily a set of assumptions and relevancies which might in fact have no bearing on the details of participants' actual conduct. This is an issue we will return to later.

In the first instance, CA is concerned to examine how turns turns at talk perform actions: greetings, questions, answers, requests, assessments, accusations, agreements, rebuttals, clarifications and so on. One of its distinctive features is the analysis of how any particular utterance is designed to 'fit' with, or show its relevance to, a prior turn. In the focus on the moment-by-moment unfolding of contributions to interaction, CA is able to explore how successive turns cohere into action sequences which exhibit recurrent and stable properties.

To illustrate this, we will begin by looking at a fairly simple kind of sequence: paired action sequences.

Intuitively, it seems that some kinds of conversational actions belong with each other. Greetings, such as 'hi' - 'hi' seem to form a 'natural' pair. It also seems natural that questions will be followed by answers, and that offers will be followed by acceptances (or declinations), and so on. To provide a formal account of their generic properties, Sacks proposed the concept of the *adjacency pair*. Heritage (1984) provides the following formulation. An adjacency pair is a sequence of two utterances which are adjacent, produced by different speakers, ordered as a first part and second part and typed, so that a first part requires a particular second (or range of second parts) (Heritage 1984:246.) An invitation, then, would be the first part of an invitation-response pair.

However, there is something quite interesting about certain kinds of paired action sequence. If a question is asked, it is apparent that what should come next should be an answer, or some reason why an answer can't be provided. Some first parts of pairs, however, could be followed by one of two second parts: for example, an invitation can be followed by an acceptance or a refusal. Similarly offers can be accepted or declined. It is noticeable however, that these kinds of possible second parts are not equivalent in that they are produced in very different ways. Consider the following extracts. The first two come from naturally occurring telephone conversation; the third comes from the start of a mentation review from the Edinburgh ganzfeld experiments. (As we will discuss later, CA uses a distinctive set of transcription symbols to record aspects of interaction not captured by records of the spoken word. Extracts 1 to 6, however, are simplified to allow easier reading. Two distinctive transcription techniques are used: the square bracket crossing between lines is used to show the precise onset and termination of spates of overlapping talk. Numbers in brackets, such as (0.2), record the gap between successive turns in tenths of a second. All names are anonymised. It is a convention in CA papers to indicate the corpus/text from which data extracts are taken. The codes for the extracts from the KPU data refer, respectively, to the trial number, the identity of the experimenter, the gender of the subject, and the page in the original transcript from which the extract was taken.)

Invitation - acceptance sequence

(1) (From Heritage, 1988:129.)

A: Why don't you come up and see
me some [times
B: [I would like to

Assessment - agreement sequence

(2) (From Pomerantz, 1984: 69.)

E: that Pat isn' she a do [ll -
M: [Ye- h isn't she pretty

Summons - response sequence and question - answer sequence

(3) (KPU:01-80 E1/M:1) ('E' is the experimenter, 'S' is the subject.)

E:	Bobby?	**summons**
	(0.2)	
S:	mm hm,	**response**
E:	can you hear me okay	**question/check**
S:	ah ha	**answer**
E:	good	

There are some common properties to these sequences. In extract (1) the first speaker's invitation is accepted before it is completed. Similarly in extract (2) the first speaker offers an assessment, with which the second speaker agrees; again the second speaker's turn occurs in overlap with the end of the prior turn. And in each case, the second speaker's turn is fairly short: in extract (3) the subject's turns consist of 'mm hm' and 'ah ha' only. There is little embellishment on the basic activities of agreeing, accepting and answering. So what might be termed positive responses (acceptances instead of refusals, agreements instead of disagreement) tend to be produced quickly and minimally. In following extracts, however, an invitation and an offer are declined.

(4) (From Atkinson and Drew, 1979:58)

B: Uh if you'd care to come over and
visit a little while this morning
I'll give you a cup of coffee
A: hehh Well that's awfully sweet of you,
I don't think I can make it this morning
hh uhm I'm running an ad in the paper and and uh I
have to stay near the phone.

(5) (From Heritage, 1988:133)

H: And we were wondering if there's anything we can do to help
S: [Well at's
H: [I mean can we do any shopping for her or
something like tha:t?
(0.7)
S: Well that's most kind Anthony
At the moment no because we've still got the boys at home

In each case, the second speaker's turn displays the following components in the same order. First, there is a delay: in (4) this is the result of a short breathy laugh; and in (5) there is a 0.7 second silence before S. starts talking. Then there is the particle 'well' before an appreciation component in which the speakers express gratitude for the invitation/offer. Only then is the invitation/offer rejected; and this is softened by the use of 'I don't *think* I can make it' and *'at the moment* no', both of which depict the refusal as somehow conditional and not absolute or definitive. Finally, both speakers offer an account as to why they can't accept the invitation/offer. Accounting practices such as these are regular features in circumstances in which required or projected behaviour does not occur (Heritage, 1988).

Sequential organisations are vehicles for social actions. The second pair parts illustrated in extracts (4) and (5) address a relatively transparent set of interpersonal concerns: managing the possible loss of face which might result from the rejection of offer or an invitation.

CA and the problem of warranting qualitative analyses

One of the key problems in qualitative research is to warrant whatever empirical statements are made: how do we know that the researcher's interpretations are valid, accurate depictions of objective phenomena, and do not simply reflect their particular interpretative approach?

CA's distinctive methodology offers a neat resolution to this problem. This is because the goal of conversation analysis is not to furnish an academic or 'outsider's' reading of some conversational sequence, but to describe the organised interpretations that *people themselves* employ in the moment-by-moment course of conversation. To explain this key methodological principle, consider the following extract, which comes from an exchange between a mother and her son about a Parent-Teachers Association meeting.

(6) (Terasaki, 1976: 45)

1	Mother:	Do you know who's going to that meeting?
2	Russ:	Who?
3	Mother:	I don't know!
4	Russ:	Oh, probably Mr Murphy and Dad said Mrs
5		Timpte an' some of the teachers

In this extract Mother's question 'Do you know who's going to that meeting?' can be interpreted in two ways: as a genuine request for information about who is attending the meeting, or as a pre-announcement of some news concerning the people who will be attending the meeting. In the examination of this exchange, the analyst can identify which of these interpretations Russ makes by *examining the next turn after Mother's question*. Here Russ treats Mother's turn in line 1 as indicating she has some news for him. Thus he displays his understanding that her turn as a pre-announcement. But because his understanding is displayed in his turn, Mother can see whether or not he understood as she intended; and in this case, her subsequent turn indicates that he had not. Next positioning of utterances, then, allows participants in interaction to monitor each others' understanding on a turn-by-turn basis, and provides the basis upon which misunderstandings can be identified and addressed. The kinds of organised tacit reasoning procedures that CA seeks to identify are thus displayed in the trajectory of the turn-by-turn unfolding of interaction. And as next turn analysis is a key methodological step, conversation analysts place great emphasis upon the examination of *sequences* of interaction, rather than, say, the detailed analysis of utterances which have been extracted from the sequential context in which they occurred, and for which they were designed.

Transcription

Research has shown that even apparently minor or trivial aspects of interaction have a significant impact on its subsequent development. CA transcriptions therefore try to capture characteristics of verbal interaction omitted from transcripts which merely record the spoken word. This means not only transcribing what was said, but the way it was said, and making sure that things that might seem messy, 'accidental', or ungrammatical are recorded in the transcript and not filtered out in some form of 'tidying up' process. To capture these hitherto overlooked features of interaction, CA employs a transcription system which uses symbols available on conventional typewriter and computer keyboards. (The main symbols are explained in the Appendix.) The system focuses on, first, the properties of turn taking, such as the onset of simultaneous speech and the timing of gaps within and between turns; and second, it exposes features of the production of talk, such as emphasis, volume , the speed of delivery and the sound stretching.

To illustrate why a detailed transcript is so important, consider the two following extracts. They are two different transcriptions of the same section of a mentation review session. The first comes for the KPU's transcript; the second comes from a retranscription by the author using conversation analytic conventions. (It is important to stress that the comparison between the two transcripts should not be taken to imply inefficiency on the part of the original transcriber. The comparison is designed to highlight the level of detailed information, and features of possible analytic interest, lost in conventional transcription practices.)

(7) (01-47 E1/F:1)

E: Something red, looks like it might be a porcupine with lots of spines standing up. And then a frog, a frog's face peering over something. A ghost coming out of a door or a chair like a mirror in a funny house. Shapes in this funny house and shapes look like bunny rabbits with weird ears. Then you said sheep lots of sheep.
S: I didn't know what it was
E: Okay. Something in the ceiling
((Continues))

(8) (01-47 E1/F:7-8)

E: ˙hh something re:d. ehrm:: i- looks like it might be a
porcupine with lots of spines standing ˙hhh standing up
S: yeah hh
E: and then a frog=a frog's face peering over something
(0.8)
˙hh a ghost? coming out of a door: or a chai:r (0.5) like a mirror. (.)
in a funny house,
S: yeah=
E: =˙hh shapes (0.3) ahr:: are in this funny house

10		and shapes look like ehm ↑bunny rabbits with weird ears	
11	S:	yeah (ch)hhuh huh ˙hhhh	
12	E:	then you said sheep lots of sheep	
13	S:	˙hhhh (g)oads of sheep (pf)ah didn't know what	
14		it was (hi-) ˙h [hhh (k)huh uh	*((smiley voice))*
15	E:	[ok(h)a(h)y	*((smiley voice))*
16		(0.5)	
17	E:	huh	
18		(3.5)	
19	E:	okay ˙hh something in the ceiling *((continues))*	

Consider the features of the interaction made visible in the CA transcript. First, there are ostensibly 'minor' contributions and non-lexical items. So, the subject's turns in lines 3, 8 and 11 are included. These might be minimal contribution to the interaction; but as we have seen, successive turns are understood by participants to display each producer's current understanding of the on-going dialogue: even a minimal turn consisting only of one word will display the speaker's sense of 'what is going on right now', and thus may be consequential for subsequent turns. The transcript also includes audible breathing. Again, it might be objected that this is an unnecessary detail to include; but audible or emphasised inbreaths are a way of marking a launch into a turn and thus can display an interactional orientation: to obtain the floor before someone else begins to speak, for example. The transcript also records non-lexical items such as 'er', 'erm' and their variations. Again, research has shown that these items, rather than filling empty space or representing 'thinking time' on the part of the speaker, serve delicate interactional functions: for example, they display that the current turn might be on-going, thus establishing continued speakership rights (Jefferson, 1984; Schegloff, 1981).

Transcription also attempts to capture laughter and words which are produced in conjunction with breathy bubbles of laughter. It also seeks to identify those words that sound like they have been delivered through a mouth forming a smile (as indicated by the 'smiley voice' characterisation). This is an arduous task: transcribing laughter, and words which are punctuated by breathy plosives, is extremely difficult; but there are analytic dividends. (In the following section we will discuss some of features of the way the experimenter says 'okay' punctuated by small 'bubbles' of breathy laughter.)

Finally, the CA transcript captures the way in which words are delivered. This has clear interactional consequences. For example, consider how E says 'bunny rabbits': '^bunny rabbits'. The first part of 'bunny' is emphasised and the onset of the word is marked by a clear rising or 'punched up' intonation.

There are many other features of the revised transcript which could be discussed: the importance of timing periods of absence of talk; the significance of elongated or stressed words, and so on. However, this section has simply tried to demonstrate the kinds of information which are yielded by close attention to the detail of what actually happens in interaction. However, it is important to keep in mind that CA is not simply the study of transcripts: it seeks to make sense of those events of which the transcription is a representation. The transcript is merely an aid (albeit a valuable one) in the analysis of the events recorded on tape.

Illustration: 'you said' item prefaces in mentation reviews

In this section I want to illustrate the conversation analytic approach by reporting some preliminary observations from a study of interaction in ganzfeld mentation reviews. These data come from experiments were conducted in the mid 1990s by researchers at the Koestler Parapsychology Unit at the University of Edinburgh, UK. At the time of writing, five mentation review recordings have been transcribed (yielding over 70 double spaced pages of data). However, these five review sessions were conducted by the same experimenter. While it would be possible to establish robust and recurrent interactional phenomena with one consistent participant (the subjects, of course, change each time) it is desirable to obtain data from sessions involving different experimenters. (Comparative data have been made available to me and will be transcribed in due course.)

The mentation review is based on the subject's verbal report of events in their consciousness during the period the target materials were being screened. During the review the experimenter goes over the images and sensations reported by the subject to remind them of key moments, or to encourage further recollections or expansion on particular images or sensations. Here is a typical strip of interaction from a review session.

(9) (01-18 E1/M:10-11)

E: ˙hh and you saw a slope with a doorway at the to:p
S: yeah
E: ˙hh then you mentioned that your eyes were s->beginning to ache a
bit<,
S: mm
E: ˙h and then you saw the roof again and you were s:(1)
looking straight up (.) at it.
(2)
S: yeah, (.) yeah
(0.5) .
E: then you had an (.) image of a- a toothbrush ˙h still wrapped up in:
(.) its package ˙hh and it was being spun in someone's h- fingers (0.3)
˙hh you: er:m: (0.3) saw that on the toothbrush sai:d (0.2) i(t) it said
↑toothbrush in big blue letters.
S: yeah
E: ˙hh and then you saw: er: an impression of mickey mouse,
(0.5)
E: ˙hhh and then you said a drill:=the threads of a drill spinning
around,

20 (1.2)
21 *((P swallowing approx. 1 second))*
22 S: yeah (.) 's coming in from th- from the left (.) ˙h
23 >s't've (l)ika< like a like a cross section through the earth I could see
24 this huge ˙hhh like a sort've er: (0.2) channel tunnel drill
25 (0.8)
26 E: okay, (.) ˙hh a humming top spinning (at-) a children's toy:s
((continues))

In this passage the experimenter introduces a number of items, thus providing the opportunity for subjects to expand upon their earlier reports, or to correct any experimenter misunderstanding. For example, after the experimenter has introduced the drill item the subject does indeed provide more information about this topic (lines 22 - 24). However, it is noticeable that it is more common for subjects to 'pass' on opportunities to expand upon items. Such 'passings' take various forms: in this passage the subject uses a minimal continuers ('mm', line 5), minimal confirmation ('yeah', line 15) and silence (line 17) to pass on opportunities where expansion could occur.

There are various components to turns in which items are introduced in the review. Minimally, the experimenter can simply report the item. For example 'a humming top spinning (at-) a children's toy:s' (line 26). The experimenter can introduce the item in connection to the chronology of the original mentation: for example 'then you mentioned..' or 'and then you saw...' (lines 3 and 6 respectively). A further component may be the mode of perception/knowing reported by the subject during the mentation: 'and you saw...' or 'then you had an (.) image...' (lines 1 and 11 respectively). Finally, the experimenter can use a 'you said' preface to introduce an item: for example, 'and then you said a drill:...' (line 18).

However: the mentation is a verbal report by the subject of conscious images experienced during the sending phase of the experiment. Therefore, any item could logically be introduced with a 'you said' preface. But they are not; and this suggests there is a selection process at work. Moreover, it is curious that in this extract the only item that the subject expands upon is the one introduced with the 'you said' preface: he offers no further information about other items. Moreover, this is not a unique occurrence. Consider the following extract:

(10) (01-80 E1/M: 6-7)

1 E: ˙hh and now the do:g again it's the same one ˙hh with
2 skinny straight legs (.) [and it's black and white
3 S: [uh huh
4 S: uh huh
5 (0.6)
6 E: ˙hh and then you said it looks like (0.3) tall tall

7 tree. ˙hh bro[wn
8 S: [oh that was odd. (.) ye[:s that was odd=
9 E: [yeah.
10 S: =that looked like a telegraph pole with little green stumps sticking
11 out li[ke that=I- I ca]n't imagine
12 E: [(CH)uh::huh huh hu]
13 S: that being in do you?
14 (.)
15 E: (h)okay? (.) ˙hh ehrm shapes again.

There is further evidence of a selectivity in how an item is introduced. The experimenter uses a`you said' preface to introduce the 'tree' item, but does not use it to introduce the 'dog' or 'shapes' items. And, again, it is noticeable that the subject provides further information about the item introduced with a 'you said' preface.

There are some interesting features of the interaction which occurs after the 'you said preface' (lines 8 to 13). First, the subject offers a comment on the item: 'oh that was odd. (.) ye-:s that was odd'. He then provides further description: 'that looked like a telegraph pole with little green stumps sticking out like that'; compared to the experimenter's description, 'tall tall tree' this works to upgrade the strangeness of the item. Finally, he seems to offer an assessment of the likelihood of this image being relevant to the target materials: 'I- I can't imagine that being in do you?'. Moreover, this item expansion sequence facilitates some further activity from the experimenter: she produces a short burst of laughter towards the end of the subject's comments on the strangeness of the image. Thus, not only does an item introduced with a 'you said' preface generate further information from the subject (and a variety of discrete verbal activities), but that in turn leads to further contribution from the experimenter.

Finally we can return to the extract used earlier to illustrate conversation analytic transcriptions. This strip of interaction, we now see, displays many of the features identified in the previous two extracts

(11) (01-47 E1/F:7-8)

1 E: ˙hh something re:d. ehrm:: i- looks like it might be a
2 porcupine with lots of spines standing ˙hhh standing up
3 S: yeah hh
4 E: and then a frog=a frog's face peering over something
5 (0.8)
6 ˙hh a ghost? coming out of a door: or a chai:r (0.5) like a mirror. (.)
7 in a funny house,
8 S: yeah=
9 E: =˙hh shapes (0.3) ahr:: are in this funny house
10 and shapes look like ehm ↑bunny rabbits with weird ears
11 S: yeah (ch)hhuh huh ˙hhhh
12 E: then you said sheep lots of sheep
13 S: ˙hhhh (g)oads of sheep (pf)ah didn't know what

14		it was (hi-) ˙h ┌hhh (k)huh uh	*((smiley voice))*
15	E:	└ok(h)a(h)y	*((smiley voice))*
16		(0.5)	
17	E:	huh	
18		(3.5)	
19	E:	okay ˙hh something in the ceiling *((continues))*	

There is a 'you said ' preface used selectively; and the subject provides more information about this item. In line 10 the subject seems to say the word 'goads', which makes no sense. However, it is reasonable to suggest that she was aiming for 'loads' and simply 'tripped up' over the 'l' and produced a much more harder sound instead. In which case we can ponder the relationship between the two assessments: lots and loads. Although this is hard to ground empirically - and indeed, may not be reflect common practice in North American English - there is a sense in which 'loads' does work which 'lots' does not: namely, it seems better at conveying the speaker's response to or surprise at the number of an object, whereas 'lots' simply seems to point to the plurality of that object. In this, then, 'loads' indexes the element of personal surprise at the number of sheep, and thus stands as an upgrade of the experimenter's description, which merely indexes the large number of sheep.

Finally, the experimenter responds to the subject's further description of the item. In lines 13 and 14, the subject expresses puzzlement about an image from her mentation introduced with a 'you said preface' and produces a short bout of breathy laughter. Note that in her subsequent turn, the experimenter matches this by pronouncing the word 'okay' with a slight roll of breathy plosives. Research on interaction has shown that the next positioned production of 'matching' laughter is a delicate matter, and a key method for displaying alignment and affiliation with the speaker's on-going talk (Jefferson *et al*, 1987). Moreover, the careful recording of the onset of affiliative laughter indicates that its production is timed with respect to the on going turn. The experimenter's 'ok(h)a(h)y' in line 15 begins just after the first contracted bubble of laughter in the subject's on-going turn. It is not only that the experimenter's turn is affiliative: it is delivered almost at the same time as the turn to which it is affiliative.

Finally, in line 11 the subject says 'yeah' which is followed by a distinct burst of laughter '(ch)hhuh huh ˙hhhh' However, the experimenter does not join in. Thus we have the basis for a comparative analysis: what are the interactional features of the subject's laughter which elicits affiliative experimenter turns, and what systematic departures from this pattern mark those occasions when the experimenter's next turn moves immediately to other business?

Summary

I have only presented some preliminary observations from research which is on-going. However, it is apparent that these extracts exhibit the properties of a distinct sequence of verbal activities:

- the sequence is initiated by a 'you said' preface for item introductions;

- in the next turn, the subject provides further information about the item;

- the subject's further talk (amongst other things) upgrades or expands upon the the strangeness of the image: thus 'the threads of a dri<u>ll</u> sp<u>i</u>nning around', is upgraded to 'huge ˙hhh like a sort've er: (0.2) channel tunnel drill' (the Channel Tunnel is a road and rail link under the North Sea connecting the British Isles to mainland Europe); in response to 'tall tall tree' the subject says 'that looked like a telegraph pole with little green stumps sticking out; and 'sheep lots of sheep' is countered with what seems to be an attempt at 'loads of sh<u>ee</u>p' .

- in two cases, the subjects offer a comment explicitly on the strangeness of the image: in extract 10 'I can't imagine that being in do you?' and in extract 11 'ah didn't know what it was'.

In both these cases the experimenter produces a short bout of affiliative laughter in response to these reflections. (Interestingly, in extract 9 the subject merely expands upon the strangeness of the image, but does not offer explicit reflection, and there is no affiliative experimenter response.)

These preliminary observations and need to be supplemented with analysis of data from mentation reviews conducted by other experimenters. But they raise interesting possibilities for further research: how do 'you said' prefaces do the work of inviting subjects' consideration of a particular item? What is it about direct or indirect speech markers (for this is what they are) that manage that task? Are there any other sequences in which experimenter's display affiliation with the subject? And what is it about reflection on the strangeness of an image that seems to facilitate experimenter affiliation?

Discussion

So what are the implications of this form of analysis? Where will it lead us? There are three issues I would like to raise.

Identifying the 'fingerprint' of ganzfeld interaction
The first point to keep in mind is that, despite its name, CA is the study of talk-in-interaction *per se*, not some narrowly defined understanding of 'conversation'. More relevant, though, is the considerable body of research on the organisation of talk-in-interaction in a variety of institutional or work-related settings: in court rooms, in doctors' surgeries, in calls to emergency services, in talk-radio programmes and in television news interviews.

Heritage (1997) has identified some of the key features which demarcate institutional talk from ordinary conversation. First, participants in institutional interaction are normally concerned with specific set of tasks and goals which are clearly connected to the 'business' of the institution; moreover, these goals are tied to identities relevant to that institution: for example, doctors provide information about medical problems, and teachers teach. Second, it is understood that there are constraints on what kinds of participation are normatively appropriate. Finally, the practical tasks or business of the institution will shape the kinds of inferences about and understanding of on-going interaction. Collectively these features constitute what Heritage and Greatbatch call a 'fingerprint' of the patterns in interaction in each institutional setting (1991: 95-6).

Talk between experimenter and subject in parapsychological laboratory settings can be analysed as another instance of institutional interaction; and as such, we can ask: what properties might constitute the fingerprint of interaction in ganzfeld procedures? Speculatively, I propose that the answer will be found in analysis of:

- patterns of turn taking which display a marked departure from turn exchange mechanisms in conversational interaction; how do these turn taking procedures allow participants to manage the business of the mentation review?

- distinctive methods for the identification and resolution of actual or potential 'troubles';

- techniques by which the experimenter displays alignment with the subject; the close co-ordination of reciprocal laughter is a likely candidate.

Undoubtedly, further analysis will reveal other characteristics of experimenter-subject interaction through which the distinctive 'work' of the ganzfeld experiment is accomplished.

Investigating the interactional correlates of anomalous communication
Earlier in this paper I discussed evidence which suggested that certain personality or psychological variables which seem to correlate with psi communication in ganzfeld conditions. But what are the interactional correlates of anomalous communication in ganzfeld settings? Can we identify clear differences between ostensibly successful and unsuccessful ganzfeld trials? Is psi inhibition to be found in the fine detail of interactional practices? Can we begin to speak of a psi inhibitory interactional episode, instead of, or as well as, psi inhibitory experimenters? More broadly, If we want to identify the characteristics of psi conducive laboratories, then it seems important that we understand the organisation of the distinctive interactional episodes through which the work of the laboratory is accomplished.

The quantitative and experimentalist orientation of (most) parapsychological research means that answers to these questions may have to be supported by statistical analysis. It may not be easy to shape conversation analytic research to meet the formal requirements presupposed by statistical analysis; it is an on-going debate as to whether it is either desirable or possible to code the kinds of normative and interactional phenomena discovered by CA (Drummond and Hopper, 1993; Schegloff, 1993; Zimmerman, 1993). But there is some support for the idea that conversation analytic claims can be marshalled to meet the needs of statistical analysis. The power and refinement of those analysis may be diminished - the task will be to minimise this - but it may be possible to begin to use statistical methods to make claims about the relationship between interactional phenomena in ganzfeld mentation reviews and the subsequent success or failure revealed in the judging session.

CA as a model for analysing anomalous communication

If, or when, the wider scientific community accepts the evidence for anomalous communication, we will be faced with a variety of revolutionary research questions which will cut across parapsychology and the social sciences. Understanding the nature and organisation of extrasensorimotor interaction will be one such task. I would propose that the way CA has studied language in use might be an appropriate model for the study of anomalous communication.

Up until the 1960s language was primarily regarded as a means of information transfer. The actual practices of interaction were regarded as unimportant or too disorderly to merit analysis when set aside the self-evidently important issues, such as the way in which information is encoded in talk and decoded by a hearing receiver. The information transfer model of language, however, is no longer as powerful as it once was. Language is now understood to be a medium for, and the site of, social actions. Conversation analysis has been at the forefront in describing the socially organised and recurrent practices of interaction, and thereby changing the way in which the social sciences view language in use.

The implication for research on psi phenomena is this: it may not be sufficient to understand the biological or neurophysiological basis of anomalous communication. Parallels may be drawn here with our understanding of everyday speech. We may know the physiology of speech production: the way muscles, tongues and lips work; and we may be aware of Chomskyian psycholinguistic rules of language, but these are not enough to tell us how people use talk in their conduct with others. Talk-in-interaction is ordered at a level of interpersonal *actions*, not psycholinguistic *rules*. And when we come to appreciate the nature of anomalous communication - to inquire, how does it operate and what is it for - we may have to look beyond the physiology of brains and the influence of psychological processes, and explore the socially-organised and normative conventions which organise its occurrence and function in everyday settings.

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Appendix: transcription symbols

(.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 hs, 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))* ;or transcriber's attempt to convey particular feature of speech production, for example *((smiley voice))*.
-	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.
,	A comma indicates a continuing intonation.
?	A question mark indicates a rising inflection. It does not necessarily indicate a question.
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.
CAPITALS	With the exception of proper nouns, capital letters indicate a section of speech noticeably louder than hat surrounding it.
° °	Degree signs are used to indicate that the talk they encompass is spoken noticeably quieter than the surrounding talk.
> <	'More than' and 'less than' signs indicate that the talk they encompass was produced noticeably quicker than the surrounding talk.
=	The 'equals' sign indicates contiguous utterances.
[ ]	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: ix-xvi).

The organization of demonstrations of paranormal cognition in psychic-sitter interaction

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Abstract

It is well known that members of the public who consult mediums and psychics often believe they have been told information which the psychic could not have known by the use of normal senses. They are convinced that the authenticity and accuracy of paranormal powers of cognition have been demonstrated, be they the ability to communicate with the dead or to discern the future from the lay of tarot cards.

In demonstrations of contemporary psychic practitioners, proof of special cognitive powers is almost always demonstrated verbally. Any proof that is given, any evidence that is provided, is accomplished in the interaction itself; what is communicated between the psychic practitioner and the sitter is thus the primary basis from which judgements can be made about the authenticity of the psychic's claim to posses paranormal forms of cognition.

Sceptics have also focused on the importance of the dynamics of the exchanges between psychic and sitter. It is argued that we can explain sitters' convictions by reference to cold reading strategies: the ability to elicit information from tacit or conscious inspection of the sitter's appearance, their tone of voice, the use of leading questions and so on. In cold reading accounts, however, little attention is paid to the use of dynamic nature of language between psychic practitioner and the sitter. It presumes a model of language in which utterances are regarded as inert vehicles for the transmission of ideas and information. Consequently, there has been no systematic study of the interactional organisation of the discourse between psychic practitioners and their sitters.

Using a conversation analytic perspective, this paper examines transcripts of recordings of sittings between various kinds of psychic practitioners and their clients. The paper describes a linguistic sequence in which the psychic implies s/he has some knowledge of the sitter or their circumstances, which is then accepted by the sitter, leading to a turn in which the psychic attributes the now-accepted information to a paranormal source. This three turn sequence sequence can be represented schematically as:

T1	Psychic:	a question embodying a claim about, or knowledge of, the sitter, their circumstances, etc.
T2	Sitter:	minimal confirmation/acceptance
T3	Psychic:	attribution of now accepted information to paranormal source.

The paper explores various properties of this sequence. It focuses on how first turns are designed so that the hinted at knowledge of the sitter is not attributed to a paranormal source. It also examines how the design of the sitter's acceptances facilitate the early onset of the third position attributive turn.

An important step in building a conversation analytic account of an interactional phenomena is to examine cases in which there seems to have been some departure from the established pattern, and investigating how participants' utterances display their understanding of the significance of that departure. In this paper, this methodological principle is developed in analysis of cases in which the sitters do not provide minimal acceptances/confirmations.

The paper concludes by discussing some implications of the conversation analytic approach for cold reading accounts of psychic-sitter discourse.

The organization of demonstrations of paranormal cognition in psychic-sitter interaction

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Introduction

The frequency and apparent popularity of psychic demonstrations indicates that contemporary interest in mediumship, and other forms of psychic powers, remains strong. Every week around the United Kingdom, for example, hundreds, perhaps thousands, of people consult psychic practitioners.

It is well known that members of the public who consult mediums and psychics often believe they have been told information which the psychic could not have known by the use of normal senses. They are convinced that the authenticity and accuracy of paranormal powers of cognition have been demonstrated, be they the ability to communicate with the dead or to discern the future from the lay of tarot cards. And psychic practitioners are fully aware of the need to provide proof of their powers. For example, the importance of establishing proof of post-mortem survival is a constant theme in mediums' promotional flyers, in the *Psychic News* (the weekly newspaper for Spiritualists and mediums) and in their autobiographies (for example, see Byrne and Sutton, 1993; O'Brien, 1992).

During the late nineteenth and early twentieth centuries, the proof of paranormal abilities was often demonstrated physically. Physical evidence, however, is rare in the demonstrations of contemporary psychic practitioners, in which the proof of special cognitive powers is almost always demonstrated verbally. Any proof that is given, any evidence that is provided, is accomplished in the interaction itself; what is communicated between the psychic practitioner and the sitter is thus the primary basis from which judgements can be made about the authenticity of the psychic's claim to posses paranormal forms of cognition.

Those who are sceptical of the psychic practitioners' claims to paranormal powers have also focused on the importance of the dynamics of the exchanges between psychic practitioner and sitter. It is argued that we can explain sitters' convictions by reference to cold reading strategies (Hyman, 1981; Randi, 1983). Cold reading is simply a set of techniques of character assessment by which we may gain information about someone: subtle inspection of the sitter's appearance, their tone of voice, observation of facial and other physical responses, the use of leading questions and so on. And, used with a stock spiel, consisting of the kind of highly general personality statements which can apply to almost everyone (Forer, 1949), cold reading techniques provide an explanation for the apparent success of psychic practitioners which does not invoke the existence of the spirit world, or the use of paranormal powers.

Hyman (1981) argues that cold reading is so efficient because of a basic ability to make sense of even random stimuli. Drawing on Garfinkel's (1967) counsellor experiments, and Weizenbaum's (1976) interactive computer program, 'Doctor' he argues that

> The cold reading works so well, then, because it taps a fundamental and necessary human process. We have to bring our knowledge and expectations to bear in order to comprehend anything in our world. In most ordinary situations this use of context and memory enables us to correctly interpret statements and supply the necessary inferences to do this. *But this powerful mechanism can go astray in situations where there is no actual message being conveyed. Instead of picking up random noise we still manage to find meaning in the situation.* So the same system that enables us to creatively find meanings and make new discoveries also makes us extremely vulnerable to exploitation by all sorts of manipulators.
>
> (Hyman 1981: 96; italics added)

In this account, the characterisation of the sitter reflects the strong cognitive bias in contemporary American and British psychology: the individual is perceived as an incorrigible information processor, able to draw from a store of knowledge and memories to fashion some understanding from 'random noise'.

What is noticeable about this account is that little attention is paid to the use of language in the exchange between the psychic and the sitter. It presumes a communication model of language in which utterances are inert vehicles for the transmission of ideas and information. To paraphrase Schegloff (1989), language is assumed to have the same relationship to information or meaning that telephone cables have to the conversation conducted through them.

This view informs the analysis of psychic practitioner-sitter interaction in the following way: the medium's utterances are portrayed as essentially void of information, a series of empty vessels despatched by the psychic, and which are then reconstituted by the sitter, via the unavoidable but (in this context) inappropriate use of every day sense making practices, into statements containing pertinent and relevant information.

In the past three decades, however, there have been several critiques of this model of language, the most sustained of which is represented by the body of findings produced from conversation analytic (CA) studies of naturally occurring interaction. As Hutchby and Wooffitt state:

> Conversation analysis is characterised by the view that how talk is

> produced, and how the meanings of that talk are determined, are the practical, social and interactional accomplishments of members of a culture. Talk is not seen simply as the product of two 'speaker-hearers' who attempt to exchange information or convey messages to each other. Rather, participants in conversation are seen as mutually orienting to, and collaborating in order to achieve, the outcome of orderly and meaningful communication. (Hutchby and Woofffitt 1998:1)

CA suggests that 'understanding', and sense making more generally, are not simply consequences of the encoding, transmission and decoding of ideas expressed in language, but the product of speakers' use of tacit, socially organised methods for conducting social actions through their talk. This perspective casts psychic-sitter interaction generally in a new light; but more relevantly, it suggests new lines of empirical investigation of what appear to be successful demonstrations of mediumistic and psychic powers in particular.

First, conversation analysis focuses on the activities which are accomplished through the design of utterances; in particular it addresses the ways in which exchanges display robust properties as patterned sequences, and how the normative properties of those sequences are oriented by participants and demonstrably inform their conduct. In this sense, a CA perspective facilitates both an analysis of specific kinds of discursive actions through which successful knowledge or claims by the psychic are produced, and also an understanding of the larger sequence of exchanges of which the medium's utterances are a component.

Second, the cold reading approach leads us to think in terms of the psychological or cognitive bases for the practitioner's apparent success. However, CA focuses on the social organisation of interaction: it emphasises that sequential patterns in verbal interaction are part of the culturally available stock of communicative practices native speakers can use. And while advocates of 'cold reading' methods have indicated the importance of the sitter's (albeit tacit) compliance in their dealings with psychic practitioners (Kurtz, 1985), a CA approach permits identification of the dynamics of such compliance, and thereby further exposes the collaborative basis for the production of 'proof' of the psychics's power.

Third, a cold reading account endorses a sceptical position. By contrast CA studies of interaction do not seek to arbitrate on the truth or falsity of the content of utterances. It merely seeks to describe the ways in which utterances are used to perform activities in interaction. A neutral concern with the organisation of interaction can yield findings which may be obscured in a premature rush to characterise psychics' discourse as deceptive, manipulative or deluded. (Although, as we shall see, it would be easy to recruit the findings from this study to support a sceptical argument.)

In this paper I report on some findings from a CA study of psychic-sitter interaction. I describe the properties of a sequence which underpins (ostensibly) successful demonstrations of psychic powers; I show that this sequence is common in the demonstrations of various kinds of psychic practitioners; and I will argue that an understanding of the sequential organisation of successful demonstrations has implications for cold reading accounts of the activities of psychic practitioners.

Data

The data for this research come from four sources.

i There are 26 taped sessions of psychic practitioners conducting sittings with individual clients. In each case, the sitting was recorded by the psychics themselves (they provide a tape of the sitting as part of the fee). The sittings were conducted either at psychic fairs in various locations in the UK (London, Bristol, Telford and Guildford), or were conducted in the psychic's or the sitter's home. The sitters were either students who volunteered to go to a psychic and provide me with a copy of the tape, or people who have consulted psychics independently of this research and who subsequently provided me with copies of the tape recording of their sitting.

Of the student volunteers, only two knew that the focus of the subsequent research would be the sequential organisation of verbal interaction between psychic practitioner and sitter. Some of the student volunteers had readings from more than one psychic; and there were seven psychics from whom more than one reading was obtained.

ii In addition to these recordings, the Randi Foundation provided an audio tape of a private sitting conducted in the north west of England, and a video-taped reading by an American medium, both of which were recorded independently of any research purpose.

iii On Sunday 22 november, 1998, a BBC 1 television programme, *Everyman*, which examined mediumship and spiritualism, showed a medium providing two separate consultations, one of which was transcribed.

iv Finally, a colleague, Colin Clark, provided me with transcribed fragments taken from a tape of 7 'edited highlights' of Doris Stokes performing at the Dominion Theatre in London.

In total, there are 30 recordings, involving 24 different sitters and 20 different psychic practitioners.

The data were transcribed using the conventions of conversation analysis, a description of which is provided in the Appendix. For an account of the analytic method of CA, see Hutchby and Wooffitt, (1998).

However, one important methodological point needs to be established. In the following empirical sections, analytic claims will be made about the interactional force and consequences of utterance. However, this should not be taken to imply I am claiming that psychics and sitters are deliberately using language to achieve these ends. The communicative competencies they employ, and which are revealed by the design of their utterances, are *tacit* skills. They inhabit the weave of everyday interaction, but they do not yield to reflection or introspection, and resist explicit articulation. They are identified only through the analysis of turn design and the discovery of sequential environments.

'Success' in psychic practitioner discourse

A routine feature of the psychic practitioners' discourse is the use of questions to initiate topics, or develop ongoing topics, which then become, even if only momentarily, the focus for both participants. Moreover, these questions embody or 'hint at' aspects of the sitter's current circumstances, or their future plans, information which should not be available to a stranger such as the psychic. If the sitter finds the psychic's utterance to be accurate, or is in some way relevant, it is is receipted and accepted with a minimal turn, usually a simple 'yes' or 'yeah'. After the sitter's minimal acceptance or confirmation, the psychic practitioner moves swiftly to a turn in which the now-accepted knowledge is attributed to a paranormal source. From the psychics' perspective, these instances may be considered 'successes', and they routinely exhibit a three turn structure. To explicate this structure we will consider the following extract. This comes from the transcript of a sitting between a psychic who uses tarot cards and a young woman. During this sitting, the psychic is using tarot cards to discern aspects of the sitter's present and future life. (In this and subsequent extracts, the psychic practitioner is designated by the the letter 'P', and the sitter by the letter 'S'.)

(1) (K/CC)

(Discussing S's plans to travel after graduating.)

S: I graduate in June I'm probably going to work until a
bout february [so: jus' (.) any old j[ob]y'know.
[RIght okay [right]
P: and are you going to the states,
(.)
S: yeah.
P: y<u>ea</u>:h, c'z e I ċan see the old ehm:
(.)
S: Hh [huh Hah 'h]
P: [statue of] liberty around you,
S: heh heh h[e 'hhh
P: [there you <u>a</u>re, there's contentment for
the future.
S: oh go[od
P: [who's pregnant around you?

The question 'and are you going to the states' may be heard as displaying the psychic's special knowledge that the sitter is indeed planning to visit the US. Once this has been accepted it is retrospectively cast as having been derived from the tarot cards: the psychic's utterance 'c'z e I can see the old ehm: statue of liberty around you,' portrays her prior turn as a consequence of her ability to to discern from the arrangement of cards a classic iconic representation of the US, and interpret its relevance to the sitter. Moreover, the turn is initiated with a derivation of 'because', thus explicitly establishing that the topic of her prior utterance was generated from the special powers claimed in her subsequent turn.

Once the attributive turn is complete, and the psychic has made a closing remark related to the sitter's anticipated contentment about her predicted travels, she initiates another topic with the question 'who's pregnant around you?' which, should it be accepted by the sitter, would project the relevance of another attributive turn and further demonstration of special powers.

This three turn sequence can be described schematically as:

T1	Psychic:	a question embodying a claim about, or knowledge of, the sitter, their circumstances, etc.
T2	Sitter:	minimal confirmation/acceptance
T3	Psychic:	attribution of now accepted information to paranormal source.

This is a routine organisation of ostensibly successful claims about the sitter. The following two extracts come from sittings with mediums. Extract 2 is taken from a sitting with a medium in the US, and comes from an early part of the siting; extract 3 comes from a sitting in the UK.

(2) (JREF/VP)

P: So spirit wants me to do a scan on your bo:dy, talk
about your health, so I'm going to do that okay? I'm
going to do this for your health (0.8) Let's see
what's going on with you. ˙hh number one thing is your
>mother in spirit please?< **T1**
(0.2)
S: Yes **T2**
P: >'cause I have (n-m) y'r mother standing right over **T3**
here, ˙hh and she said I WANna TAlk to HEr and I want
to speak to her because ˙hh your mother has very
lou::d when she comes through. ˙h she speaks with a in
a very lou:d way a very uhm (.) y'understand
very [she has to be
S: [ye:s:.
P: heard, ˙h and like this would not happen today

	without her coming through for you. D'y' -un'erstand?	
S:	-'kay	
S:	Ye:s.	

(3) **(EV/trio)** (In this extract there are two sitters, a mother and her daughter. At this point in the sitting the medium claims to be in contact with the spirit of their husband/father)

P:	>'ave you 'ad< (.) bit >(o')< trouble with your back as well.	**T1**
	(0.2)	
S1:	yes a little bi [t	**T2**
P:	[he says ah'd best send her a bit of	**T3**
	sympathy down so you understand it,	
	˙hh [h	
S1:	[ye [s	
P:	[coz y'know ˙h y'try to bottle things up and you don't	**T1**
	always let people get close to you in that sense do you	
S1:	no.	**T2**
P:	he says she can be quite stubborn at times y'know	**T3**
	(.)	
P:	is that true	
S1:	°yes°	
P:	an' he knows cz ˙h you are fussy about the bungalow	**T1**
	aren't you [girl	
S1:	[yes I am	**T2**

We will consider each extract in order. Extract 2 begins with a section from the psychic practitioner's description of how the sitting will proceed. After this initial preamble, he produces a question about the sitter's mother. This has an interesting design in that it could be heard as a genuine question about the sitter's mother; that is, it may be equivalent to 'has your mother passed on or is she still living?'; or it could be heard as a question which seeks confirmation of information already known to the medium. The sitter's minimal response does not disambiguate the prior turn, in that a simple 'yes' could be 'a telling' or 'a confirmation'. The medium's next turn, however, reveals that he is in contact with the spirit of the sitter's mother. Moreover, the psychic prefaces this turn with ''cause'; this establishes that his prior turn was a consequence of, or an upshot of, information or events he is about to disclose in his current turn. This retrospectively characterises his first turn as a question seeking confirmation of information already at hand. Also, it can now be inferred that the knowledge that the sitter's mother has died came from a paranormal source: the spirit of the mother herself.

Extract 3 provides three further examples of the sequential unit outlined above. There are three questions, each of which can be heard as proposing that the psychic has access to intimate knowledge about the sitter: that she has a back trouble, that she can be withdrawn, and that she is houseproud ('fussy about the bungalow'). To each of these questions the sitter provides minimal confirmative responses. And in each occasion the psychic then goes on to report what the spirit of the sitter's husband has said to him, thereby making it inferable that it was the spirit who provided the information about the sitter.

The display of paranormal cognition then, is sequentially ordered: it is in the third turn of the sequence where now-accepted claims about the sitter are attributed to a paranormal source, and thus constitute evidence of paranormal cognitive abilities.

In the next section I want to focus on two 'design' features of the sequence, and show how these exhibit the speakers' tacit understanding of the significance of third turn attributions.

Psychics' and sitters' orientation to third turn attributions

The non-attributive design of first position turns
It is noticeable that in all kinds of psychic-sitter interaction, the knowledge claim tentatively presented in first position turns is invariably unattributed (for example, consider the first turns in extracts 6 to 12 below). Psychic practitioners tend to declare the paranormal source of their information only when it has been accepted by the recipient. Indeed, there is evidence that practitioners will avoid making a first position attribution even it would be expected given the context of their own talk. We can illustrate this by looking at the following extract, which comes from a sitting with a medium

(4) (JREF/Manchester:2)

P:	and she's pleased about that and she's (.) says	
	sh(e)- ↑who's ↓<u>der</u>ek.	**T1**
	(0.5)	
P:	who's derek.=	
S:	=derek is a nephew	**T2**
	(0.2)	
M:	˙hh >she's<- <u>sh</u>:e's saying she's pl<u>ea</u>sed about so	**T3**
	obviously	
	(0.3)	
P:	there's s<u>o</u>mething she's pleased about	
	where derek is concerned	

Here the medium is providing closing comment on a prior topic by reporting the spirit's attitude: 'and she's pleased about that'. The utterance 'and she's (.) says sh(e)-' at the very least provides strong evidence of the onset of direct or indirect reported speech. We can infer, then, that the spirit is depicted as talking to the medium. And when the sitter accepts that the name has some significance for him, the medium - albeit convolutedly - attributes her knowledge of the the relevance of the name to the spirit's expression of a positive regard for this person. Yet the production of the first position turn gives no hint that the spirit may the source of the query about Derek. Indeed, there seems to be a clear cut off mid-production of those components of the turn which preface reported speech in favour of a non-attributive question.

It is common to find psychic practitioners building first turn knowledge claims in such a way that they are not seen to be making attributions to paranormal sources. Indeed, an earlier study has revealed some of the ways in which psychic practitioners minimise the likelihood that they can be interpreted as endorsing the truth or certainty of a claim prior to its acceptance by a sitter (Wooffitt, 2000).

There is a logic to the absence of reported speech in first position turns. If a psychic practitioner makes a substantive claim which does not accord with the sitter's knowledge or experience, there is at least the basis to question the genuineness of his or her powers. But the inferential damage of such negative sitter responses can be minimised if that claim has not been attributed to a paranormal source. It can be simply be ignored, and the psychic can simply move on to another topic. In the following case, for example, the question 'an' are y' changing a ca:r,' receives an unequivocally negative response. The sequence projected by this candidate first turn is immediately abandoned and another initiated

(5) (K/CC)

```
M:   an' are y' changing a ca:r,                                   T1
     (0.4)
S:   No┌:.
M:     └and is your da:d, (0.2) 's your dad ehm, (0.8) generous? T1
```

However, if a first substantive claim is attributed to a paranormal source, its subsequent rejection would constitute strong grounds for scepticism about the authenticity of the medium's powers.

Sitters' minimal responses in second position

Turns in which the sitters accept or confirm the information proposed in the psychic's prior turn are routinely minimal in design, and there is very little delay before their production.

(6) (K/CC)

```
T1   P:    and are you going to the states,
           (.)
T2   S:    yeah.
```

(7) (JREF/TV)

```
T1   P:    can you understand a gentleman with cancer,
T2   S1:   °yes°
```

(8) (J/BJ)

T1 P: is your brother quite sensitive?
T2 S: yes

(9) (JREF/VP)

T1 P: ˙hh number one thing is your >mother in spirit
please?<
(0.2)
T2 S: Yes

(10) (JREF/VP)

T1 P: does he have a son?=
T2 S: =yes.

Indeed, the confirmation/acceptance may be produced in overlap with the psychic's turn.

(11) (JREF/VP)

T1 P: was this cancer that he passe [d with] please?
T2 S: [y:es,]

(12) (JREF/VP)

T1 P: is this your husband (.) [who passed over please?
T2 S: [yes.

These minimal turns have some interesting interactional consequences. A first observation is that they return the floor to the psychic practitioners, and they do so quickly. However, the provision of minimal acceptance also stands as 'passing' an opportunity to produce more talk: for example, one might expect some form of response to the presentation of private or intimate information, yet the sitters do not indicate that they regard the prior turns as being 'newsworthy' or somehow remarkable. However, the sitters' withholding of further talk at this point suggests an orientation to the production of the third turn, and an understanding of the kind of activity that is properly located there. That is, any other turn components would delay, however minimally, the onset of the third turn. Moreover, any components in addition to a minimal 'yes' or 'yeah' might project the relevance of some form of recognition, acknowledgement or minimally a receipt by the psychic. An expression of, for example, surprise at the revelation that the psychic somehow has access to personal information might generate or require some form of corresponding comment by the psychic. This would further delay the attribution of the now-accepted information to a paranormal source. The minimality of the sitter's acceptance/confirmation is a feature designed to allow the psychic to move directly to the evidentiary work of the third turn.

Deviant case analysis: Projected and completed extensions of second turns

An important step in building a conversation analytic account of an interactional phenomena is to examine cases in which there seems to have been some departure from the established pattern, and investigating how participants' utterances display their understanding of the significance of that departure. This is because

> If someone displays in their conduct that they are 'noticing' the absence of a certain type of turn from a co-participant, then that demonstrates their own orientation to the relevance of the sequence that the analyst is aiming to describe. (Hutchby and Wooffitt, 1998: 98)

The analysis so far suggests that both participants orient to the significance of the activity undertaken in the third turn. Can we find further evidence in cases in which participants deviate from the established pattern of this sequence? We will consider two cases in which sitters do not provide minimal acceptances/confirmations.

In the following extract the psychic's question implies knowledge of the sitter's ill health.

(13) ((B)H/RC)

```
P:   are you fi:nding that >y'got to have< check          T1
     ups and it's getting you down
     (1.8)
S:   yea:h ah've got my [(      )]                         T2
P:                      [yeah.] yeah >we(ll) ah know<      T3
     'cos I've got the medical: (0.2) feel arou:nd
     you ˙hhh erhm:
```

There are three features of the sitter's turn which mark its difference to routine acceptance/confirmations: first, it is delayed; second, the turn initial item is a slightly extended 'yeah', which could be hearable as expressing hesitation or unwillingness to produce an unequivocal endorsement; and finally, ' 'ah've got my' projects a forthcoming report or telling.

The psychic begins to talk in overlap with the sitter. Indeed, her utterance cuts across the sitter's on-going turn, which is then abandoned before reaching any recognisable completion. Moreover, it can be inferred from 'ah've got my' that the sitter is working up to a disclosure or announcement of some kind, the site of which is projected after the production of 'my'. Thus the psychic's first 'yeah' is timed to collide with precisely that part of the sitter's utterance in which it is likely that the sitter will produce a word or phrase which reveals what the topic of her turn will be (for example, 'operation', 'appointment', and so on). The psychic's turn is initially composed of 'yeah' repeated, and it is only when she is clear of co-occurring talk from the sitter does she first, explicitly claim to know already about the sitter's problems, 'we(ll) ah know', and second, attribute that knowledge to a paranormal source:''cos I've got the medical: (0.2) feel arou:nd you'.

Similar concerns inform the following extract. Here, the psychic proposes that earlier in her life the sitter may have considered a career in what is characterised broadly as a caring profession. The sitter treats this as correct, but instead of a minimal acceptance, she states specifically which kind of caring profession she had intended to enter.

(14) (CD/RD)

P: ˙h ↑y'ever though(t) o(f) ˙h did you want to go
into a caring pro↓fession early <u>on</u>, when >y'w's uh(t)<
y'know when you were ch<u>oo</u>sing which way you were T1
gonna go.
(.)
S: yeah I wanted to: go into T2
child care actuall [y when I]
P: [MMMmm:::]:::.=
S: =when I let school
P: that's right yeah >well< ˙h (.) 'm being shown T3
that>but (t)-< ˙h it's (0.2) it's not your
w<u>a</u>y ye(t) actually but i(t) y'y may be caring for
(t-)ch- children or whatever later on okay?

Here again, the sitter does not provide a one word acceptance/confirmation, but in T2 embarks on an extended turn in which she discloses factual information. The psychic's subsequent turn begins with a loud and extended agreement marker. While this is positioned at a possible turn transfer location (the end of 'actually') it is continued in overlap with the sitter's continuation. The psychic's agreement marker has an exaggerated and extended character, and seems to be designed to close down the sitter's on-going turn. Indeed, the sitter does abandon this turn, albeit temporarily, and the end of the psychic's overlapping agreement marker occurs in the clear. However, the sitter recommences her turn exactly at the point where psychic's 'mmm' finishes, and completes it. And, as in the previous extract, when the psychic eventually gets the chance to produce the third turn in this sequence, the demonstration of knowledge obtained from a paranormal source is delayed; this time, by the inclusion of 'that's right yeah', an item which is responsive to the sitter's informing.

In extracts 13 and 14 the sitters treat the psychic's prior utterance as warranting or inviting disclosure of fairly specific information; and in both cases, the sitters' departure from the established pattern of second turns is followed by the psychics' departure from the established pattern of third turns. In 13 the psychic initiates an overlapping turn, thereby demonstrating an orientation to the possible loss of relevancy of the third turn. And in 14, although the psychic's agreement marker is placed in the vicinity of a location where turn transfer may be initiated, its exaggerated and extended production seems - conspicuously - to cut across a factual report from the sitter, and ends when it appears that the sitter has terminated her turn. Moreover, before the psychics move to an attribution they produce components which are responsive to the 'informings' being produced. However, they do not mark the informing as 'news', as this which would constitute a clear breach of the lay understanding that psychics are meant to tell the sitter things, not the other way around. Instead, they produce agreements: 'yeah' and an exaggerated 'mm', thereby exhibiting that they are confirming news, not receiving it. And in both cases, the psychics then establish that they already knew what the sitter has just revealed. This is explicitly addressed in extract 13 when the psychic says '>we(ll) ah know<. In extract 14 it is realized by ''that's right yeah', an unmarked acknowledgement which specifically proposes that the speaker is already aware of - and therefore in no need of - the information being presented to them (Heritage and Sefi, 1992: 395-398).

These turns, then, display the psychics' understanding of the interactionally problematic nature of extended second turns. But what kind of interactional troubles could arise from the disclosure of factual information in the prior turn?

Consider extract 14. Once the sitter has revealed that she had wanted to work in child are, the psychic is placed in the position of having to claim in his next turn that information which has just been disclosed by the sitter *just so happens* to have been revealed to him through a paranormal source. This invites a sceptical query about the authenticity of the psychic: if he already knew this, why didn't he mention it before the sitter? Furthermore, insofar as the sitter has elaborated upon the kinds of work adumbrated by 'caring professions', it is now apparent that the paranormal source has provided less specific information than a human one. This raises another basis for doubt about the credibility of the psychic, for even if it is accepted that the psychic is indeed using paranormal powers to glean information, what value are his reports if they are less perceptive or insightful than those provided by the sitter? Finally, his subsequent prediction about the sitter's *future* involvement with child care - 'it's not your w<u>a</u>y ye(t) actually but i(t) y'y may be caring for (t-) ch- children or whatever later on' - seems transparently to originate not so much from a paranormal source, but from her disclosure that she had *wanted* to work in this area, a formulation from which it can be inferred that she had not yet done so.

Extended utterances, then, threaten the effectiveness of the third turn as the site in which attribution can be accomplished. The design of third position turns in extracts 13 and 14 addresses this: claiming that something was known already

> him. *One version of fishing is to phrase each statement in the form of a question* (Hyman, 1981:87; italics added)

According to this perspective, then, psychics use questions to elicit information. Intuitively, that seems a reasonable claim; but our intuitions are a poor guide to the way in which we actually use language. When we study the sequential and interactional use of questions, a different answer emerges. A conversation analytic perspective has revealed a sequence which is invariably initiated by a question; these questions, however, do not seem to be used to expose information about the sitter, but are designed to initiate a short sequence of utterances which return the floor to the psychic with minimal sitter participation. Empirical evidence for this account can be derived from close inspection of the participants' own conduct: if sitters provide more than a minimal acceptance, psychics begin to talk in overlap with them, eventually curtailing that turn. We can understand this because of the significance of the third turn *in this interactional sequence*: it is in this sequential location that the psychics can attribute the now-accepted information as coming from a paranormal source. Psychic practitioners do ask questions, and lots of them: but perhaps not for the reasons suggested by cold reading. To understand why they are used, it has been necessary to examine the broader sequential environment in which they occur.

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Appendix: Transcription

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 than two tenths of a second.

˙hh — A dot before an 'h' indicates speaker in-breath. The more hs, 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.

, — A comma indicates a continuing intonation.

? — A question mark indicates a rising inflection. It does not necessarily indicate a question.

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.

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.

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.

= — The 'equals' sign indicates contiguous utterances.

- - / - - — 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: ix-xvi).

Interrelationships of Psychic Experiences, Dream Recall and Lucid Dreams in a Survey with Spanish Participants

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Abstract

The work reported here is an attempt to replicate the positive significant relationships reported in previous research between different types of psychic experiences (waking and dream ESP, apparitions, out-of-body experiences, auras and PK), and between psychic experiences and dream recall and lucid dream frequency. The study uses mainly Ibero American participants (most of them Spanish), a population hitherto neglected in this type of studies.

Four-hundred and ninety-two readers of the Spanish magazine Más Allá de la Ciencia, a popular publication devoted to paranormal topics, participated in this study. Sixty-eight percent were female (N = 492). Out of 482 who indicated their nationality, 94% were Spanish. The rest were Mexican (3%), Argentinean (1%), British (0.4%), French (0.4%), and one each of a variety of nationalities (1%). Unfortunately the age question was omitted in the questionnaire.

The questionnaire used in this study consisted of questions about demographic variables (9), psi (6), mystical (1), and dream experiences (2). In addition, seven questions about details of out-of-body experiences were included. Besides the omission of the question on age, the magazine altered the dream ESP question so that only dreams of future events were mentioned.

The magazine published the questionnaire across two facing pages. Readers were asked to answer even if they had not had any experiences. Respondents returned the questionnaires to the editorial offices and forwarded them to the first author. We corrected for multiple analyses (45 correlations) by using a Bonferroni correction to set a corrected .001 alpha level.

Dream recall and lucid dreaming frequency were significantly correlated with all psychic experiences, except for apparitions and OBEs (dream recall) and waking ESP and auras (lucid dreams). The pattern of intercorrelations between psychic experiences supported our predictions. Overall, out of 45 correlations ranging from .039 to .703, 34 (75%) of the positive correlations were significant.

Our findings support those of previous studies and extends them to nationalities who have not been studied before from this point of view. The picture that emerged from these correlations is consistent with previous research relating psi experiences to fantasy proneness, absorption, dissociation, hypnotic susceptibility, transliminality as well as other experiences and psychological constructs. It seems that the richer our psychological life, in terms of variety of experiences, the richer our parapsychological experiences. Our work is made difficult because we still do not understand the psychology and psychophysiology of these experiences and thus are hampered in our ability to understand the nature of these statistical relationships. As we progress in out understanding of dreams, dissociation and other experiences and constructs, work such as that reported here will hopefully acquire a new meaning.

Some questionnaire studies of parapsychological experiences have shown significant positive relationships between different psi experiences (e.g., Kohr, 1980; Palmer, 1979). Our own work with auras (Alvarado & Zingrone, 1994) and out-of-body experiences (Alvarado & Zingrone, 1999; Alvarado, Zingrone, & Dalton, 1998-99) shows that individuals who are classified as experiencers have a higher frequency of such other experiences as ESP and apparitions than those individuals who have not had the basic experience. These experiences have also been positively related to measures of dream recall and lucid dreaming (e.g., Kohr, 1980; Palmer, 1979; Sherwood, 1999; Usha & Pasricha, 1989).

Such relationships make sense because both dreams and psi experiences are related to constructs such as boundary thinness (Hartmann, 1991), hypnotic susceptibiltity (Pekala, Kumar & Cummings, 1992) and dissociation (Richards, 1991). The commonality suggests a disposition to a general capacity or openness to a variety of experiences, among which a high frequency of dream recall, lucid dreams and parapsychological experiences are some examples. Perhaps, as Palmer (1979) has suggested, dream recall and lucid dreams "reflect the degree to which the conscious mind is capable of gaining access to the content of the unconscious mind" (p. 248). This, in turn, could be the reason for the relationship of these dream variables to psi experiences if we follow the long-held idea that psychic phenomena are functions of the subconscious mind (e.g., Myers, 1903).

The work reported here is an attempt to replicate these findings with a sample of mainly Ibero American participants (most of them Spanish), a population hitherto neglected in this type of study. In our study we predicted significant positive intercorrelations between different types of parapsychological experiences (Waking and Dream ESP, apparitions, out-of-body experiences, auras and PK), and between these experiences and the frequency of dream recall and lucid dreams.

Method

Participants

Four hundred and ninety-two readers of the Spanish magazine *Más Allá de la Ciencia*, a popular publication devoted to paranormal topics, participated in this study. Sixty-eight percent were female (N = 492). Out of 482 who indicated their nationality, 94% were Spanish. The rest were Mexican (3%), Argentinean (1%), British (0.4%), French (0.4%), and one each of a variety of nationalities (1%). Unfortunately the age question was omitted in the questionnaire.

Questionnaire

The questionnaire used in this study was published in English in a previous paper (Alvarado & Zingrone, 1999). It consisted of questions about demographic variables (9), psi (6), mystical (1), and dream experiences (2). In addition, seven questions about details of out-of-body experiences were included. The dream recall question had a six-item response option ranging from "Never" (scored as 1) to "Always" (every day; scored as 6). The religiosity question had four responses ranging from "Not religious" (scored as 1) to "Very religious" (scored as 4). The frequency of the rest of the experiences was estimated by the experiencers in a free response question. Besides the omission of the question on age, the magazine altered the dream ESP question so that only dreams of future events were mentioned.

Procedure

The magazine published the questionnaire across two facing pages. Readers were asked to answer even if they had not had any experiences. Respondents returned the questionnaires to the editorial offices and forwarded them to the first author.

Analyses

Because the data are not normally distributed (see Table 1) we used Spearman Rank Order correlations. We corrected for multiple analyses (45 correlations) by using a Bonferroni correction, yielding a corrected alpha level of .001.

Results

Table 1 contains the descriptive statistics of the continuous variables used in the study. The Kolmogorov-Smirnov analysis shows that none of the variables were normally distributed.

Table 1
Descriptive Statistics of Continuous Variables

Variable	Overall %[1]	N[2]	Range[3]	Mean	Standard Deviation	Kolmogorov-Smirnov[4]
Religiosity	--	459	1-4	2.39	.99	5.18
Dream recall	100	482	2-6	4.61	1.12	6.18
Lucid dreams	89	254	0-1000	10.54	66.02	6.98
Dream ESP	86	366	0-100	3.61	8.86	6.55
Waking ESP	73	324	0-100000	311.80	5546.81	9.24
Apparitions	83	289	0-500	7.34	42.58	7.35
Out-of-body experiences	82	364	0-1000	8.46	74.22	8.69
Auras	46	367	0-1000	4.17	53.18	9.00
Movement of objects	36	451	0-100	1.44	7.90	9.09
Mystical experiences	70	384	0-1000	4.89	52.38	9.13

1 Percent of overall N who responded "yes" to the item.
2 Number of respondents who provided frequency data.
3 Questions with ranges of 100 or more are open questions in which the participants were asked to estimate the number of experiences they had.
4 All the analyses were significant, $p < .001$.

Table 2 presents correlations between the experiences reported by the participants. The table has 45 correlations ranging from .039 to .703. Thirty-four (75%) of the correlations were significant.

Table 2
Intercorrelations Between the Variables of the Study

Variables	1	2	3	4	5	6	7	8	9	10
1. Religiosity	—	.139	.039	.138	.171	.118	**.281**	**.313**	**.224**	.077
2. Dream recall		—	**.218**	**.309**	**.226**	.145	**.292**	**.293**	**.292**	.071
3.Lucid dreams			—	**.288**	.220	**.240**	.204	.138	**.283**	**.325**
4.ESP dreams				—	**.369**	**.290**	**.428**	**.365**	**.273**	**.202**
5. Waking ESP					—	**.269**	**.459**	**.379**	**.336**	**.227**
6. Apparitions						—	**.483**	**.367**	**.456**	**.342**
7. Auras							—	**.703**	**.485**	**.324**
8. Mystical								—	**.400**	**.339**
9. Movement									—	**.352**
10. OBEs										—

Note: The bolded coefficients are significant at the corrected .001 level of significance.

Discussion

As predicted, we obtained several significant correlations between parapsychological experiences. Many of these experiences were also positively related to dream recall and lucid dreams. Individuals who reported parapsychological experience had a tendency to report different experiences, both parapsychological and dream experiences. This supports previous findings and extends them to nationalities who have not been studied before from this point of view. We will report later research conducted in other Iberoamerican countries to explore whether the relationships found here generalize to other countries.

The picture that emerged from these correlations is consistent with previous research relating psi experiences to fantasy proneness (Alvarado & Zingrone, 1994), boundary thinness (Hartmann, 1991), absorption (Irwin, 1985), hypnotic susceptibility (Pekala, Kumar & Cummings, 1992), dissociation (Richards, 1991) and transliminality (Thalbourne & Delin, 1994). It seems that the richer our psychological life, in terms of variety of experiences, the richer our parapsychological experiences. Our work is made difficult because we still do not understand the psychology and psychophysiology of these experiences and thus are hampered in our ability to understand the nature of these statistical relationships. As we progress in our understanding of dreams, dissociation and other experiences and constructs, work such as that reported here will hopefully acquire a new meaning.

Acknowledgements

We wish to thank José Campoy, editor of the magazine *Más Allá de la Ciencia*, who allowed us to print the questionnaire used in this study in the pages of his publication. The contact with the magazine and the mailing of the questionnaires to us was possible thanks to the assistance provided by Benjamín Noriega and María Pérez Molina.

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Consciousness Collapse of the State Vector As Support for the Quantum Observational Theory

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Abstract

One of the basic ingredients of the Observational Theory, the collapse of the state vector by means of observation is tested. The experiment amounts to a conceptual replication of the Hall-experiment published in the seventies in Foundations of Physics. In that experiment, final observers of a quantum event had to guess if a pre-observation had taken place. Although framed as a physical experiment, the authors did explicitly refer to the possibility of a relation with parapsychological phenomena like telepathy.
Two improvements are introduced. First the delay between pre-observation and final observation of the same quantum event is increased from a few microseconds in the original experiment to 1 second in this replication. Second, rather than using the observers' verbal response as the dependent variable, we use objective measurements, the early brain responses of the observers as measured by EEG as the dependent variable. These early responses cover the period of incipient conscious observation of the quantum event.
Results support the 'subjective reduction' hypothesis because a significant difference between the brain responses of the final observer are found dependent upon the pre-observer looking or not looking at the quantum event. Alternative 'normal' explanations are discussed and rejected. It is concluded that the present results lend support to the Quantum Observational Theory.

1. Introduction

The Quantum Observational Theory (QOT) as originally formulated (Walker, 1971) is based upon what physicists call the *measurement problem* in Quantum Physics. In the QOT it is assumed that a conscious observation is one of the crucial ingredients. In 1977 Hall et al (Hall et al, 1977)) reported an experiment that, according to their description, tested this solution to the measurement problem, in which *the state vector collapse* [aka: reduction of the wave packet] *is a physical event which occurs only when there is an interaction between the physical measuring apparatus and the psyche of some observer.*

They defended their experiment writing: *although we concur that there is a genuine problem of the reduction of the wave packet, we do not intend in our paper to defend* *this opinion against those who maintain that it is a pseudo problem.* We point out that despite the fact that the measurement problem arose naturally from within physics itself and has a body of literature amounting to thousands of technical papers in physics, its obvious implications for and even application to parapsychology has fostered great opposition to it.

In spite of many attempts, like the relative state solution (Everett, 1957) and the introduction of non-linear terms in the Schrödinger equation (Ghiradi, 1986; Walker, 1988), the measurement problem seems still not be solved. The well-known Bell's theorem was originally developed to prove quantum mechanics to be incomplete explicitly so as to dispose of this problem. Instead, it succeeded only in making the measurement problem all the more bizarre. This failure to clearly resolve the problem has left the physics community polarized with some contending the problem remains a fundamental shortcoming in the quantum formalism and others holding that there is no state vector collapse at all (Bohm and Hiley, 1997; Griffith, 2002; Dieks and Vermaas, 1998). Costa de Beauregard (1976), Walker (1971, 1988b, 2000) and later Stapp (1993) have argued, using arguments provided by von Neumann (1955) and Wigner (1967), that none of these prior solutions are acceptable and that observational collapse or reduction is still a possible and even preferred alternative.

It should be made explicit here that the often cited issue of environmental decoherence due to the warm environment of the brain is not an issue here for two reasons: Firstly, because in Walker's (1977: "Quantum Mechanical Tunneling in Synaptic and Ephaptic Transmission," *Int. J. Quantum Chemistry 11*, 103—127, 1977.) treatment of quantum tunneling in synaptic functioning, thermal effects were included in closed form (i.e., exactly) and the presence of the thermal effects did not mitigate the quantum mechanism. Secondly, the whole point is that von Neumann showed that in the measurement process the system's description does not collapse but instead increases in complexity, remaining a superposition. A natural consequence of this argument is that also macroscopic systems (like Schrödinger's cat) may be in superposition and the typical wave like behavior associated with this quantum state could be observed even for this kind of systems.

An explicit experiment to observe this superposition without entirely collapsing the quantum states initially reported an absence of an interference patterns in an experimental test using macroscopic systems (Walker et al 1988a).
Subsequent inspection finding interference fringes at a ~10% effect level (too strong to have been light scattering) was reported by Walker (1990). The failure to find a more robust effect may have been caused by film reciprocity or computer algorithms that served to "observe" shutter positions before photon registration..

We, like Hall *et al*, would like to investigate the issue of the role of human consciousness in the measurement process experimentally. The Hall experiment is conceptually easy to understand. A quantum event, in this case a radioactive decay, is measured in a counter and the signal is displayed on a scale. An observer, *Observer 1*,

observes the scale. The scale signal is transmitted through a delay unit and displayed again. This second scale is observed by 'final' observer, *Observer 2*.
Moreover, Observer 1 sometimes observes and sometimes does not observe his scale. Observer 2 is then required to 'guess' if a quantum event observed by him has already been observed by observer 1 (see fig.1 from the original publication)

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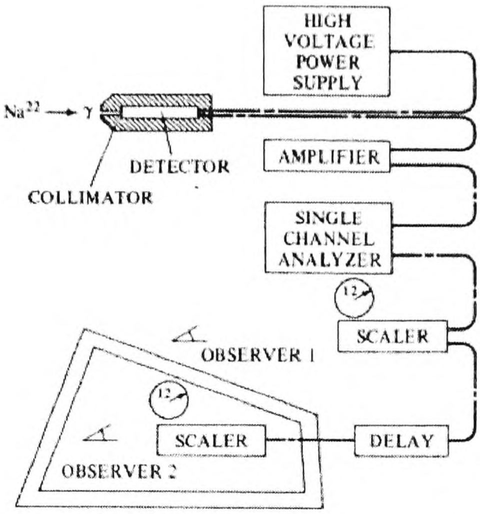

Figure 1. Experimental arrangement (not drawn to scale).

The results of Hall's experiment were precisely at chance—the second observer guessed 50% correct. Hence it was obvious that this observer was unable to detect if the observed signal had already been observed earlier. It was concluded that the experiment does not provide support for the hypothesis that it is the interaction with consciousness that causes the wave packet to collapse.

It should be made explicit that there is an implicit assumption of Hall et al that our brains in some way are able to detect the difference between a superposition state and a singular state, and also that this difference can be communicated consciously.
In a comment later added to the article the authors note that the delay they used was extremely short and that "*The delay time should be in the order of psychologically discriminable intervals...*" Since the original Hall paper has been widely acknowledged as evidence against the hypothesis that it is the interaction with consciousness that causes the wave packet to collapse, it is essential that this serious error in the Hall experiment be corrected by means of improved testing methods. It is important that both the time delay be of a physiologically significant duration and that the determination as to whether the observers have been affected differently by the two conditions be placed on an objective foundation—something more than the verbal report used by Hall.

In the present conceptual replication the time between the first observation and the second one was set to 1000 msecs. The hypothesis being tested requires that the first observation be a conscious observation. Libet's (1991) seminal work on the brain's

processing time needed for brain stimulation to become a conscious perception gives a lower interval of about 300-500 msecs. However, the difference from the original experiment goes further than just adjusting this interval.
Rather than asking the second observer for a conscious guess, we measure the brain responses to the stimulus. This is done for the following reason: If consciousness is the crucial element for state vector collapse, the conscious decision, used as dependent variable in the original experiment will be based on the physical state of the state vector *after* consciousness in the second observer has developed. At that time, the state vector according to the hypothesis under investigation, has already collapsed even if no pre-observation has taken place. Thus, the manipulation of the pre-observer will not induce any difference in the final observer with regard to his conscious behavior.
By measuring brain potentials of the second observer one can however also tap into the early (<300-msec) non-conscious processing of the brain. At that time the State vector is supposedly still in superposition, but only if no pre-observation has taken place.

2. Design of the experiment

Quantum events were generated by an alpha particle source (as used in smoke detectors; 2P40-76-18) that was attached onto a slide-adjustable mounting allowing the source to be moved with respect to a lead shielded Geiger-Muller counter (Automess 6150-100). The distance was adjusted so that on average approximately 1 particle was detected each second. The counter pulse was amplified and fed to the trigger channel of an EEG data-acquisition system (*Biosemi Active-1*, 2003). We used *National Instruments LabView* software (NI, 2003) to detect this trigger and to transform it into a delayed audio beep of 1500 Hz and 50 msecs duration. The audio-delay was 1 second. The software would randomly generate a visual stimulus of ~65 msecs duration directly upon occurrence of the trigger signal. The visual stimulus therefore preceeds the audio-beep by a time sufficient for the first observer to have a conscious experience of the quantum event *before* the second observer (see fig.2). The random decision to show or not to show this visual stimulus to the first observer before submitting the beep to the second observer was *pseudo-random* with the seed determined by the computer clock. After each quantum event thus measured there was a dead time of 2 seconds during which input from the Geiger-Muller counter was discarded. Additionally, the subjects were asked to count the number of observed quantum events in order to check for and assure attention to that task.
The quantum mechanical theory of radioactive decay describes the emitting particle as a superposition of two states, the decayed and the non-decayed state. Although our measurement system is a composite many particle system it can be regarded as being in a superposition of a 'decayed' and a 'non-decayed' state, the so-called state vector. According to the 'radical' proposition under consideration, a reduction of this superposition occurs only when an observer 'looks' at (so as to consciously observe) one of the two indicators of the emission. Either observation of the visual or the audio representation would collapse the state vector (i.e., reduce the wave packet).

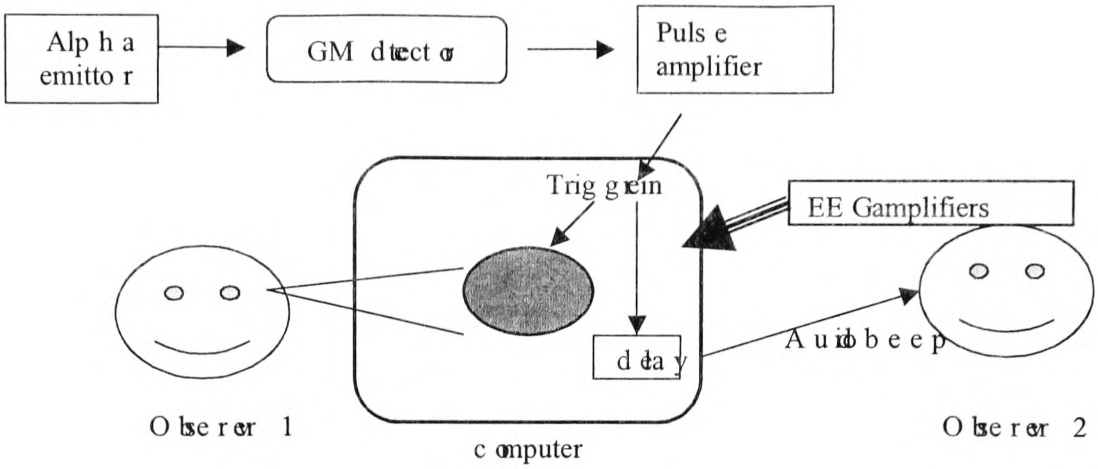

Figure 2. The experimental set-up of the present replication experiment.

3. Experimental Procedure

Subjects
Volunteer subjects were invited in pairs. These were generally freshman psychology students who participated for course credit. In total 9 male and 21 females, providing useful data, participated in the experiment (mean age=21.4, sd=4.7).
Upon arrival they were fully informed about the purpose and potential implication of the experiment. First they participated in a so-called odd-ball task used to test the equipment. Then the crucial task, which we, for obvious reasons, called the '*Schrödinger-task'* was presented. The role of observer 1 and 2 were played by both subjects in two separate runs.

Physiological measurement and further procedure.
Sintered AgCl EEG electrodes with active preamplifiers (*Biosemi Active 1*) were connected to the head of observer-2 using the standardized 10/20 system (see appendix 1). No temporal electrodes were used. Then observer 2 went to a neighboring room and was seated in a relaxing chair while observer 1 stayed at the computer screen with the experimenter. A short 'calibration' experiment was run consisting of the above-mentioned odd-ball task in which observer-2 was presented each 3 seconds (with one second random jitter) audio beeps of 30 msecs duration. A hundred beeps with either a frequency of 1200 Hz or a frequency of 2000 Hz were presented. The frequency was randomly determined with the probability for the higher frequency being 4 times lower than for the presentation of the lower frequency sound. The subject was asked to count the number of higher frequency beeps. If the resulting average evoked brain potentials conformed to the well know average auditory brain potential (Picton et al, 1974), the actual 'Schrödinger' run was started with observer 1 sitting in front of the computer screen observing the visual stimulus that appeared in about 50% of the cases directly upon a radioactive decay. The experimenter refrained from looking at this screen. The total run consisted out of 120 radioactive decay events. This took about 8 minutes.

After a short break roles were switched and the procedure was repeated. The total experiment took less than one hour.

4. Results

To prevent ourselves from data snooping and data selection with the goal to 'find what we were searching for', we first analyzed the results of the standard, and completely unrelated, odd-ball task. Once we had fixed the complete procedure on the basis of exploration of these odd-ball task data we would allow ourselves to analyze the actual data.

On the basis of the explorations of the odd-ball data it was concluded that two of the 32 subjects were not providing valid EEG data. They were removed before further analyses. The electrodes O1 and O2 turned out to produce very noisy signals and thus these were also dropped from the analysis. Furthermore these odd-ball data were used to establish an optimal preprocessing procedure. The thus established preprocessing procedure consisted of 4 steps. All signals were referenced to (compared to) the signal at the Pz electrode. First a 50 Hz notch filter was applied, then the data were filtered through a band pass filter between 1 and 30 Hz (slopes = 24 db/Oct). Then (eye) movement artifacts were removed from the data. The criteria used were 'absolute value' and 'derivative'. On the average this algorithm removed about 5-10% of the available segments. Because there is a high correlation between the results obtained from different leads (electrodes) we did a factor analysis to see how we could combine the signals of different leads into a compound signal. This analysis gave two clear factors, one consisting of the central and frontal leads with a mean factor load of 0.87 and one for the parietal electrodes with a mean factor load of 0.93. We called the two combined signals 'FC' which is the average of 11 leads (Fpz, Fp1, Fp2, Fz, F7, F3, F8, F4, Cz, C3, C4) and 'P' which is the average of two leads (P3 and P4).

After having thus established the data to be used and having a well-specified preprocessing procedure, we applied this without further adaptation to the EEG data obtained in the 'Schrödinger' part of the experiment. First we averaged all the data pooled over subjects and pre-observer condition per sample for the FC- and P-signal separately.

The thus obtained evoked potentials were submitted to an automatic peak detection procedure. Results are given in fig. 3.

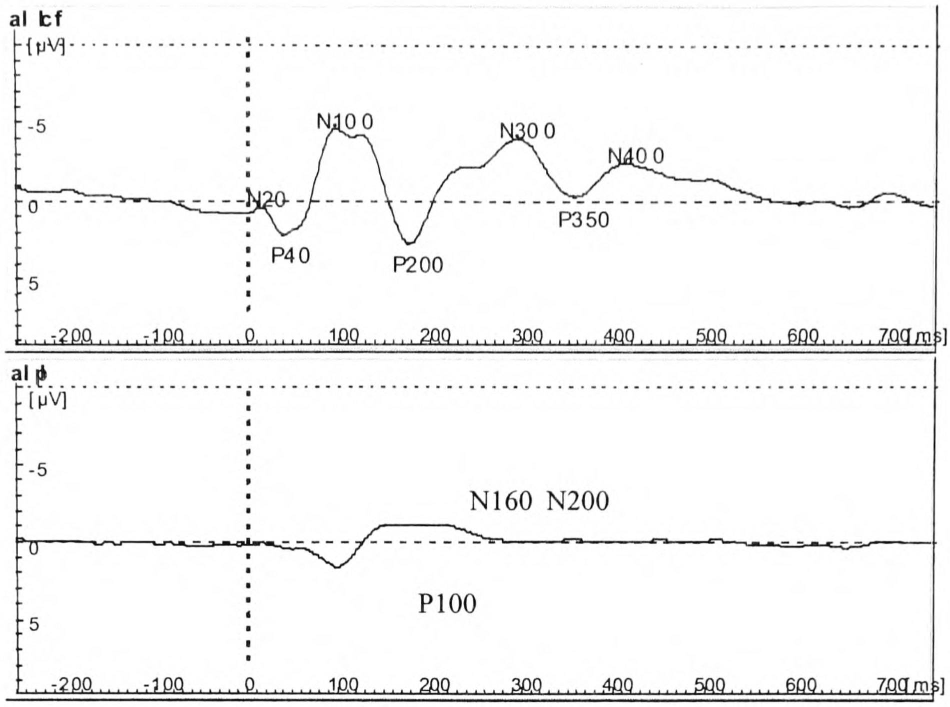

Figure 3. The mean evoked response for all subjects. Upper trace: all frontal and central leads (FC leads). Lower trace: two parietal leads (P-leads).

Note that in figure 3 the evoked potentials are still pooled over all data, pre-observer and non pre-observer conditions. In order to check if the pre-observation by a first observer makes a difference for the brain signals of the final observer we have to split the data for the two pre-observer conditions.

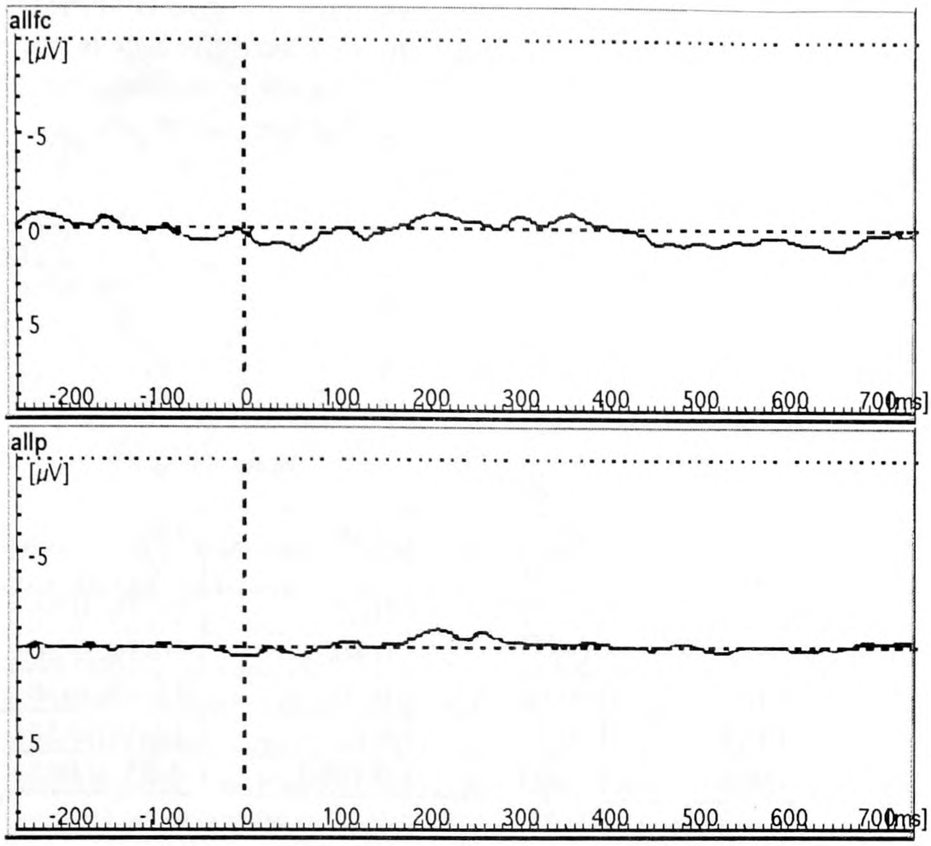

Figure 4. The differential mean evoked responses between pre-observation condition and no pre-observation condition.

In figure 4 the same evoked potentials are plotted but this time the difference for the two pre-observer conditions. Under the null-hypotheses (that pre-observation doesn't matter) this difference should be nill.

Statistical Analysis of peak amplitudes

As usual in these EEG data, the two traces for the two conditions do not completely coincide. In order to assess if the observed differences are statistically meaningful we did a simple comparison between the signal value at peak position for the pre-observed and the non pre-observed trials.

All peaks obtained by the automatic peak detection procedure were analyzed:

For the combined frontal and central leads: N20, P40, N100, P200, N300, P350 and N400. At exact 17, 41, 95, 178, 292, 357 and 411 msecs after stimulus onset. (The convention in EEG plots is generally that positive voltage is plotted "down", i.e. to the bottom of the page.) For the two combined parietal leads, P100, N170 and N200 at exact 99, 160 and 212 msecs after stimulus onset.

In Table I, column 3, we give the differences for the peak amplitudes between the two observer-conditions. As said before these differences should be negligible under the assumption that the fact that someone has observed the same quantum event earlier doesn't matter. A standard t-test was run to find the probabilities that the observed differences are due to chance (column 5).

In addition to the results of the parametric t-test we also calculated the results of the non-parametric binomial tests. In this latter test the magnitude of the difference is not relevant, only the direction for each subject. It can be argued that the non-parametric test is more suitable since the differences between two evoked potentials are not necessarily normally distributed.

			df = 29		
	Peak	Difference (microvolts)	t	p	Non-parm p N=30
FC-leads	N20	1.002	2.12	*0.043*	19-11: 0.20
	P40	0.903	2.64	*0.013*	22-8: 0.016
	N100	0.350	0.66	0.52	15-15
	P200	-0.09	-0.18	0.86	15-15
	N300	-0.04	-0.08	0.93	15-15
	P350	-0.54	-1.17	0.25	12-18: 0.36
	N400	0.098	0.25	0.80	16-14: 0.86
P-leads	P100	-0.16	-0.67	0.50	12-18: 0.36
	N160	-0.152	-0.84	0.41	13-17: 0.58
	N200	-0.956	-3.93	*0.0005*	7-23: 0.005

Table I: Results of the differential analysis of the peak amplitudes.

From these results the following preliminary conclusions may be drawn:
With regard to the signal from frontal and central leads there is a significant difference between the conditions in the very early peaks. This difference is gone after about 100 milliseconds.
On the parietal leads the difference is in the other direction and arises later with a clear maximum at 200 milliseconds.

Post hoc Spatial analysis

EEG is not the most optimal tool to draw conclusions about the spatial locations of effects. All leads, to some degree, do get their signal from all parts of the brain. That is also evident from the factor analysis. Nonetheless global spatial trends like lateralization between the two hemispheres can be observed. In fig. 5 the effect for the P40 peak is graphically projected on the head. The electrodes on the left hemisphere give a larger size effect supporting the hypothesis than do the electrode signals from the right, while the central electrodes give intermediate effects.

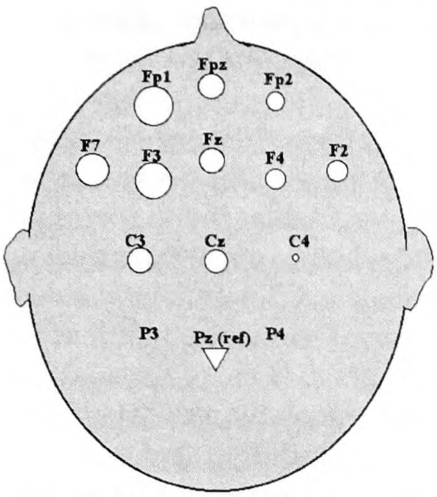

Figure 5. Differential effect at different lead locations. The size of the circle corresponds to the effect size.

This finding should, however, be considered with great caution because the signals at the different leads are by no means independent. Another way to get information about the brain regions involved is to look at the specific components in the evoked response. For auditory stimuli, like beeps, it is well known that the early peaks like the N20 do originate in the brain stem. Later peaks like P40 can be attributed to the thalamus while everything occurring with a larger latency than 100 msec is generally coming from the cortex.

5. Discussion

The results of these experiments support the observer causation of state vector collapse as the solution of the measurement. The absence of significant differences in the late evoked potential appears to be in line with the fact that in the original Hall experiment no differences were found when one asked the second observer to *consciously* express his feeling if the observed quantum event had already been observed. This finding however should be treated cautiously because the lack of statistical power in the later phases of the response. This lack of power is caused by increased variance with increasing latency times.
Before drawing far reaching conclusions we should first check if there are no more mundane explanations for the current findings.

Alternative explanations
Spurious sensory cueing of the second observer has been considered. The reason for having the first observer observe a *visual* representation of the quantum event rather than a audio-beep was indeed to prevent any audio leakage to the second observer. Both observers were in adjacent and not auditory or electromagnetically shielded rooms. Ultrasonic or electromagnetic signatures from the monitor displaying the signal for the first observer might still have presented sensory cues. Thus the second observer might have produced a slightly different auditory evoked potential due to this earlier pre-observation related ultra-sound. This scenario, however, is not very

plausible because the physical signals form the first observers display should have impact on the second observer about one second earlier, at the time the red dot is displayed.
A second explanation might be found in improper randomization of the pre-observer condition. It is well known that evoked potentials on simple stimuli like beeps tend to habituate (decline). Thus the amplitude of the signal becomes smaller in the course of the experiment. If, for some reason, the randomization did result in a non-balanced distribution of conditions in time this could artificially induce a differential effect due to habituation. We tested this idea using the actual sequence of stimulus conditions as they occurred in the experiment with several habituation models. None of these models gave any effect (p-values around 0.77). As a further test on the validity of the peak differences that we found between the two pre-observer conditions, we 'randomly' relabeled the markers so that we created two pseudo-conditions for which we did exactly the same peak difference analysis. The result of this analysis was at chance level. (the mean difference found was 0.16 microvolts at the P40. This is 6 times smaller than the real effect).

Although the current results look pretty robust, they are not *extremely* improbable in terms of statistics. It is to be noted that in spite of our conservative approach (assessing the analysis procedure on other data, not searching in any of all leads but pooling the leads etc.) one can argue that the reported p-values might be inflated due to the analysis of 10 peaks without applying a Bonferoni correction for multiple analyses. Of course peak N200 would easily survive this correction (adjusted p-value of the t-test is 0.005). Depending on how serious one takes these objections one could argue that the current findings might be attributable to chance with a probability of 1 in 50. Although this figure satisfies the criterion of 5% which is generally accepted as the significance criterion, additional data is to be sought to give unequivocal acceptance to the hypothesis based on this type of experiment. It is to be kept in mind, however, that there are other argument for this hypothesis that consciousness collapses the state vector, arguments that come both from the formalism of quantum mechanics and from the explanatory power of the QOT in parapsychology.

EEG Transfer as an explanation?
Recently several labs have reported (conceptual) replications of the original EEG transfer potential work by Grinberg-Zylberbaum (Grinberg-Zylberbaum et al, 1994; Richards et al, 2002; Wackermann et al, 2003). It was found that a subject whose EEG was measured showed changes in this EEG depending on stimulation of another (remote) subject. It should be noted that the anomalous 'transfer' was more of an energetic effect than of an informational nature. That is to say, it was not the form of the evoked potential that was 'transferred', but rather the power in the EEG signal of the 'receiver' that was found to be correlated with the remote stimulation. Moreover, this correlation was found to be synchronized in time.
In the present experiment we have also two subjects with one stimulated while the EEG from the other subject is being measured. However there are also major differences. In the first place, unlike in the EEG transfer experiments, our second subject is also stimulated, and with a delay of one second. So we find delayed

correlations rather than simultaneous ones, a significant difference from the Grinberg-Zylberbaum experimental results. A true EEG transfer would have resulted in changes in the EEG of the second observer even before the second observer was stimulated. Further we find a systematic directional effect. Thus, the peaks are larger (more positive or more negative) in one condition compared to the other. In the EEG transfer experiments there is no systematic directional effect. Only an effect in power. Thus we feel that although we cannot exclude an explanation in terms of EEG transfer potential, the probability for this explanation is low.

Further work

The further crucial experiment in which the radioactive source is sometimes replaced by a pseudorandom source is presently underway. In this experiment, the differential effect should largely disappear in the latter (classical) condition as the quantum character of the observed event is crucial. Differential results will also exclude alternative explanations in terms of sensory leakage and EEG transfer potential. If however effects are found for classical as well as quantum events we would be forced to consider the EEG transfer potential explanation for these results after having excluded all potential sources of sensory leakage.

In these replication studies we now are also able to predict more precisely where and when to look for differences in the brain signals.

So far the concept of a conscious observation has not been worked out in detail. In Libet's work, which was used in the present study to estimate the delay between perceptual input and the conscious experience thereof, he takes conscious observation to be a perception some part of which is stored in memory. This number can also be obtained from the quantum consciousness theory of Walker (2000) by calculating the mean time for a randomly selected neural stimulation to become a part of the intersynaptic quantum interaction that is part of the ongoing consciousness. There is further evidence from 'change blindness' experiments, that memory incorporation plays no essential role in consciousness.

In work in the field of 'Artificial Intelligence', the question has arisen if future computers might become conscious. The present results suggest that such a question can become empirically testable.

Acknowledgements

BioSemi offered generous support by loaning the EEG equipment. Chris Duif was helpful in setting up the software. Ronald van der Ham ran this experiment as a part of his master's thesis. Dennis Dieks helped to understand and describe the experiment in a formal way. The experiment was originally designed at *Starlab*. All former Starlab personnel are thanked for providing the unique climate for real scientific enquiry.

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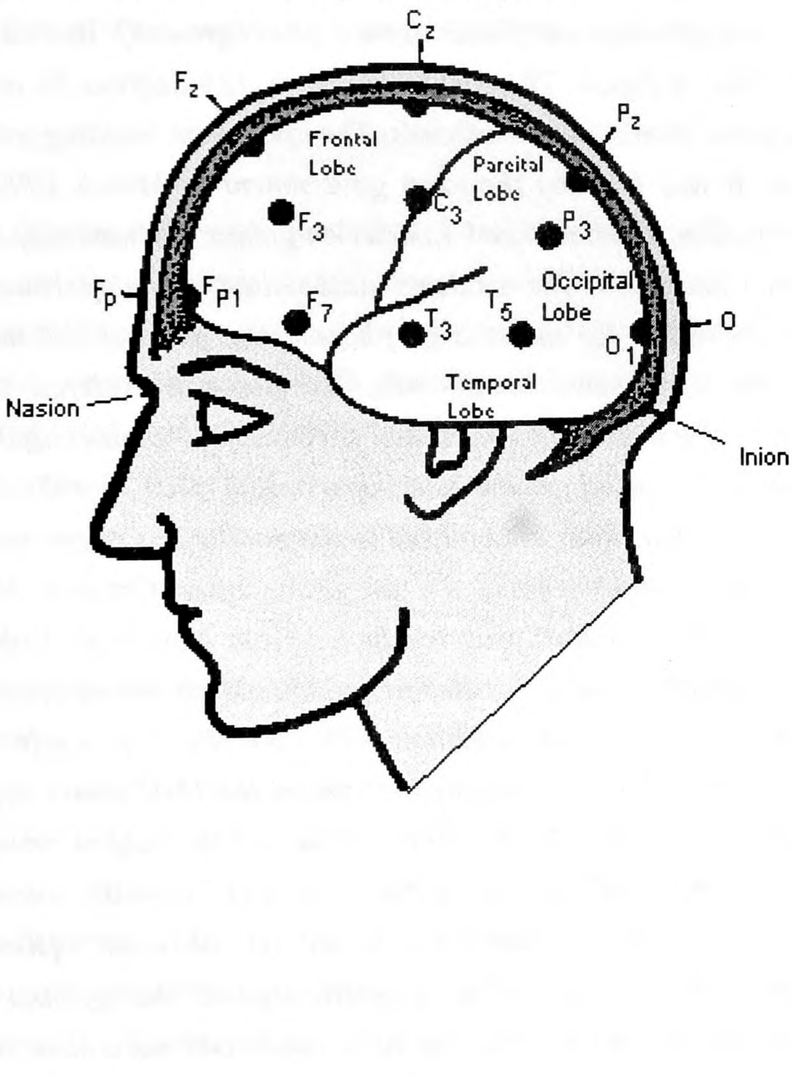
Raw Data:
http://a1162.fmg.uva.nl/~djb/research/eeg_data

Equipment:
National Instruments' Labview (2003) http://www.ni.com

The 10-20 electrode placement system:
http://faculty.washington.edu/chudler/1020.html

Biosemi Active-1, (2003):
http://www.biosemi.com/

APPENDIX I
The 10/20 EEG electrode placement system



Case Study - Tomika-cho Incident
- Analysis of Electromagnetic Data for a Poltergeist Incident in Japan -

Hideyuki KOKUBO* and Mikio YAMAMOTO

International Research Institute,
c/o Yamamoto Bio-Emission Laboratory,

Abstract

[Purpose] *In Tomika-cho, Gifu Prefecture, Japan in 2000, many families living in an apartment building claimed that poltergeist phenomena had occurred repeatedly; for example, strange sounds, the apparition of ghosts, movement of things, and electric tools working without a power supply. The authors tried to detect specific signals of magnetic fields there.* ***[Background]*** *Tomika-cho is a typical rural town located in the middle of Japan. The east longitude is 136 degrees 58 minutes 52 seconds, and north latitude is 35 degrees 28 minutes 55 seconds. The apartment building was located in the southern part of Tomika-cho. It was built by the town government in March 1999, and 24 families lived there in 2000. Many residents experienced various enigmatic phenomena, and some phenomena could be experienced by visitors too. The residents' association of the apartments asked the Tomika-cho government to take measures for the strange phenomena, but they did not receive satisfaction. A few families left the apartments temporarily. Residents considered that their experiences were caused by the work of ghosts, and they asked a medium to do a religious ritual. After the ritual, strange phenomena decreased in the east apartments (101 - 402). However, phenomena did not completely stop, and their focus area moved to the middle and upper rooms. This incident was reported by newspapers, magazines and TV programs after October 2000 as a poltergeist case.* ***[Investigations]*** *The investigation was conducted from November 15th to 17th, 2000. The social dynamics in the apartment building, and frequencies/kinds of experiences were investigated. A preliminary survey for background radiation was done by a portable radiation spectrometer. Magnetic fields were measured by two magnetometers of the Hall sensor type (10nT, DC-10 kHz) and the flux-gate type (1 nT, DC-20 Hz). The outputs of the magnetometers were recorded by a DAT tape recorder at 2.5 kHz, and then the outputs of the DAT recorder were recorded by a computer at 200 Hz through a universal interface unit and an AD converter.* ***[Results]*** *The results of the three-day investigation showed no anomalous magnetic signals. Background radiation anomaly was not detected. However, two strange electric signals in the circuit were observed during measurements at Apartment 305 on November 15, 2000. Although the reasons of these electric*

signals were not identified, it is suggested that some claims of residents corresponded to real phenomena.

1. Introduction

In Tomika-cho (Tomika town), Gifu Prefecture, Japan in 2000, many families living in an apartment building claimed that enigmatic phenomena had occurred repeatedly; for example, strange sounds, the apparition of a ghost movement of things and electric tools working without a power supply (**Table 1, Fig. 1**)(See Appendix). This incident was reported by newspapers, magazines and TV programs after October 2000 as a poltergeist case. The authors searched reports of media and contacted TV staff members. It was considered that anomalous electromagnetic phenomena had occurred at the apartment building. Therefore the authors planned to measure any magnetic fields, and they formed a research team with collaborators including a psychologist.

2. Investigations

The investigation was conducted from November 15th to 17th, 2000 by agreement of the residents and the residents' association. A preliminary survey was done by a portable radiation spectrometer. The results showed no anomalies of background radiation. Frequencies and kinds of experiences were investigated. In addition, the social dynamics in the apartment building was investigated. However, the details of the social dynamics are not described in the present paper because the residents are still living there now.

3. Apparatus

Magnetometers were of the Hall sensor type (10 nT, DC-10 kHz, Model 9200, F.W. Bell) and the 3-dimensional rectangular flux-gate type (1 nT, DC-20 Hz, TRM-200S-OP1, Tokin). The outputs of the magnetometers were recorded by a DAT recorder (PC216Ax, Sony) at 2 kHz, and then the outputs of the DAT recorder were recorded by a computer (VAIO Note 505, Sony) at 200 Hz through a universal interface unit (UIM100A, Bio-Pack Systems) and an AD converter (MP100WSW, Bio-Pack Systems) (**Fig. 2**). This was a double-recording method in which one detector and two recorders were connected in series. Temperature and humidity were measured by an apparatus (temperature; 0.1 degree, range 0-50 degree, humidity; 1%, range 10-95%RH, Ondotori RH TR-72S, T & D) at a 5- second interval.

4. Measurements

The results of the three-day investigation showed no anomalous magnetic signals. However, two strange electric signals in the circuit were observed during measurements in Apt. 305 on November 15, 2000. That day, a resident of Apt. 305 claimed that something invisible tried to turn the doorknob of the entrance door and passed across the passageway and the child's room from the entrance to the veranda. The flux-gate magnetometer was set in the child's room, especially on the line along which something had possibly passed (**Fig. 3**). The Y sensor of the magnetometer was faced toward the "exit" (south direction approximately) claimed by the resident. The Hall sensor magnetometer was not used at that time. One-hour preliminary measurement showed no anomalous magnetic signals. There were no urban noises and outputs of the magnetometer were very stable: South (Y) was -2.02×10^4 nT; West (X) was -0.53×10^4 nT; Vertical (Z) was -2.44×10^4 nT. An official measurement started at 22:24 o'clock on November 15, 2000 (Japan local time). The first electric signal was observed at 22:30 o'clock on the Y graph corresponding to the Y sensor which faced toward the north-south direction (**Fig. 4**). Then, the second electric signals (A & B) were observed at 23:10 o'clock on the Y graph again (**Fig. 5**).

After the second observation, the sensors of the 3-dimensional flux magnetometer were turned at 90 degrees horizontally and the X sensor was set toward the north-south direction. This was a test for problems with the Y-unit. However, no other signals were observed that night.

The sensor unit of temperature and humidity was set on one leg of the tripod on which the magnetosensors were set on top. Room temperature was stable at 22 degrees Celsius and humidity was stable at 72% during both the first and second observations. It was a rainy calm night.

5. Analyses

The DAT records of Tomika-cho were compared with those of the computer. However, the signals were recorded only by the computer, and not by the DAT recorder. Therefore, the strange signals were considered to be electric signals in the circuit, not magnetic signals. The measurement system was reconstructed for a test at the National Institute of Radiological Sciences (NIRS) in Chiba. Although 6-hour measurements were repeated twice, there were no similar results. Additional analyses were done for other independent data recorded by other computers in previous experiments at NIRS, but there was no signal.

In previous report, the authors analyzed data by FFT and reported frequency shift phenomena

(Kokubo et al., 2002). By recent analyses, those frequency shift phenomena were considered as artifacts which had been caused by noise of a motor in DAT recorder. However, in spite of various tests, the authors could not find the cause of signals in **Figs. 4 & 5**.

6. Discussion

In the three-day investigation, the authors could not detect anomalous magnetic fields nor anomalous background radiation. However, the magnetometers could detect signals only in low frequency. If Tomika-cho incident was caused by magnetic fields, the frequency of magnetic fields is expectedly lager than 20 Hz.

The authors obtained strange electric signals (**Fig. 4 & 5**) in a circuit corresponding to the direction which the resident claimed that something passed along. Those signals are possibly kinds of meaningful coincidence although they can not be explained at present. Either, there is a possibility that the location of the measurement was a specific electric focus. It is suggested that some claims of residents corresponded to real phenomena if the later is correct.

The authors considered that Tomika-cho incident possibly consisted of group psychological factors, physical disturbances, and others which include parapsychological factors and other events; for example, water-hammer effect.

7. Conclusion

In the three-day investigation at the apartment building in Tomika-cho, there were no magnetic anomaly in low frequency. Background radiation anomaly was not detected by the preliminary survey. However two strange electric signals were observed at a place where a resident claimed that enigmatic phenomena occurred. Although the reasons for these signals were not identified, some claims of residents seemed to correspond to real phenomena. The authors considered that Tomika-cho incident possibly consisted of group psychological factors, physical disturbances, and others which include parapsychological factors.

Acknowledgements

The authors express their appreciation to the residents, the residents' association of the apartments and collaborators of this investigation; especially Prof. Takayoshi Onodera, Dr. Masahide Furukawa, Ms. Suzue Haraguchi, and Dr. Tsutomu Iwayanagi.

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Tomika-cho official homepage (2003). http://www.town.tomika.gifu.jp/

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Table 1 Examples of phenomena which were claimed by residents.

* Some claims were possible to explain by usual reasons. For example, some footstep-like sounds were made possibly by water-hammer effects.

Item	Apartment Number	Description
Strange sounds were made repeatedly.	More than half the apartments	Some sounds were similar to noisy footsteps. Some seemed to be periodical. Hearing and recording them were easy. There were many claims for east apartments (101-402) and upper apartments (3rd and 4th floors).
	West stair	* Sounds, which were recorded by a TV station crew, were similar to the sonar sound of a submarine in movies.
Focus area moved to other areas after the religious ritual.	From east area to middle area	The residents' association of the apartments asked a medium to do a ritual because many residents considered this case was a psychic phenomena.
Flowers placed on verandas died easily.	304, 403, 405	
Apparition of ghosts.	403	A woman and man.
	404	* A resident of Apt. 304 saw a ghost stand outside Apt. 404 when the resident stand on the veranda of Apt. 304. * A resident of Apt. 303 had done a piping work in Apt. 404 in 1998 (October or November) during construction of this building house. He had seen a ghost here at that time.
	405	A man.
Spontaneous movements of things and working of machines.	101	The curtain at a window moved.
	304	A can flew into a room from an unknown place.
	305	A fan worked without power supply; a shower worked incorrectly.
	403	A doorknob turned; the door of a shoe cupboard opened.
	404	A rice bowl moved from a cupboard and became strange chipped form; the door of a cupboard opened; a television changed its channel automatically; a gas cooking stove turned itself on.
	405	Machines often broke down; a hair dryer worked without a power supply; rotation of a magnetic compass was caused; cameras often did not act at certain places. * Journalists reported that they also experienced rotation of a magnetic compass and camera troubles.

Fig. 1 Apartment Building in Tomika-cho

View from northeast. Apartment numbers run from 101 on the left to 106 on the far right. The house on the left is an assembly hall of the residents' association.

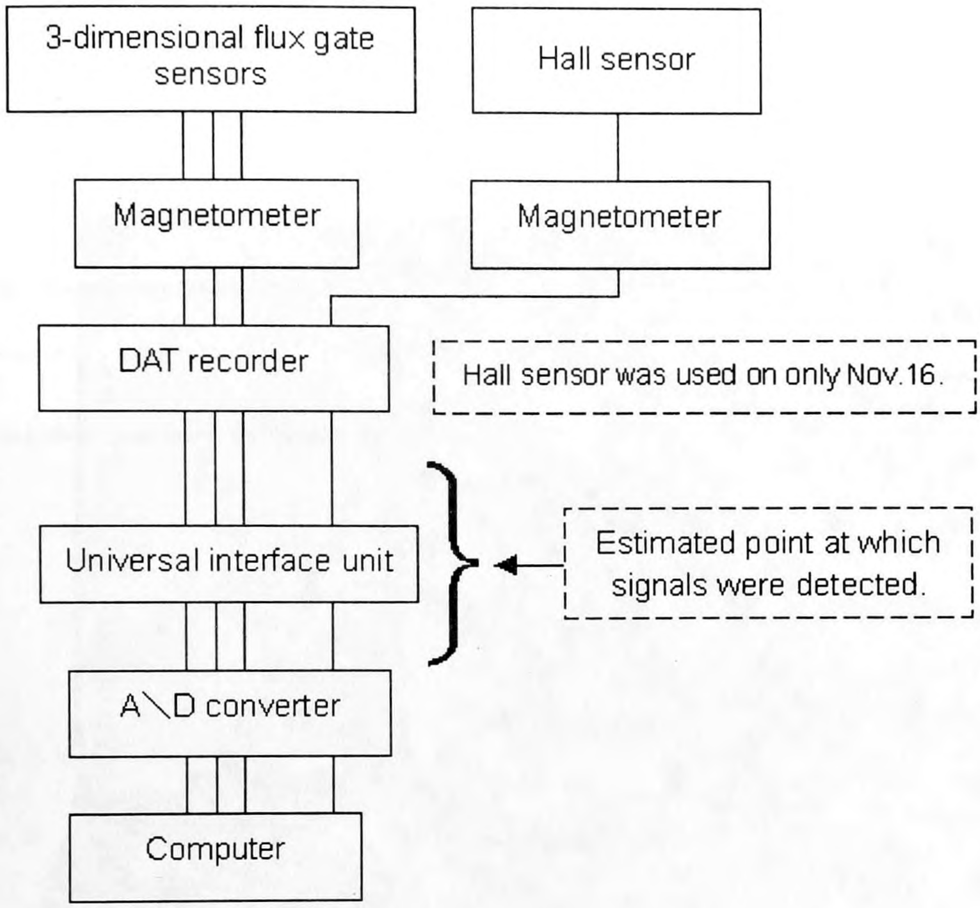

Fig. 2 Schema of Measurement System

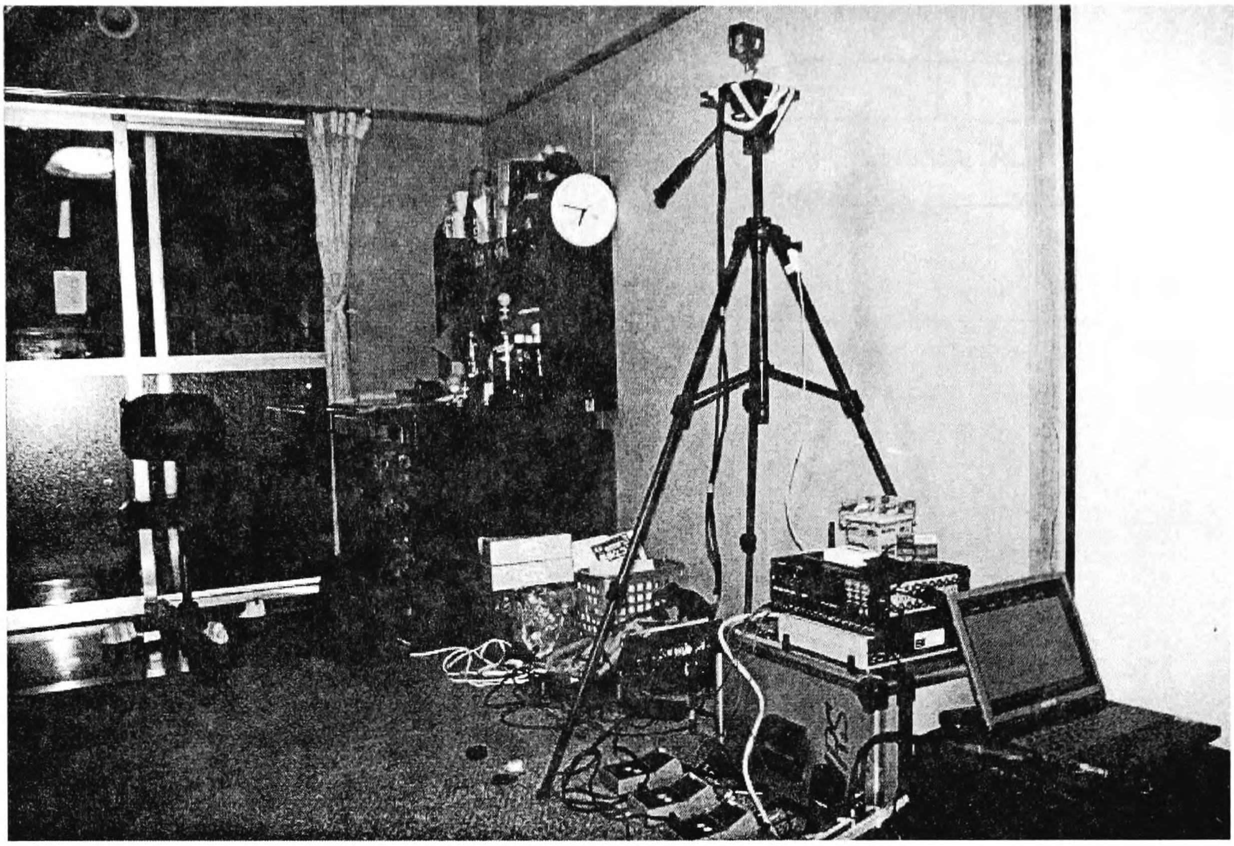

Fig. 3 Measurement System in Apt. 305

The unit of 3-dimensional rectangular flux gate sensors was set on the top of the tripod.

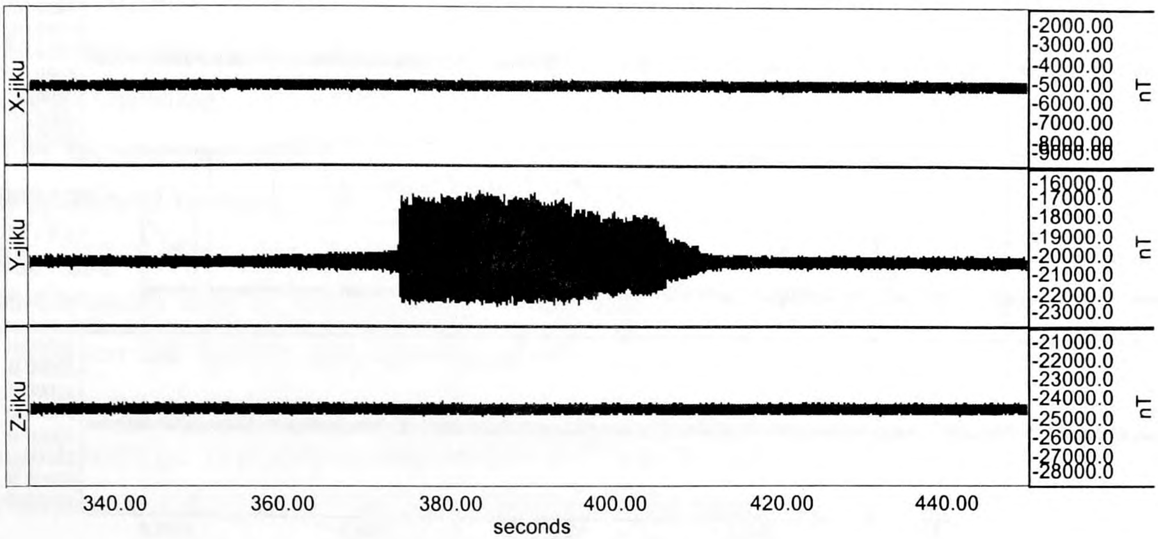

Fig. 4 First Signal

Sampling rate was 200Hz. The first signal were observed at 22:30 o'clock on November 15th in 2000 (Japan local time). It started at 374 seconds after the start of the first measurement.

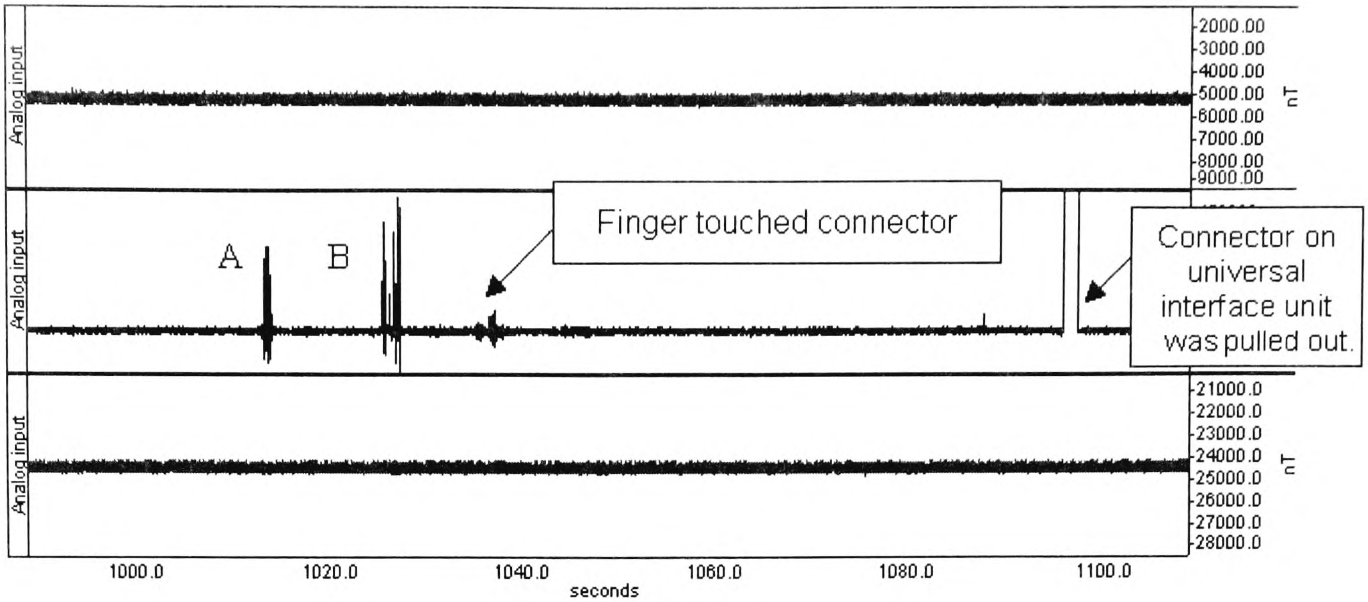

Fig. 5 Second Signals

Sampling rate was 200Hz. Both signals A and B were observed at 23:10 o'clock on November 15, 2000 (Japan local time). It was about 1020 seconds after the start of the second measurement. At that time, the authors were checking all connectors in sequence. When one of the author's tried to check the connectors on the universal interface unit, signal A occurred and surprised him. Next signal B occurred. He touched the metal body of Y connector with his fingers. (Usually there is no change of signals even if someone touches the connector). Moreover, he became afraid and then pulled out the Y connector. But he remembered the aim of measurements, and put the connector into the universal interface again.

Appendix - Background

1. Geography: Tomika-cho is a typical rural town. Tomika-cho is located in the middle of Japan. The east longitude is 136 degrees 58 minutes 52 seconds, and north latitude is 35 degrees 28 minutes 55 seconds. It is 75 meters above sea level. Nashiwari Mountain (278m above sea level) is in the north area and plains are in the south area. The town has an area of 16.82 km^2 which consists of farms (25.3%), forest (25.1%), housing (7.6%) and others. There is a local train line on the southern edge. Maximum temperature in 2000 was 36.0 degrees Celsius (September), minimum was -6.8

degrees C. (January), and mean was 15.9 degrees C. The precipitation in 2001 was 1828 mm. Population (2000) was 5835 persons (1582 families). Many people have lived here from old times because 1119 individual names are listed in an official family record done in 702 AD.

2. Apartment Building: The apartment building was located in the southern part of Tomika-cho. It was built by the town government in March 1999, and 24 families lived there in 2000. It is a typical four floor apartment building (**Fig. 1**). The Nagaragawa Line (local train line) was to the north about 250m away from the building. Trains run infrequently and are stopped at night. There was a stream nearby on the south side of the buildings. There was a factory on the south side in a woods. The distance between the factory and apartments was about 200m. The factory was in operation only during the daytime on weekdays. Around the apartments, there were rice paddies, woods and houses, but no high buildings. A parabola antenna tower of a communication company could be seen to the south by anyone standing on the 4th floor veranda of the apartment building. But antennas were set perpendicular to the direction toward the apartments, and they did not face the apartments.

3. Reactions: Residents sensed that something was strange just after their moving into their apartments. Some residents had not lived in apartments until that time, and they were also perplexed by noises of their neighbors. Therefore, time was needed for the residents to be sure that their experiences were not normal noises or acts of close living to neighbors. The residents' association of the apartments asked the Tomika-cho government to take measures for the strange phenomena, but they did not receive satisfaction. A few families left the apartments temporarily. Residents considered that their experiences were caused by the work of ghosts, and they asked a medium to do a religious ritual. After the ritual, strange phenomena decreased in the east apartments (101 - 402). However, phenomena did not completely stop, and their focus area moved to the middle and upper rooms.

A newspaper reported these strange incidents, and many journalists came to the apartments. Seven weekly magazines reported details of the incidents. Some TV production staff members brought mediums to the apartments and let them try to do clairvoyance or exorcise ghosts, and others asked researchers to make scientific investigations. The apartments became a kind of tourist attraction, and many spectators came to see there. Additionally, mediums or religious persons came from all over Japan. They visited residents, or did rituals without permission of residents, or walked around late at night. For example, during the authors' investigation, a cult group came suddenly in three cars in the middle of the night and began doing their own rituals here and there.

4. End of Fever: The last night of the authors' investigation, a religious ritual "Jou-rei" was done by Buddhist monks at an assembly hall of the residents' association of the apartments. This ritual was based on requests from the residents' association, and the Buddhist monks were high ranking monks. An important aim of "Jou-rei" is to give peace and happiness to ghosts and let them leave to the other world. Almost all residents attended this ritual, except a child who became feverish suddenly that night and several residents who were absent because they had left their apartments. Residents seemed to be satisfied by this ritual. This study's collaborators often have visited or contacted them since the investigation. One resident, who lived in the focus area, said that the strange phenomena decreased gradually after the ritual and the resident was able to enjoy life without discomfort or disturbance. Also the president of the residents' association agreed that the residents' claims decreased. Tomika-cho incident finished apparently after November 2000.

Dreams, Near-death Experiences and Reality

Jody A. Long, J.D.

Near Death Experience Research Foundation

After Death Communication Research Foundation

Out of Body Experience Research Foundation

Abstract

This retrospective study of near-death experiences (NDEs) and dreams was undertaken to understand similarities and differences of these altered states of consciousness. The Near Death Experience Research Foundation (NDERF) has collected over 300 anecdotal NDE accounts. Participants fill out a detailed web-survey on www.nderf.org containing over 50 questions about the NDE. Data is analyzed to determine if the participant experience a NDE using the NDERF definition, "A lucid experience associated with perceived consciousness apart from the body occurring at the time of actual or threatened imminent death." While any methodology may introduce bias, website access allows for greater diversity in the sample population. Much of prior research is localized to a particular area, academic affiliation, or type of illness such as cardiac arrest patients.

Out of 650 people who responded to the NDE-specific web-survey, 312 (48%) met the NDERF definition of NDE. The gender breakdown of the participants is 179 (57.4%) female, 133 (42.6%) male. The participants primarily come from English speaking countries, with the majority from the United States. Age 24 was the average age of the person at the time of the NDE, while the average age at time of reporting the NDE is age 45. The analysis crossed three answers from the NDERF web-questionnaire: 1) "What was your level of consciousness and alertness during the experience?" 2) "Was the experience dream like in any way?" and 3) "Following the experience, have you had any other events in your life, medications or substances which reproduced any part of the experience?" Not all participants answered all three questions or provided narrative answers where asked. Some just answered "yes," "no" or other monosyllabic responses. From the results of the survey, it is fascinating that most participants described their experience in terms of reality. Almost three-quarters (73.6%) of the participants reported that during their NDE they were "wide awake," "very alert," "more alert than normal," or being "very conscious." The majority of NDErs (74.9%) were emphatic that their experience was NOT dreamlike. Contrastingly, almost one-fourth (23.8%) who answered "yes" were generally not as definite in their answers.

Personality boundaries may hold a clue as to why some people have a NDE, how they integrate and narrate their experience, and compare the NDE to waking reality or other altered states. People with thick boundaries tend to be highly compartmentalized in their perceptions, feelings and thoughts about an experience. People with thin boundaries tend to merge perceptions,

feelings and thoughts when processing their experience. Studies by Earnest Hartmann, Richard Kohr, and R.A. Palmer, found that those people with thinner boundaries report more dreams, mystical and psychic experiences, and that NDErs tend to have thinner boundaries than non-NDErs. According to Robert Ornstein, memories must be vivid enough to pass the screening function of the subconscious mind, such that participants are able to recall both, their dreams and NDE. Consequently, there might be a population of those experiencers with thick boundaries, who cannot recall their experience because the subconscious screens the experience out or ignores the input. On the other hand, those with thin personality boundaries might be able to experience and see things that others cannot experience or perhaps recall. More study would be needed to determine the connection between altered states of consciousness, personality boundaries, and threshold screening level of the subconscious.

Introduction

This retrospective study of near-death experiences (NDEs) and dreams was undertaken to understand similarities and differences of these altered states of consciousness. There is a lot of speculation that NDEs are products of a dying brain, anoxia, false memories, wishful thinking, and fantasy (See e.g. Stone, 2002). A relatively recent study headed by Pim van Lommel, concluded that the NDE is medically inexplicable (van Lommel, van Wees, Meyers, & Elfferich, 2001, p. 2040). Over the years there have been many ideas proposed by the skeptics to debunk NDEs, yet my studies suggest that the best model fitting the evidence is that NDE is a state of consciousness that occurs after physical death but before the person permanently leaves their body. In the Dutch study, van Lommel concurs by defining the NDE as "the reported memory of all impressions during a special state of consciousness, including specific elements such as out-of-body experience, pleasant feelings, and seeing a tunnel, a light, deceased relatives, or a life review (van Lommel et al ., 2001)".

Datum received from the Near Death Experience Research Foundation (NDERF), the After Death Communication Research Foundation (ADCRF), and the Out of Body Experience Research Foundation (OBERF) all concur that the out of body state is common to both, dreams and NDEs, and may represent either a transitional state or distinct type of consciousness (Long, J.A. & Long, J.P., 2003). According to Robert Ornstein (1991, p. 176-200) experiences from altered states of consciousness are recalled in the conscious memory the same way. However, the degree that one is able to recall the altered states is vastly different depending on how the conscious brain interacts with the subconscious. The human mind has such a vast array of input, of which evolution of the brain has responded by developing a filter for this input (Ornstein, 1991, p. 148-149). The subconscious mind determines what information is important for the rational mind to utilize. This threshold level of information may hold the key to our individual abilities to perceive altered states of consciousness.

Earnest Hartmann (1996), when discussing the nature and functions of dreaming, describes boundaries as "a dimension of personality which relates to the degree of separateness or compartmentalization (thickness) versus fluidity or merging (thinness) in all mental functions." He noted that someone with thick boundaries has a rigid thought process where perceptions, thoughts and feelings are distinct and separate. Their view of reality was similarly well organized and compartmentalized. Those with thin boundaries tended to have experiences where thoughts, perceptions and feelings merge together. Their view of reality similarly tended to merge with waking and altered states. Consequently, Hartman (1996) found that the "thicker" the personality, the fewer dreams the person reported. While the "thinner" the personality, the more that dreams and waking reality blended. This finding on dreams is consistent with study results from Richard Kohr (1983, p.171), regarding NDEs and J.A. Palmer (Kohr, pp. 169, 171) regarding psychic phenomena and mystical states.

Methodology

The Near Death Experience Research Foundation (NDERF) has collected over 300 anecdotal accounts (Long, J.A. & Long, J.P., 2003). Informed consent is given in the web-form introduction and instructions that discloses the purpose of the survey, use of the material submitted, assurance of confidentiality to the extent requested by the contributors, and lack of compensation for participation in the survey. The website has been available for 4-1/2 years. Those persons who are directed to the website originate either from another website, word of mouth, or from searching for "Near Death Experience" on a web search engine. The web-form is available for people who subjectively feel that they have experienced a NDE and who wish to participate in the on-going study.

Participants fill out a detailed web-survey on www.nderf.org containing over 50 questions about the NDE. Data is analyzed by two researchers to determine if the participant experienced a NDE using the NDERF definition: "A lucid experience associated with perceived consciousness apart from the body occurring at the time of actual or threatened imminent death." Both researchers must agree that the experience is a NDE or it is not used for statistical purposes. While any methodology may introduce bias, website access allows for greater diversity in the sample population. Much of prior research is localized to a particular area, academic affiliation, or type of illness such as cardiac arrest patients.

Out of 650 people who responded to the web-survey, 312 (48%) met the NDERF definition of NDE. The gender breakdown of the participants is 179 (57.4%) female, 133 (42.6%) male. The participants primarily come from English speaking countries, with the majority from the United States. Age 24 was the average age of the person at the time of the NDE, while the average age at time of reporting the NDE is age 45.

Results

The analysis crossed three answers from the NDERF web-questionnaire: 1) "What was your level of consciousness and alertness during the experience?" 2) "Was the experience dream like in any way?" and 3) "Following the experience, have you had any other events in your life, medications or substances which reproduced any part of the experience?" Not all participants answered all three questions or provided narrative answers where asked. Some just answered "yes," "no" or other monosyllabic responses.

In scoring the question, "What was your level of consciousness and alertness during the experience?" I read the narratives, found patterns, and then counted up all the experiences that mentioned specific words or phrases. Qualitatively, the narrative response to the question, spoke volumes, with 226 (73.6%) NDErs reporting being "wide awake," "very alert," "more alert than normal," or being "very conscious." Many who gave narrative explanations described the distinction between the totally unconscious body and the hyper-alert state of consciousness they had entered as a consequence of being dead.

All but one participant (311) responded to the question, "Was the experience dream like in any way?" Of those who answered, 192 participants (62%) gave narrative explanations, while the other 119 (38%) of the participants gave one-word answers. There were 311 responses that I reviewed for content consistent with a "yes," "no" or "uncertain" answer. If the answer contained both, "yes" and "no" answers, it was scored as a "yes." The majority of participants, 233 (74.9%), stated that the NDE was not dreamlike in any way. However, almost one-quarter (23.8%) of the participants did find some similarities between the NDE and dreams. Only 4 (1.3%) were uncertain.

Comments were analyzed for clues as to what NDErs considered dreamlike and not dreamlike. The highest category of 68 (21.9%) NDErs defined what makes the experience dreamlike by comparing the NDE to reality. NDErs describe reality in terms of what we know in our waking reality as observed through our physical sensory input. Other narrative responses contrasted the NDE to dreams in terms of "intensity, vividness, stronger than a dream" 23 (7.2%), "reality is over there" 21(6.6%), and ease of recall 15(4.7%). It is worth noting that most of the participants who responded that the NDE was NOT dreamlike in any way, were very emphatic about this particular response. Furthermore, most participants reported that the NDE is a hyper-lucid state as compared to our waking state.

Dreamlike qualities noted by 49 (25.5%) NDErs primarily occurred in the out of body portion of the NDE, which typically occurs after dying, but prior to entering a tunnel or going towards the light. Most participants would comment on the floating sensation, the surreal feeling of being out of body, or the oddness of viewing their body as being "dreamlike."

Only four people (1.9%) out of 212 participants said that they reproduced any element of their NDE through a dream, yet all four answered that the experience was "not dreamlike." This is probably the strongest evidence from this study indicating NDEs and dreams are generally different states of consciousness.

Discussion

From the research, the NDE is typically described in terms of reality, and many times as the reality of "over there" being more real to the participant than in the waking state. Reality, as defined by the participants, is described in terms of memory recall, clarity, vividness, degree of alertness, and heightened physical senses and emotions. Dreams are generally described as less real than NDEs or the waking state. Dreamlike qualities are frequently described as more fluid, harder to remember, surreal, and closer to that experienced in the out of body state of consciousness.

Personality boundaries may hold a clue as to why some people have a NDE, how they integrate and narrate their experience, and how they compare the NDE to waking reality or other altered states. From survey results, it is fascinating that many participants described their experience in terms of reality. Experience memories from NDEs and dreams occur at a time when the rational mind lacks sensory input or is flat-lined (Ornstein, 1991, pp. 194-195; van Lommel et al, 2001, p. 2040). Memory input and storage retrieval must be strong enough to pass a threshold screening by the subconscious mind (Ornstein, 1991). Consequently, there might be a population of those experiencers with thick boundaries, who cannot recall an altered state because the subconscious screening level is too high, the intensity of the experience is not great enough to make it to the rational mind, or perhaps the subconscious has determined that remembrance would cause damage to the rational mind.

On the other hand, those with thin personality boundaries might be able to experience and remember things that others cannot perceive or perhaps cannot recall. More study would be needed to determine the connection between altered states of consciousness, personality boundaries, and threshold screening level of the subconscious. It would be interesting to find out if personality boundaries are genetic predispositions or if they represent another pathway in the brain that can be trained to induce these types of experiences.

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A Controlled Study of Intuitive Medical Assessment

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Abstract

While there has been a large and quickly growing literature in what might be called the PK side of health and healing research, namely remote influence on biological systems, there has been relatively little research on the ESP side. The latter has come to be labeled as intuitive diagnosis or intuitive assessment. The most rigorous research on this topic was done in the 1970s testing graduates of psychic development courses, but the results were uniformly nonsignificant. In the present experiment, eight volunteer "intuitives", who reported frequent psi experiences but (with one exception) no intuitive assessment experience, were asked to diagnose eight volunteer target persons (TPs), each of whom has or had one or two distinctive and relatively serious medical conditions. The intuitives and TPs were divided into two groups of four each, with an effort made to minimize overlap of symptoms within each group. The readings were conducted at the home of the experimenter supervising the sessions (C.R.), who was blind to TP identities. No one else was present. Each intuitive gave successive readings to the four TPs in their group, in counterbalanced order using a Latin Square design. To help the intuitives focus on each particular TP, they were presented with a photograph of a security envelope containing the TP's name. The session began with a structured interview of the intuitive concerning his or her attitude toward the study and any abilities, practices, or training he or she might have that would be relevant to the assessment task. The intuitives then completed Aron's Highly Sensitive Person (HSP) scale. Immediately following the diagnosis, the structured interview continued, with the intuitives being asked how they conducted their assessments, their experience during the session, and their estimation of success. The entire session was tape recorded, and the tapes were transcribed by a person not otherwise involved in the study. The TPs served as judges, either at their homes or at the Rhine Research Center. Each did four successive judgings, one for each intuitive in their group. They ranked the four readings given by the intuitive in the order of correspondence to their symptoms and then rated them on a 0-100 scale. This task was done separately for the total reading and for physical symptoms only (minus sex, age, temperament, and psychological problems.) The rankings and z scores of the ratings were averaged across TPs to get scores for each intuitive. Although it appeared that the judges rated each reading independently, the target designations formed a closed deck. In recognition of this factor, a Monte Carlo type analysis was performed on the general assessment ranks. Results were close to chance on all measures, and the experienced intuitive obtained one of the poorer set of scores. There was no within-session order effect or significant variability of success across TPs. The HSP scores were uniformly

high, and they correlated negatively but nonsignificantly with assessment scores. The interview data have yet to be analyzed.

A growing amount of research has been reported addressing directly or indirectly the application of psi to health and healing. This research has almost exclusively involved what might be called in parapsychological jargon the PK side of psi, dealing with attempts to remotely influence physiological processes in a wide variety of living systems ranging from plants to lower animals to humans. However, only a handful of studies have addressed what might be called the ESP side of psi in a health-related context. In research of this type, ESP is used to remotely diagnose or assess the medical condition of someone suffering from one or more physical or psychological disorders. The context of such attempts is often that of a traditional psychic reading, although at times it resembles more closely remote viewing. All this research has recently been summarized in some detail by Benor (2002).

Three sets of intuitive diagnosis studies were reported at PA Conventions in the mid-1970s, all of which gave disappointing results. The first two tested graduates of Silva Mind Control, a commercialized psychic development course popular at that time. In each of two series, Brier, Savits and Schmeidler (1974) had a surgeon select 25 patients who were divided into groups of five such that the symptoms of patients in each group were maximally diverse. Five enthusiastic Silva graduates each received the first name, initial of last name, age, and sex of the five patients in one of the groups and asked to give a diagnosis of each. A blind judge then attempted to match the five real and five psychic diagnoses for each of the five readers. Overall results were nonsignificant in both series, although the results of one reader in the second series were independently significant, as were the results of an 11th reader tested later. Vaughan (1974) had 21 Silva graduates attempt clairvoyant diagnoses of five patients of a physician of his acquaintance. The readers were given the patients' first names, last initials, sexes, ages, and cities of residence. The experimenter selected for judging two of these patients of comparable sex and age. The pairs of readings given by the graduates were randomized within pairs and sent to the physician to see if he could pick out which member of each pair was intended for which patient. Overall results were nonsignificant and only one diagnosis proved to be accurate.

Jacobson and Wiklund (1976) tested an instructor of a technique called Mind Dynamics that is purported to develop an ability for intuitive diagnosis. The experimenters separately randomized two lists describing ten male patients. The first list contained their names and towns of residence; the second list contained their true diagnoses. The participant entered a self-induced hypnotic state and orally diagnosed each of the ten patients after being given the name and town by the blind experimenter. The participant was then asked to match the names and true diagnoses from the randomized lists. No hits were obtained.

Three other studies included no blind judging or statistical analysis of the results. Shealy (1975) gave six "clairvoyants" photographs, names and birth dates of up to 200 patients and compared their diagnoses to the results of Shealy's conventional diagnoses of the patients. The author reported success rates of between 70 and 75% for three of the clairvoyants, but no additional documentation was provided. Nothing was said about the results of the other three. The two more recent studies allowed sensory contact between readers and patients. Benor (1992) had "two patients with known diagnoses...sit, consecutively, in front of [a] group of four healers" (p. 51). Healers and patients were separated only by a screen, and there was inadvertent verbal contact between one patient and one healer during the recording of impressions. Diagnoses used drawings as well as words to describe the patients' medical conditions. Results were presented exclusively by tables comparing specific diagnoses of the healers and physicians, so it is difficult to evaluate the rate of success. Finally, Young and Aung (1997) had three "psychics" diagnose illnesses of five patients. Psychics and patients were all tested individually with the two separated by a screen, and the patients were told to remain silent. The sessions were videotaped. Diagnoses were made by drawings as well as verbal report. Following the "blind" readings, the psychic was given the actual diagnosis of the patient by the experimenter and then invited to assess face-to-face additional conditions the patient might have. These additional statements were mixed in with the earlier statements for judging. Results were presented in a large table similar to that of Benor (1992), but the authors also reported that the percentage of correct statements ranged from 6.2 to 14.1%. They found this outcome to be unimpressive.

The results of these earlier studies have generally been negative and the methodology and reporting of the one successful study (Shealy, 1975) are not up to parapsychological standards. On the other hand, there is no reason to believe that applications of ESP to medical symptoms should be any less successful on the average than to other target systems where success has been demonstrated. Therefore, we decided to conduct a well-controlled experiment to see if we could get better results using as the readers persons who are not practicing healers or intuitive diagnosticians but who have had histories of multiple spontaneous psi experiences in various contexts. We felt that such persons may feel less pressure to perform than more "professional" intuitives with reputations to maintain, and this may actually increase the odds of obtaining good results.

Another distinctive feature of the present experiment was that the intuitives were given minimal information about the target person (TP). In fact, all they were given was a photograph of an envelope, located in a distant office, containing the TP's name. This stinginess served two purposes. First, it completely eliminated any chance that the intuitive could obtain useful sensory cues during the test session. Second, we wanted to create a situation in which the most likely psi sources were the TPs themselves, rather than sheets of paper. If intuitive diagnosis is to ever be of practical value, it must reveal information beyond what is already available in, say, the patients' medical records. We hypothesized that the photograph would guide the intuitive to the sheet with the TP's name which, in turn, would guide them to that person, who would be the source of the information needed for the medical diagnosis. These assumptions about the information trail are, of course, speculative, but they seem reasonable. Finally, by having multiple experimenters involved in different aspects of the procedures, none of whom had all the information needed to infer the correct target/transcript matches (except J.P. during data analysis), we sought to minimize potential objections about the possibility of experimenter chicanery.

The only formal hypothesis for the experiment was that the intuitives would score above chance to a statistically significant degree.

Method

Participants

Target Persons (TPs). Eight volunteers were selected by Maggie Blackman (M.B.) to serve as target persons from among acquaintances of Rhine Research Center (RRC) staff and visitors to the RRC. They had to be persons who at the time of recruitment had or previously had one moderately serious physical ailment but not more than two ailments. The ailments of the TPs are listed in Table 1.

Intuitives. Eight volunteer intuitives were solicited by Colleen Rae (C.R.). All had previous psi experiences. Seven were members of a Paranormal Experiences Group (PEG) co-facilitated by C.R. and Sally Feather (S.R.) at the RRC, who had expressed an interest in participating in research. Several had served as participants in other studies. The other intuitive, suggested by an RRC staff member, had previous intuitive experiences of a medical nature.

TABLE 1
Ailments of the Target Persons

	Code	Sex	Symptom(s)
Group I			
	A1	F	Multiple sclerosis; lumbar disc surgery
	B1	M	Prostate cancer
	C1	F	Leg amputation; enlarged pancreas
	D1	F	Epilepsy
Group II			
	A2	F	Parkinson's disease
	B2	M	Paralyses
	C2	F	Brain tumor; tachycardia
	D2	F	Breast cancer; left knee pain

Design

The intuitives and TPs were divided into two groups of four persons each, hereafter referred to as Group I and Group II. TPs were assigned to groups by John Palmer (J.P.) in such a way as to maximize the diversity of symptoms within each group (see Table 1). An ordering of the eight sessions by group was determined by a computerized pseudo-random number table, and the assignment of intuitives to groups was determined by the order in which they were scheduled. For example, if the table defined the first session as a Group I session, the intuitive scheduled first for the study would be in Group I. This order of sessions by group was given to C.R. Each intuitive participated in one session, during which they successively read the four TPs in their group. The order of TPs in each session was determined by a Latin Square format implemented by Robert Bourgeois (R.B.), such that each TP in a particular group would occupy a given location in the sequence of readings once and only once. The order of TPs for the first session of each group was determined by a random permutation program written by J.P.; once this sequence was chosen, the sequences for the other sessions were fixed by the Latin Square format. This resulted in a closed deck format.

Target Envelopes

J.P. arbitrarily assigned the four TPs in each group one of four ESP-card symbols: star, cross, square, and waves. Symbols were chosen rather than letters or numbers because they have no obvious ordering. On the upper left corner of each of eight plain white 8½ x 11" security envelopes was written in black ink the group number and symbol that had been assigned to the corresponding TP. J.P gave these envelopes to M.B., who inserted inside each a sheet of paper containing the name of the corresponding TP. She then sealed the envelopes shut and handed them to R.B., who kept them locked inside his office. During each session, the appropriate envelope was removed from the set and placed on a table inside R.B.'s office. A photograph of this envelope was exposed to the intuitive during their reading of the corresponding TP.

Questionnaires

In addition to the intuitive assessment task, the intuitives completed two exploratory test instruments during the session.

Structured Interview Questions. Prior to their readings, the intuitives were asked to respond orally to a series of 12 questions concerning their attitude toward the study and any personal abilities, practices, or training of relevance to intuitive medical assessment. Following the readings, they were asked three additional questions concerning how they conducted their assessments, their experience during the session, and their estimation of success. The questions were devised by Robert Morris (R.M.).

Highly Sensitive Person (HSP) Test. The HSP test is a 27-item true-false questionnaire designed to assess individual differences in what the authors call sensory processing sensitivity, or how "sensory information is transmitted to or processed in the brain" (Aron & Aron, 1997, p. 347). Due to a clerical error, only the first 17 items were actually administered to the participants, but earlier versions of the HSP test with a comparably reduced number of items had been found to have satisfactory reliability and validity; even an 8-item version yielded a alpha of .75 (Aron & Aron, 1997). Endorsement of an item contributes one point to the person's score, so the possible scores ranged from 1 to 17. The higher the score, the more sensitive the person is considered to be. The rationale for using the HSP is the hypothesis that persons who are most sensitive to environmental stimuli generally will also be most sensitive to psychic information.

Procedure

At the beginning of the experiment, C.R. emailed R.B. with the sequence of group numbers for the 8 sessions. R.B. then emailed C.R. with the order of envelopes (trials) for that session, based on the ESP-card symbols.

All sessions were conducted by C.R. at her home. C.R. knew the seven participants from the PEG group personally and had already established good rapport with them. This rapport was one reason that C.R. was chosen for this role, as well as the fact that she also considers herself to be psychic and thus the intuitives would have another basis for identifying with her.

At the beginning of the session, C.R. introduced the study as a "fact-finding mission" designed to see "how normal psychics like us" who had not been formally trained in medical diagnosis might receive relevant information that could be helpful to the TPs. She noted that each TP had a distinctive ailment they should try to uncover, but that the intuitive should be attentive to other possible ailments. She then explained the procedure to the intuitive (which had already been done in general terms during the recruitment). She likened it to "remote viewing", a procedure most of the intuitives were familiar with by virtue of having participated in remote viewing research at the RRC. She explained that the intuitives were not being allowed contact with the actual envelopes containing the names of the TP out of fear that "psychometric" impressions might be left on the envelopes by earlier intuitives in the series that would then bias the impressions of subsequent intuitives (cf., Roll, 1966). (This was a particular concern of C.R., as she had noticed in a pilot study with handled envelopes that later intuitives appeared to duplicate the diagnoses of earlier ones.) The intuitive was told that the picture of the envelope was being presented as a reminder that the actual envelope was present at the RRC and that the name inside was intended to help them "find" the TP. C.R. mentioned that during the readings she would be meditating in an effort to avoid having her own thoughts intrude on the intuitive's mentation. She noted that there would be no attempt to induce an altered state of consciousness in the intuitives because she knew that they had their own techniques for doing this, but that they should "feel free to take as long as [they] needed to get into that state where the information came through easily".

After having the intuitive sign a consent form, C.R. turned on a tape recorder and conducted the 12-item pre-test structured interview. The tape recorder was then turned off and the intuitive asked to complete the HSP test, which was labeled the "Self-Profile Test". Next, the tape recorder was turned back on and the photograph of the target envelope for the first TP was exposed to the intuitive and remained exposed during the reading of this TP. The intuitive then gave orally their impressions of the TP's physical condition. (In addition, the intuitives included a guess as to the TP's sex in 18 of the 32 readings, and they frequently commented on their age and psychological well-being, although this information was not solicited.) After the first reading, the photograph was replaced with that for the second TP, and the readings continued thusly until all four had been completed. Then C.R. administered the three post-test interview questions. Finally, she turned off the tape recorder, invited questions about the study and the procedure, revealed the nature of the "Self-Profile Test", and asked the intuitive not to discuss their session with anyone else who might be an intuitive in a later session.

Judging

The tapes from the eight sessions were transcribed by Lynette Minnich (L.M.), who was not otherwise involved in the project. The computer file was then sent to J.P., who isolated the readings from the interviews and put them on separate sets of pages (one per intuitive) in the order they were given during the session. Each reading was labeled by the group number (1 or 2) and the letters A-D indicating their order. It was decided to keep editing to a minimum; however, J.P. did remove extraneous statements from one intuitive to the effect that she felt unqualified to do the task. He felt that leaving such statements in might cause the judge to not consider this intuitive's statements as carefully as those of the other intuitives. A rating sheet was then stapled to the front of each set of readings.

The TPs served as judges. Four completed the judging at the RRC, supervised by R.B. The other four completed the judging at their homes. Three of these were supervised by M.B. and one by R.B.

After signing a consent form, the TPs were asked to give each of the four readings in the set a rank of 1 to 4 as to accuracy vis-à-vis their current or past circumstances. Then they were asked to convert each rank to a rating of 1 to 100, indicating the degree of accuracy. The ratings were intended to serve as a refinement of the rankings. Finally, they were asked to repeat this procedure considering only statements about their physical symptoms, excluding such factors as sex, age, temperament, and psychological problems. Each TP completed the above task four times, once for each intuitive.

Results

Judging Anomaly

Upon examining the judges' scores, J. P. noticed that the ratings did not always correspond precisely to the ranks, in that a lower-ranked item (e.g., 3) sometimes got a lower rating than a higher-ranked item (e.g., 2). The judges were not told explicitly that the ratings had to correspond to the ranks, but we expected that they would. Most of the discrepancies were minor and seemed to reflect ambivalence about how to score pairs of readings whose levels of perceived accuracy were very similar. However, in the case of one judge the discrepancies were so marked that this explanation was clearly not applicable. J.P. thus asked R.B. to supervise a re-judging by this one judge. The original judging packet was given to this judge, including scoring sheets reflecting her original choices. The problem was explained to her and she was asked to modify only her ratings. R.B. was still blind to the identity of the targets. The judge could provide no rationale for her original ratings.

Main Results

The four rankings and ratings of each intuitive were averaged for both the general and physical symptom assessments. For the general assessments, the mean rank for the 8 intuitives was 2.44. Compared to mean chance expectation of 2.5, this value was slightly above chance but not significant, $t(7) = 0.254$. The ratings were converted to z scores, and the mean of these was 0.05, which is also nonsignificant, $t(7) = 0.327$. The individual ranks for the general assessments are presented in Table 2.

The scores the judges assigned for physical symptoms corresponded closely to those assigned for the general assessments, and all the resulting statistics were nonsignificant. The mean rank was 2.53, $t(7) = 0.098$ and the mean z score was 0.13, $t(7) = 0.483$.

Judging Dependency? Because of the Latin Square design, the four sets of readings evaluated by each judge each had a different target reading location, corresponding to the definition of a closed deck. However, it is unlikely that the judges treated their ratings as interdependent. Unlike cases in which the judges are confronted with a matching task, in this situation they were asked to evaluate 4 *different* sets of 4 readings, and there is no reason for them to assume that the assigned targets for the 4 sets would be mutually exclusive. This judgment is borne out by an examination of the ranks the judges actually assigned. None of the eight judges assigned a given rank to the target only once, i.e., 1,2,3,4. Four of the judges had one duplicate pair of target rankings, and the other four had two duplicate pairs.

Nonetheless, a Monte Carlo type analysis was performed on the general assessment ranks. There are 35 possible length-four sequences of the numbers 1-4, ignoring order within the sequence. A sum of ranks was calculated for each of these sequences, and the proportion of sums as low or lower than each of these sums was determined. This proportion was then converted to a z score. Finally, the appropriate z score was assigned to each intuitive based on his or her own sum of ranks. The mean of these z scores is 0.12, $t(7) = 0.341$, very similar to the value obtained by the original method.

TABLE 2

Rank Assigned to Each Target Person by Each Intuitive
(General Assessments)

Group I		Target Person		
Intuitive	A1	B1	C1	D1
I	3	3	1	2
II	1	4	4	2
III	4	4	4	3
IV	4	1	1	3

Group II		Target Person		
Intuitive	A2	B2	C2	D2
V	2	2	1	2
VI	2	1	1	3
VII	4	1	2	1
VIII	4	4	1	3

Secondary Analyses

Order. Was there a decline or incline effect across the four readings in a session? To answer this question, a sum of ranks was computed for the general assessments for readings in each of the four positions. The sums were 1:22, 2:16, 3:21, 4:19, with mean chance expectation being 20. Clearly, no decline or incline effect is present, and the variability of the ranks sums is nonsignificant by the Friedman test, $\chi^2(3, N = 8) = 0.263$.

Target Persons. Was there significant variability among the eight target persons in the ranks they assigned to the target? The sums of ranks varied from 5 to 12, with mean chance expectation being 10. The variability is not significant by the Friedman test, $\chi^2(7, N=8) = 6.917$.

Sensitivity. The intuitives scored uniformly high on the HSP, with a mean of 14.25 ($SD = 1.88$) on the 17-point scale. Because of the lack of variability, reliable correlations with ESP scores are not to be expected. Using the original z scores as the dependent variables, the Spearman correlation with HSP for general assessment was $r_s(6) = -.195$, and $r_s(6) = -.415$ for physical symptoms. Both values are nonsignificant and opposite in direction from expectation.

Discussion

Given the uniformly chance results of this experiment, there is not a great deal to discuss. The negative outcome could mean either that the intuitives, as a group, lack the requisite psi ability or that the conditions were not conducive to their demonstrating the abilities they have. The intuitive who had some previous intuitive experiences of a medical nature (VIII) obtained one of the poorest sums of ranks, whereas the intuitive who expressed lack of confidence in her readings (VII) had an average sum of ranks.

Neither the target persons themselves nor relevant information about them were in close physical proximity to the intuitives during the session. Although this feature of the design is desirable from a control standpoint, it may have made the task seem more daunting to the intuitives, although C.R. detected no evidence of this attitude during the sessions. It is also conceivable that the distance may have made the target material less accessible in a more fundamental sense, although there is little evidence that distance adversely affects psi performance generally. Recall that the purpose of making salient to the intuitive but a bare minimum of written information about the TP was so that it would not be a source of inference about the TPs medical condition. Instead, this information was intended only as a focusing mechanism. The fact that just names and social security numbers have been used successfully as beacons for remote viewing subjects (e.g., May, 1995) suggests that such beacons need not be rich in content.

Having multiple trials per session could have encouraged displacement effects, and we intend to look further for possible evidence of this. Also, information from the structured interviews has yet to be evaluated and these data may prove to be useful, either in terms of common themes or correlations with intuitives' ESP test scores.

Modifications for future research will not involve an increase in the amount of information given in advance to the intuitives, but rather in sampling a population of potential intuitives that might have more aptitude for the task. In addition to the obvious step of testing professional intuitives, we also contemplate testing nurses who have noticed an ability on their part to intuit the nature and progression of ailments in their patients that may contradict or go beyond information in the patients' medical charts. We would attempt to identify such budding intuitives through a survey given to a large number of nurses in the local area. Finally, we like a slightly modified suggestion offered by a referee of this paper, namely having the intuitives and TPs meet shortly after the experiment is completed, thereby providing the intuitives with feedback.

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MARCELLO TRUZZI MEMORIAL PANEL

Stanley Krippner, Chair

Robert Morris, participant:
Marcello Truzzi was a pivotal figure in establishing the scholarly approach to true skepticism. He left the CSICOP group as it seemed to him to be an advocacy group in itself. He started up and maintained the Zetetic Scholar, to emphasize his commitment to the original skeptical position of the Zetetic movement, which challenged any strong claim to knowledge. From his standpoint a claim that X is not the case deserved just as much challenge as a claim that X is the case. He also espoused a courtroom model of conflict resolution in science, with advocate and counteradvocate serving as lawyers with the scientific community as the jury. My presentation will explore the relevance of these features for parapsychology as a whole and for myself personally.

Rosemarie Pilkington, participant:
Marcello Truzzi and I disagreed on many topics regarding psi research and its results. However, we had very similar views on U.S. politics and Italian opera. I was constantly amazed at his wide range of knowledge, which went into depth rather than being superficial. He had a great sense of humour, and a conversation with him always stretched the mind as well as leaving one smiling or laughing. He explored the Internet avidly and sent articles of interest to me as well as his other friends. He will be missed, and is irreplaceable.

Stanley Krippner, participant:
Marcello Truzzi and I met at a PA convention and hit it off immediately. He was surprised to see that I was so skeptical, and I was surprised that he was so open-minded. We shared a trip to China with several other PA members such as Hal Puthoff, Thelma Moss, and Jerry Solfvin. This group represented a wide range of beliefs and worldviews, yet all of us caught the so-called "psychic children" using sleight of hand. It was on this trip that I discovered that Marcello was an incredible gourmet, along with his other talents. Later, he wrote a landmark chapter on magicians and psi for Advances in Parapsychological Research. I only wish he would have written more because he had a fund of knowledge and understanding that was unique in our field.

John Palmer, participant:
Historians will no doubt ascribe to Marcello Truzzi an important role in the psi controversy of the latter 20th Century. A founding member of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP), he quickly bolted from their ranks because of their lack of objectivity and pandering to the media. He understood that the scientifically prestigious mantle of “skeptic” should be attributed in the psi debate only to those who apply the principle of doubt to all proposed explanations (or classes of explanations) of psi anomalies, not just those they happen to dislike. Most self-proclaimed

skeptics of parapsychology fail to meet this test, but Truzzi was an exception. As such, he carved for himself a distinct niche between advocates of paranormal and conventional explanations of psychic phenomena, and he often tried to serve as a referee or "honest broker" between the two sides. The most important expression of this objective was *Zetetic Scholar (ZS)*, a journal he founded and edited between 1978 and 1987 as a scholarly and fair-minded alternative to CSICOP's *Skeptical Inquirer*. During its all too brief existence, *ZS* published a number of noteworthy debates. The highlights (for me, at any rate) included a rather acidic exchange between myself and James Alcock concerning his book *Parapsychology: Science or Magic?* and an extended discussion of CSICOP's attempts to debunk the neo-astrological findings of Michel Gauquelin, the so-called "Mars Effect" controversy. Truzzi and I were both very interested in conceptualizing the broader psi controversy, and our thinking often moved along parallel tracks. For example, he recognized and objected to the rhetorical device of many critics to frame the evidence for psi as either conclusive or worthless. He understood, as do most scientists in other contexts, that evidence is a matter of degree. One of our disagreements was the validity of the maxim "extraordinary claims require extraordinary proof". Truzzi defended this maxim (I believe he was the one who actually coined the phrase), although a few months before he died he expressed to me a favorable view of an article I had written many years ago disputing it. Truzzi always argued his points in a scholarly but animated way that wouldn't let you get bored even if the topic was intrinsically boring. His exuberance will be missed as much as his scholarship by those of us who had the privilege to know him.

On the Centenary of Frederic W.H. Myers' *Human Personality and Its Survival of Bodily Death* (1903)

***Human Personality and Its Survival of Bodily Death*: An Overview**

(Jeffrey Mishlove)

Scholars regard Frederick William Henry Myers' classic synthesis of nineteenth century field research as the most important single work in the history of psychical research. He was, in 1893, the first writer to introduce the works of Freud to the British public. The British Psychological Society, for example, lists the publication of this book among the landmark events in its "Chronology of Psychology in Britain."

Myers maintained that the human personality is composed of two active coherent streams of thoughts and feelings. Those lying above the ordinary threshold of consciousness he labels supraliminal while those that remain submerged beneath consciousness are subliminal. The evidence for the existence of this subliminal self derives from such phenomena as automatic writing, multiple personalities, dreams, and hypnosis. Myers examined all of these phenomena carefully and feels that they are part of a continuum ranging from unusual personality manifestations to telepathic communications, traveling clairvoyance, possession by spirits, and actual survival of the subliminal layers of personality after the death of the body. Each experience in this spectrum is integrally related to the other states of mind.

Myers began his analysis by looking at the ways the personality is known to disintegrate. Insistent ideas, obsessing thoughts and forgotten traumas lead up to hysterical neuroses where the subliminal mind takes over certain body functions from consciousness. Gradually these maladies merge with cases of multiple personalities. From the disintegrated personality that reveals some of the negative aspects of the subliminal self, Myers moved naturally to look at people of genius. He discussed mathematical prodigies and musicians whose works spring fully formed into their consciousness. In addition to people of genius, Myers includes saintly men and women. From neurosis, genius and sainthood Myers moved to a state of mind all individuals experience -- sleep, which he describes as the abeyance of the supraliminal life and the liberation of the subliminal. Myers discerned the heightened powers of memory and reason that occur in some dreams, and focused on cases of clairvoyance and telepathy in dreams. He cited cases of what seem to be psychical invasions in dreams by spirits of both living and departed persons. He concludes by suggesting that sleep is every person's gate to the spiritual world.

Hypnosis was presented as the experimental exploration of the sleep phase of human personality. Myers also highlighted the relationship of hypnosis to other phenomena such as faith healing, the miraculous cures at Lourdes, and the use of magical charms. He emphasized the experimental work done in telepathic hypnotic induction at a distance as well as telepathy, clairvoyance and precognition observed in the hypnotized subject. From hypnosis Myers moved to visual and auditory hallucinations psychical researchers have labeled sensory automatisms or apparitions. Many hallucinations cited were shown to contain information that was later verified. Other hallucinations include the apparitions of the living and the dead that has been a major focus of nineteenth century psychical research. From sensory automatisms Myers moved to motor automatisms -- including automatic writing and speaking in tongues. There are cases of automatic writing where the handwriting of a deceased person is alleged.

It is on the basis of this continuum of experiences that Myers asserted the subliminal self is able to operate free from the brain in ways that modify both space and time as they appear to the ordinary conscious mind.

The Reception of *Human Personality and Its Survival of Bodily Death*
(Nancy L. Zingrone and Carlos S. Alvarado)

This presentation discusses how *Human Personality and Its Survival of Bodily Death* was received by different individuals. While spiritualists were generally in agreement with the affirmation of the reality of survival of bodily death, a spiritual world and psychic phenomena, some of them complained Myers was not saying anything that spiritualists had not argued before. This was the case of an anonymous commentary published in *Light* in 1903. In addition, they resented the use of the concept of the subliminal mind to explain psychic phenomena. Such reaction was not surprising, and followed the criticisms that the British spiritualists directed at Myers during the 1880s expressing skepticism about the existence and powers of the subliminal, as discussed by John Cerullo in *The Secularization of the Soul* (1982). More positive comments came from a group of psychical researchers and psychologists among which were Théodore Flournoy, William James, and Oliver Lodge. These were individuals who were already predisposed due to their experiences and outlook to accept both the positive functions of the subliminal proposed by Myers, as well as the supernormal, that is, such phenomena as telepathy and veridical mediumistic communications. Psychical researcher James H. Hyslop strongly criticized Myers' concept of the subliminal in 1913 arguing that Myers was over-inclusive, putting together disparate phenomena under the domain of the subliminal (physiological and psychological functions). Overall many psychologists such as Pierre Janet, Joseph Jastrow, and James Stout were more negative about Myers' work. These authors were skeptical of the supernormal (e.g., telepathy, spirit communication), and of Myers' metaphysics. Jastrow went as far as saying in his book *The Subconscious* (190) that he did not find Myers' work useful. However, Jastrow and other authors skeptical of Myers' ideas were not above using *HP* and other writings from the *Proceedings of the Society for Psychical Research*. Overall, as was to be expected, the evaluation of *HP* depended to a great extent on the particular author's openness to psychical research. Unfortunately the opinion of Jastrow and those like him was influential in science at large and helped sustain the marginalization of Myers and psychical research in wider psychology. The differential reception of *Human Personality* serves to illustrate the problems psychical researchers have had both with established science and with spiritualism, as well as the variety of assumptions and worldviews prevalent in psychical research and its critics.

Myers and Modern Parapsychology
(John Palmer)

Frederic Myers was a man ahead of his time. Contemporary parapsychologists often have wittingly or unwittingly followed his lead in choosing topics for their research, and there remain many unexplored hypotheses ripe for picking. I would like to start with three points that surprised me as I reviewed Myers's ideas for this panel. The first is the emphasis he placed on the notion that our theories of nature must be unified or coherent. In my view, the widely held assumption that psi does not fit in with other laws of nature is the main intellectual reason that mainstream science rejects the evidence for psi. I think Myers would have great sympathy for efforts, such as the observational theories, to integrate psi with modern physics. He addressed this link obliquely when he discussed volition, which he said occurs fundamentally at the molecular level, although it appears lawful at the macro level. Volition is a major element of one of the modern theories linking psi to quantum mechanics, that of Harris Walker.

The second surprise was his adoption of the view generally identified with Rhine that survival research will be impossible unless we approach it with an understanding of what our living personalities are and can do, which can be taken to include their psi capacities.

The third surprise was the value Myers placed on experiments. Although he is usually identified with spontaneous cases and indeed considered them necessary in the early stages of inquiry, he also stated that experimental methods, if diligently pursued over time, will be more likely to lead to progress.

Despite occasional references to physics, Myers wrote primarily about psychology. He considered psi to be an attribute of the subliminal self. To understand psi we must access this subliminal self, and he has many suggestions for doing that. The most prominent technique is hypnosis, which has been used successfully in much psi research. Another is crystal gazing, a modern representation of which is the psychomanteum. The subliminal manifests in sleep and dreams, sensory automatisms (hallucinations), and motor automatisms (e.g., automatic writing), and thus these are good places to look for psi. He maintained that altered states of consciousness reflect the permeability of the boundaries between the subliminal and supraliminal, and that the state of both sender and receiver are important for telepathic transmission. Myers associated the subliminal (and psi) with the right hemisphere, again echoing contemporary theory, and he suggested specifically that enhanced subliminal functioning is associated with ambidexterity. He also noted that the subliminal can be expressed in mental illness, especially hysteria, and expressed the view that we can learn about the normal manifestations of the subliminal by studying the abnormal ones. I have cited this same rationale to justify my study of spontaneous psi experiences in epileptics.

Finally, in contrast to Gurney, Myer's thought that apparitions are caused by something that actually exists in physical space. This is somewhat reminiscent of the modern view that electromagnetic and geomagnetic fields can trigger haunting apparitions.

F.W.H. Myers and the Future of Psychology
(Robert L. Morris)

Psychology was in its infancy when Myers published his major works. Its concepts, methodologies and techniques of data treatment were not well developed. The same was basically true for all of the neurosciences. Part of the joy of reading Myers, James and many others of that time was the freshness of their conceptualisation, as well as their tendency to address the aspects of psychology of most importance to us both conceptually and in terms of our everyday lives and concerns. However many of the ideas put forth were not effectively pursued, largely because the empirical tools were not there. As a result some were abandoned, forgotten, or just kept alive primarily through more theoretically oriented writings. In this paper we will explore some of the ideas offered by Myers and their implications for present day psychology's concepts and practices. What has been neglected but now could be investigated more thoroughly? And what would still be a challenge, and could push psychology into further conceptual and methodologial developments?