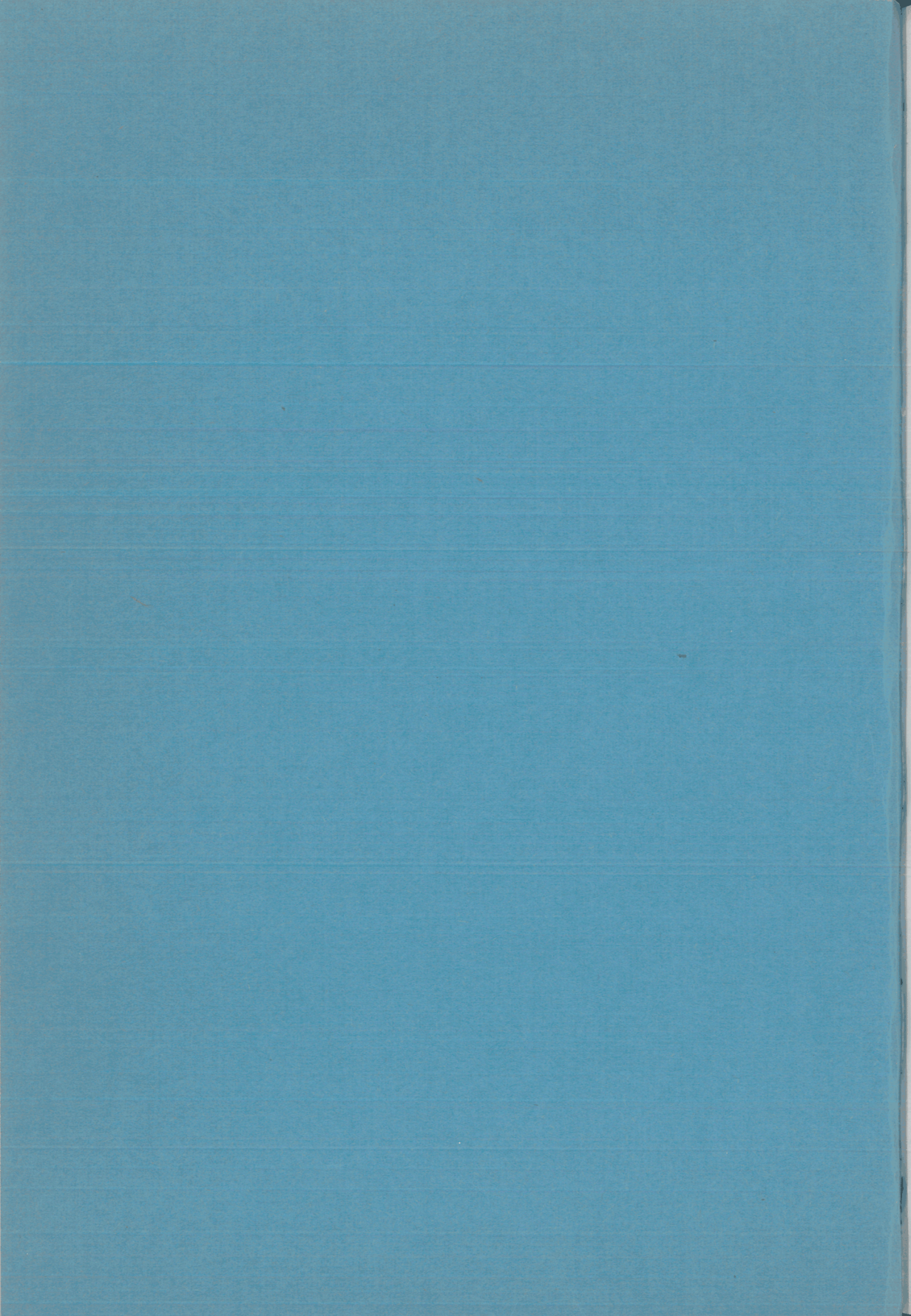


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A NOTE ON SOME RESEARCH DESIGNS

C.T.K. Chari

I should like to express my appreciation of the Research Letters issued in December, 1971, March and June 1972 by the Parapsychology Division of the Psychology Laboratory of the University of Utrecht. I should like to single out two of the reported research designs.

1. Sybo A. Schouten's psi experiments with mice are in the best modern traditions of ethology or the comparative study of animal behaviour (vergleichende Verhaltenforschung). This is a comparatively neglected aspect of psi research. Since the new science of comparative behaviour was sponsored by Konrad Lorenz and Niko Tinbergen, several important journals devoted exclusively to it, Zeitschrift für Tierpsychologie, Behaviour (Brill, Holland), the British Journal, Animal Behaviour, and the French Revue du Comportement Animal, have appeared. The choice of rodents for the psi experiment is apt, even apart from the reasons mentioned by Schouten. A rodent like the rat, as D.E. Berlyne (Conflict, Arousal, and Curiosity, McGraw-Hill, New York, 1960) noted, shows a characteristic tendency to explore a novel situation and also to be fearful of it. Both responses are adaptative and a balance between the two is often struck. The possible role of ESP in the responses may be a very significant contribution to neuroethology. There are deeper questions awaiting those who would embark on the voyage of discovery, e.g. Do we need a Markov-type of system for describing transitional probabilities in animal behaviour?

2. Johnson's designs for exploring "object-reading" are very significant. I feel that the term "object-reading" may have to be widened to re-assimilate Osty's "Metagnomy", Tischner's "psychoscopy" and Tenhaeff's "paragnosis". I suggest that ESP is a multi-choice, multi-level, multi-goal response. A one-level, one-goal system (1l 1g) usually has a causal subsystem the behaviour of which is described by an input-output transformation:

$$y(t) = \Psi * x(t)$$

where $y(t)$ is the output of the causal system, $x(t)$ is the input, and ψ is the systems operator. 1l 1g systems have been used as a conceptual framework for control theory, learning and adaptative systems, sequential multi-choice decisions, etc. The Von Neumann-Morgenstern game theory utilizes conflicts generated by differences in goals in competitive situations. I suggest that we need a more comprehensive framework for ESP. Karlis Osis and his colleagues are exploring the "ESP channel". We may have to do with a multi-channel response; indications are that channels are "open". ESP goals on different levels may be interdependent in the sense that the achievement of the i th goal on the j th level depends on success in the achievement of goals on higher as well as lower levels. Goal-interaction is of primary concern in constructing a complex mlmg system. "General Psychometric ESP", especially in the life situation, is multi-level as well as multi-goal. I look forward to receiving further stimulating reports from the Parapsychology Division of the Psychology Laboratory of the Utrecht University.

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ESP AND SUBLIMINALITY

An Attempt to enhance Psi-vigilance by Means of
Subliminal Stimulations. A Pilot Study.

By Martin Johnson

INTRODUCTION

F. Meyers has already proposed a relationship between preconscious processes and the paranormal (17). From the onset of case studies in parapsychology the reasons for the occurrences of spontaneous psi-phenomena were discussed in more or less elaborated psychodynamic terms. As John Beloff has recently stressed, there are several similarities between what is described as subliminal perception and ESP (1). Beloff alludes among other things to Dixon's statement that when a stimulus falls between two critical levels of intensity, it tends to elicit a response which is not just weaker but qualitatively different from those elicited by supraliminal stimulation (2). For readers especially interested in the controversy over subliminality, see for instance Smith (20) and Dixon (2). In an experimental context the influence of subliminally exposed stimuli on dreaming was probably first studied by Pötzl in 1915 (18). Fisher (3, 4, 5, 6), Fisher & Paul (7) and Luborsky & Shevrin (14, 15, 16) have reported findings supporting the hypothesis that subliminal perception, not consciously registered, later tends to emerge in the dreams of the subject. This seems to be especially true if the subliminal stimuli are related to "traumatic" experiences in the subject's life history. Windahl has recently reported striking and corroborative evidence of the effect of subliminally exposed "micro-traumatic" stimuli upon dreams (21).

As regards the concept of and the function of the "traumatic dream" in psychoanalytic

thinking, see Schur (19). During the last two decades Sweden has been one of the main centers for experimental studies in subliminal perception. Ulf Kragh invented and developed the Defense Mechanism Test, the DMT, a projective test. When using the DMT threatening pictures are flashed by means of a tachistoscopic viewer. After each exposure the subject has to report his impressions verbally or by writing or by a combination of verbal and written reports. The stimulus intensity is increased by steps. This "fractionated" procedure will give us a set of different levels of interpretations from the subject's side starting at a rather subjective stimulus interpretation and ending as a rather veridical one. The responses are coded and interpreted according to a manual. The manual is based both on empirical findings and on theoretical assumptions within a psychodynamic frame of reference. For further information as to the Defense Mechanism Test, see Kragh (13).

Over the years a number of ESP/DMT studies have been carried out by myself and associates (8, 9, 10, 11, 12). The principle finding is that there exists a relationship between ESP scoring direction and the degree and quality of perceptual "defensiveness" (described by Kragh as "precognitive defensive organization" or PDO) as reported in a subject's protocol. Strong signs of certain perceptual-defensive structures tend to produce psi-missing whereas a low level of "defensiveness" or freedom from certain PDOs tend to yield positive scoring (11). It has also been shown that a person's ability to recall dreams (or it may be more precise to say, his willingness to report his dreams) can fairly well be predicted by DMT data (9). There are also tentative findings suggesting that a person's dreamreports may be correlated with his scoring behavior on an ESP task (8). In a study not directly related to DMT work, the

present author obtained data suggesting that a person who ordinarily would be a psi-hitter can be manipulated to exhibit selective psi-missing by a relevant choice of life history target material (10). Some findings seem to indicate that if concepts related to "traumatic" episodes in the subject's anamnesis are used as target material, then the chances are that the subject will manifest "missing" on these targets. (10, 12). These findings, tentatively interpreted within a psychodynamic frame of reference together with the notion of the experimental induction of a "micro-trauma" constitute the conceptual background of the present study and of the attempt to try to enhance a subject's psi vigilance by the use of a subliminal technique.

PROBLEM

In view of the discussed tentative findings the next logical step in our inquiry would be to try to find out if a subject's psi-vigilance is affected if the same picture motif as the one used for subliminal induction of a micro-trauma also is utilized as a target in a subsequent ESP task.

METHOD

1. Population

Eighteen subjects, three females and fifteen males took part in the "micro-trauma" experiment. They were all freshmen in psychology at the University of Utrecht.

The selection of the subjects was based mainly on their general attitudes towards the paranormal and their willingness to participate in a number of small psi experiments at the Psychological Laboratory, carried out by Sybo A. Schouten and myself.

By and large nine of the Ss could be classified as having an accepting or favourable attitude towards psi whereas nine were characterized as

having a negative attitude.

2. Procedure of Inducing the "Micro-Trauma"

The day before a subject was going to take his ESP task he took part in a tachistos-copic experiment.¹⁾ Different pictures were shown; as stimulus for male subjects a nursing motif was utilized. For females a picture depicting intercourse between a wolf and a woman was used. Both pictures were supposed according to the psychoanalytic paradigm to function as preoedipal threat stimuli.

The picture was flashed six times at 10 milliseconds (beyond awareness). It was found that none of the subjects could give a stimulus proximal or veridical description of what they had seen.

3. The ESP Task

Before the ESP-experiment, two sets of target items had to be prepared by a research assistant. One set was for male subjects and the other for females. Each set consisted of 100 identical envelopes, distributed into 20 batches; five envelopes in each. In each of the envelopes constituting a batch, a target picture was inserted after having been wrapped in aluminium foil. The target picture was a photocopy of the slide used for "induction". In the remaining four envelopes of a batch, there were photocopies of the same size and material but depicting four of the classical ESP card symbols.

¹⁾ The tachistoscope consists of a viewer and an electronic timer. This type of tachistoscope used for individual testing, has been developed by professor Kragh and his group.

The final order of the envelopes within each batch was determined by the use of a random table. Serial numbers were written on the back of each of the randomly distributed envelopes within a batch. These numbers used for identification purposes, could not be seen during the procedure when the subject made his decisions in his ESP task. The subject was told that in one of the envelopes in each of the batches there was a picture similar to the one the subject had been exposed to subliminally the day before. The S. was encouraged to try to pick out the envelope he thought was the appropriate one. When he had done so, the experimenter made a notation of the number, put the envelope back into its batch; took the next batch and handed it to the S, and so on until he had made his 20 choices. The results were evaluated at the end of the series. By means of the identification marks (digits) on the back of the envelopes, the experimenter did not have to open the envelopes and carry out the check until all 18 subjects had carried out their ESP task.

4. The Use of the DMT

This investigation offered another chance to cross-validate previous findings as regards the DMT. Furthermore the DMT was thought a potentially good source of information concerning how differences in personality, measured by the DMT, may respond to the subliminal micro-traumatic stimuli "induced" before the ESP task.

As a safeguard against the experimenter expectancy effect, it was decided that the experimenter should have no information about the DMT protocols of the subjects. In addition the scoring of the protocols and the predictions (based on the scorings and on previous findings of the DMT/ESP correlations) were carried out blindly and by DMT experts.

5. The testing

Mr. H. Boerenkamp (H.B.) administered the DMT.

In advance of the testing he received the necessary practical and theoretical training for administering the DMT. After the DMT testing had been carried out by H.B., he translated the statements given by the subjects in their protocols and in relation to sketches they had made, from Dutch into English. The translated protocols, together with the sketches in the protocols were later sent to Mr. S. Bälint (S.B.), at the Department of Psychology, Lund University.

S.B. has considerable experience in scoring DMT protocols.

6. Scoring the DMT-protocols

S.B. was responsible for the scoring of all the protocols.

7. Predictions Based on the DMT

S.B. sent the scored DMT protocols to Kragh. As previously has been mentioned. Kragh is the inventor of the DMT procedure as well as of the paradigm on which the test is based. His task was to try to predict how the subjects should respond to the "micro-traumatically" associated ESP target. He was instructed to base his predictions in part on the perceptual defensive structures appearing in the subjects' protocols, in part on previous findings of the DMT/ESP relationship, and to some extent also on his own theoretical considerations. Finally he was to try to rank the 18 subjects from the one he thought should score highest to the one he thought should score lowest on the ESP task. He was also asked to dicotomize his ratings into a group of nine "hitters" and nine "missers".

HYPOTHESES

1. Subjects having protocols characterized by no or moderate signs of the PDO classified

as "isolation" should tend to manifest positive scoring in their ESP task, especially if there were also moderate signs of the perceptual defensive organization, defined as the sign of "projection".

2. Subjects having protocols characterized by strong signs of "isolation" should tend to manifest scoring below mean chance expectation, especially if combined with signs of "projection".
3. It was also tentatively expected that the "subliminal induction" should lead to an enhanced psi-vigilance among the subjects, an effect that according to Hypothesis 1 should enhance positive scoring among certain individuals and according to Hypothesis 2, other subjects should manifest a rather pronounced psi-missing syndrom.

TABLE 1

Outcome of predictions based on the DMT and on the ESP task

Ranking based on DMT	No of Hits on ESP task	Dev. from M.C.E. (M.C.E. = 4)
1.	6	+ 2
2.	3	- 1
3.	8	+ 4
4.	6	+ 2
5.	7	+ 3
6.	8	+ 4
7.	1	- 3
8.	7	+ 3
9.	3	- 1

"Better half" according to predictions.

Ranking based on DMT	No of Hits on ESP Task	Dev.from M.C.E. (M.C.E. = 4)
10.	4	+ 0
11.	8	+ 4
12.	1	- 3
13.	2	- 2
14.	3	- 1
15.	3	- 1
16.	3	- 1
17.	3	- 1
18.	4	+ 0

"Poorer half" according to predictions.

RESULTS

Kragh has to some extent been successful in his prediction of the scoring behaviour of the subjects on their ESP task. Both with the Mann-Whittney U test and the Kolmogorov-Smirnov test for two independent samples a difference between the two groups of scores is obtained which is marginally significant ($.05 < p < .06$).

The individuals in TABLE 1, constituting the "better half" obtained 13 hits more than M.C.E., which gives a CR = 2.42 with an associated p of $< .01$ (one-tailed).

DISCUSSION

The outcome of this pilot study gives a suggestive and corroborative support of previous findings of a relationship between DMT measures ("preconscious defensive organization") and scoring behavior on an ESP task. Hypothesis 1 and 2 can be said to be supported by the findings, while no conclusions can be drawn as regards Hypothesis 3.

We have not so far proved that the process of induction of supposed "micro-traumatic"

stimuli really affects the psi vigilance of a subject. The findings are however, judged as interesting enough to motivate further studies with an improved design that will make it possible to evaluate the supposed effect of an subliminal "induction". Such studies are now under way and will soon be reported.

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THE STANDARD-METHOD AS INSTRUMENT
FOR PARAPSYCHOLOGICAL RESEARCH *.

One of the first requirements for carrying out research is to define the phenomena under investigation. This holds for parapsychological research too. Not only because of the communicational function of a definition, but especially because a definition determines the nature, methods and aims of the research to a certain extent.

As long as nothing is known about the processes underlying the phenomena, the definition can only be based on making a distinction between paranormal phenomena and other, non-paranormal phenomena. Typical for the concept paranormal is, that a paranormal phenomenon is not considered a mere coincidence. For instance, if a person suddenly hallucinates and 'sees' an acquaintance having an accident, and if afterwards it turns out that the accident took place, then this phenomenon is called paranormal because it is assumed that there has been a connection between the content of the hallucination and the accident taking place. The hallucination is considered as a consequence of the accident and the similarity shown between the event and the hallucination is not merely coincidental.

Therefore the main paranormal phenomena: telepathy, clairvoyance, precognition and psychokinesis, are defined as phenomena showing a similarity and a connection between an event or situation and a human

*) This is a summary of the author's doctoral thesis: De Standaardmethode als instrument voor parapsychologisch onderzoek (p. 264).

(or animal) action, not explicable by knowledge based on sensory perception. In this definition the phrase 'knowledge based on sensory perception' has a broad meaning. It also includes reasoning or making predictions based on knowledge acquired by sensory perception. A connection is understood to be a describable relation in terms of causes and effect between the event and the human action.

In the case of telepathy the event or situation concerns a mental action or state of another person, for instance thoughts or emotions.

In the case of clairvoyance the event or situation is objectively perceptible. In the case of the event or situation occurring after the human action took place and if one can assume that in spite of the time-variable, the human action has been a consequence of the event or situation, the phenomenon is called precognition. To psychokinesis are attributed those phenomena by which one assumes that the cause - effect relation is reversed. In other words, when the human action is considered to be responsible for the occurrence of the event or situation.

A consequence of this definition is that one can only apply the concept paranormal when it is shown that there has been a connection between the event and the human action. However, as till now nothing is known about the processes underlying this connection; this can not be shown directly. Therefore it is necessary to select a criterion as an indicator for the presence of the connection. The criterion best suited for this purpose seems to be the probability of the established similarity, mainly because there is extensive knowledge about certain types of coincidental similarities which can be found in statistics. This enables us to make a distinction between phenomena which are to be considered as coincidences and paranormal phenomena. Moreover it creates the possibility to use the experience and experimental methods, if desirable,

of experimental psychology. A disadvantage of the chosen criterion is that for the time being phenomena with a high probability which might be paranormal have to be considered as non-paranormal. Another disadvantage is that the criterion is not at present entirely suited for application with spontaneous cases and qualitative research. As long as we do not have an indicator at our disposal which is directly related to the processes underlying the connection, the choice of a criterion remains to a certain extent an arbitrary one which can only be based on practical considerations. For instance, one could choose the meaning of the similarity for the participants as a criterion (as in fact Jung did), but such a criterion would hamper the development of research in this field for several reasons.

The main consequence of the fact that one is forced to select a criterion as substitute for the proof of the connection itself, is that at present the concept paranormal can only be considered as a hypothetical construct.

A well established distinction in fields of research in parapsychology is the distinction between research of spontaneous cases, qualitative research and quantitative research. Research of spontaneous cases and qualitative research differ from quantitative research mainly because in these fields the range of possible human actions and events are unlimited, whereas in quantitative research the possible human actions and events are rather restricted. This creates differences as regards the possibility of expressing the 'similarity' in terms of probabilities. Qualitative research differs from research of spontaneous cases because in qualitative research the human actions are linked to a specific person, which enables more or less systematical research. As it is rather difficult and often impossible

in the cases of spontaneous phenomena and qualitative research to establish a fair estimation of the probability of the similarity, these types of research are not well suited for investigations aimed at revealing the nature of the connection.

In quantitative research a method is mainly applied, in which a S (subject) has to choose one alternative in each trial, the target, from a limited number of presented alternatives. On account of the common application we shall call this method the standard-method. With the standard-method based on the known theoretical distributions it is possible to determine exactly the probability of each extent of similarity. Therefore the standard-method is suitable for experimental research, because it is possible to tell whether or not a specific experimental result satisfies the criterion, and consequently the definition; and because it makes it possible at least to a certain extent to express the experimental result in 'amount' of paranormal transmission. The latter, to measure, is essential for experimental research.

From the definition and from the fact that it is necessary to select the criterion of probability as substitute for the proof of the connection, it appears that the main objective of the experimental research has to be to find better criteria for the proof of the connection. This is only possible when more is known about the nature of the connection.

The standard-method is the most widely applied method in parapsychological research. It is estimated that at present in about 90 % of all published experimental results this method has been used. Research with this method can be distinguished into research aimed at proving the existence of paranormal transmission, and research investigating the influence of a number of variables on the paranormal transmission.

As both types of research apply the same method they have much in common, among other things they share the large amount of criticism directed against parapsychological research. These criticisms concern several parts of the procedure applied, for instance, randomisation of targets, recording errors, etc., and are directed towards the conclusion that a significant result would imply that ESP has to be held responsible for the occurrence of similarity.

The 'a priori' critique asserts that the possibility of paranormal phenomena is a priori extremely unlikely, and that any other possible known cause of the result is far more likely to be responsible than a hypothetical paranormal process. This criticism is based essentially on a subjective judgement about the 'likelihood' of phenomena and is only acceptable when it is shown that the existence of such a hypothetical phenomenon contradicts already proven and accepted laws. Another criticism maintains that a significant similarity, if shown in a parapsychological experiment, does not have to be the reason for accepting a paranormal mechanism, since such an effect can be explained as purely coincidental. The basic idea underlying this criticism is that the application of the theoretical distribution to the empirical world is not always justified. The point is if, in the case the accepted techniques of generating random numbers are used, the theoretical distributions which are mathematically derived starting from certain postulates, can be applied. This is an empirical problem, and several investigations have shown that the results of quasi parapsychological experiments, based on random numbers, have always yielded distributions of hits similar to the theoretical distributions.

Important types of criticism are those directed on the concept of significance itself. Boring asserts that the applied

probability-model in parapsychological research is incorrect because it is a model 'whose fit can never be tested empirically because every observed deviation from expectation still fits the model which tells you merely how improbable the deviation was'. This criticism seems invalid, whether the evaluation is based on the deviation or on the distribution of the scores. In both cases the proper question is, whether the model which is based on the assumption that no paranormal transmission takes place, is to be accepted in view of the experimental results or not. This is the common procedure in sciences applying statistical methods. In Bridgman's opinion a phenomenon can not be accepted when the evidence is based on 'negative' statements like: 'it can not be coincidental, so it has to be paranormal'. Tornier holds the view that an essentially incorrect way of reasoning is applied when one assumes that a significant result would imply paranormal transmission. This reasoning is of the type: 'there is a mathematical probability for the occurrence of a coincidental event, hence there is also a mathematical probability that an event is caused by coincidence'. Statistics can be usefully applied but it is incorrect to conclude: the probability of the result is too low to be caused by coincidence, hence it is caused by paranormal transmission. It is clear that the criticisms of Bridgman and Tornier with which I agree, are not only relevant for parapsychological research, but also for other sciences in which statistics are applied. A typical parapsychological problem, however, is the fact that the hypothesis of paranormal transmission can not be falsified as long as nothing is known about the mechanisms of the transmission. The above objections are the reason that research aimed only at proving the existence of paranormal phenomena seems to have little value. A significant result only becomes meaningful when it can be used as a predictor, or when the result fits into a concatenated theory, a theory whose component facts enter into a net-

work of relations so as to constitute an identifiable configuration or pattern. As up till now there is no proof that the results of parapsychological research can be used as predictors - a repeatable experiment is lacking - hence it seems wise to try to construct such a network of relations. This implies research through which the effect of variables is investigated. This type of research also serves the aim of revealing the nature of paranormal transmission. Repeatability is only possible when this aim is fulfilled to a certain extent, or when up till now unknown but very influential variables are discovered.

Use of the standard-method implies the application of statistics. This creates the possibility of introducing different operational definitions for paranormal transmission. It is unknown which operation is the best to apply: the number of hits, the variance in the number of hits, decline, etc. However, every operation is ultimately based on the number of hits. It is important to realize that this number of hits is composed of a number of hits which would have been shown in the case of no paranormal transmission taking place, and a possible unknown number of hits due to ESP. Since it is impossible at present to discriminate between both types of hits, it is not correct for instance, to assume that 50 hits would mean a higher ESP score or more paranormal transmission than a score of 45 hits. Therefore the standard-method has an accuracy as an instrument to 'measure' ESP with, which is less than the use of numbers suggests.

A large number of investigations have been carried out applying the standard-method to study the effect of certain variables on ESP. It is of consequence in order to be able to

judge the value of the standard-method as a research instrument, to study the results of these investigations. In fact the development of research is a combination of two processes. With the help of certain instruments one tries to find relations between variables involved as a base for a theory, which in turn leads to the development of better instruments to study the phenomena under investigation.

In order to judge the results of the investigations three criteria have been applied: the repeatability, and the strength, and the consistency of the effect of the variable on ESP.

Repeatability is illustrated by the fact that in every or nearly every experiment in which the variable under consideration has been investigated, a significant effect appeared. Since it can be assumed that all experiments differ in several aspects, this implies that such a variable must play an important role in the ESP process.

Strength is to be understood as the extent to which the effect of the variable shows in ESP results. Consistency means that if the variable shows an effect on ESP, the nature of the effect is always alike. For instance, the effect of the sheep-goat variable, the extent to which a S believes in the possibility of ESP, is not repeatable: not every experiment in which this variable has been investigated yielded a significant difference between the scores of sheep and goats. The effect is weak: in general the difference only becomes significant when large numbers of Ss are involved. But it is consistent: if a significant difference is found it nearly always shows that the scores of the sheep are higher than those of the goats.

Only those variables which have been investigated in a number of experiments are considered as it seems inappropriate to base conclusions on the results of one or two experiments only.

Instances of those variables are: sheep-goat dimension, introversion-extraversion, expansives-compressives, number of alternatives, feedback, distance, etc. None of the variables under investigation appeared to have a repeatable effect

with ESP results. As far as repeatability is concerned, the variable hypnosis seems the most promising one. The strength of the variables is also not very impressive. In many experiments in which a significant difference showed, it appeared that no one of the conditions themselves yielded a significant number of scores. On the other hand the consistency of a number of variables like sheep-goat dimension, hypnosis, introversion-extra-version, appears satisfactory. In addition, it is important to note that in general personality variables appear not to influence the size but the direction of scoring. For instance, sheep will score above chance-level while goats will score below chance-level. Now it can be argued that the size of the deviation is more important than the direction. Therefore it was decided to base all evaluations of the present research on the distribution of the scores of the Ss, so that all deviations will contribute to a general deviation of the observed distribution compared with the theoretical distribution. Moreover it appears from the literature that the standard-method is probably not a very sensitive research instrument.

The starting point for the present research is the problem of the 'content' of the term 'connection' in the definition. For the time being the probability of the similarity shown will be applied as a substitute for more direct proof at present lacking of the existence of a connection between event and human action. This implies that ESP as a hypothesis is only to be applied in the case of the experimental result differing significantly from chance-expectation. From this it follows that one has to apply research-techniques which enable one to fix the probability of the 'amount' of similarity. The problem concerning the nature of the connection implies the necessity to find relations

between variables and ESP. To this end it is conditional to be able to measure. Actually a specific test technique can be considered as an instrument for the measurement of ESP. To measure does not immediately imply the application of refined scales in common practice in physics, but at least one must be able to measure in a dichotomy (the phenomenon did or did not show, the effect of this condition on ESP is stronger than). So it can be concluded that a research technique has to be applied which makes it possible to fix the probability of the similarity shown in the experiment, and which allows of measurement.

However, a big problem when starting research is that one does not know which of the possible research techniques is most suited for the investigation of the as yet unknown phenomenon. This can only show empirically. If a specific instrument always yields the same result in spite of different conditions, this is an indication that it is probably a rather insensitive instrument. Only an instrument yielding different results under various conditions might be a sensitive enough instrument with which to carry out research; although the latter depends too on the nature of the results. It is possible that such an instrument is more sensitive to 'noise' than to variations in the strength of the phenomenon. So the first problem to be solved when one is interested in the nature of ESP concerns the development of a suitable research technique.

In view of the dominating position in parapsychology of the standard-method as research technique, it was decided to investigate whether this method can be considered as a sensitive instrument, and whether improvement of this method as a research instrument for ESP is possible. The latter asks for investigation of which operations of the variables inherent in the standard-method, like number of alternatives, nature of the symbols, etc., yield the best ESP results. The variables under investigation have been chosen mainly on the grounds of data obtained from published ex-

periments, and of the possibility to test certain models, and finally the expectation that the results would improve when the assumed negative influence of certain variables like response-preference are eliminated.

The variables investigated are: number of alternatives from which to choose; choosing each trial from the same or from a different set of alternatives; applying rather simple symbols or complex symbols; the effect of response-preference on ESP scores; different ways of responding; application of the so-called majority-vote technique. In addition it was investigated whether the amount of consistency in the Ss scores justified an investigation into the possibility of finding selection-criteria for high-scoring Ss.

For each of the mentioned variables two or more operations were chosen. Combination of all those different operations yields a large number of different test situations. The actual number of investigated test situations was considerably less. The effect of each variable has been investigated with related and unrelated samples. Moreover the possibility of interaction effects between variables had been taken into account. Since the theoretical distribution of the scores differs for most test situations due to a different number of alternatives or trials, all scores (number of hits) have been transformed to a V_k standard-score. These V_k -scores can be compared irrespective of the original distribution. Beside these evaluations based on the size of the scores, the results are also analysed as regards the number of extreme scores in each test situation. To this end the V_k -scores are transformed into U_k -scores, a standard-score for the extent of extremity of a specific number of hits. In total 32 test situations have been investigated with on average 51 Ss per experiment. Some test situations have been investigated more than once.

Before giving the results of this investigation the results are given of an investigation into the nature of response-preferences. This investigation was necessary in order to study the effect of eliminating response-preferences on ESP scores. Eliminating response-preferences implies that one has to know why Ss choose in such a way that their response-sequence appears to be non-random. Knowing this it must be possible to create a 'random' test situation, a test situation in which the Ss generate a more or less random sequence of guesses. The result of a first experiment showed that applying the standard-method in parapsychological research yields about the same types of response-preferences as are found in those experiments in which the S is explicitly requested to generate a random sequence of choices. Ss show a tendency to alternate their guesses and to call the symbols with different frequencies. The latter phenomenon is called a zero order-effect, analogous to the custom of calling a dependency between a choice and the x^{th} previous choice, an x^{th} order-effect. Further research has been aimed at constructing a test situation in which Ss choose 'unintentionally' (by manipulating experimental variables) and 'intentionally' (by instruction and training) as randomly as possible. To this end a strategy has been followed to eliminate the non-random effects one after another, starting with the lowest order. The methods of evaluation have been chosen accordingly, which implies that for each response-preference effect a specific method of evaluation is applied. So contrary to normal practice not all types of non-random behavior are expressed in one score.

Further research showed that with respect to the zero order-effect the position of each symbol plays a more important role than the content or the nature of the symbols. In the case where the S has to indicate his choice by touching the symbol or by pressing a button next to the symbol, it appears that symbols requiring more effort to be reached will be chosen less than

the other symbols. All symbols being within equal reach, then still a zero order-effect can be found, depending on the relative position of each symbol with respect to the other symbols. Symbols placed in the centre of the pattern will be chosen more frequently than symbols placed at the extremities of the pattern. These findings offer the possibility to eliminate zero-order-effects. It can be accomplished by taking care that all symbols are within equal reach (equally available) and that all symbols have a relatively equal position with respect to each other. The effect of alternating (avoidance of repetition of the same call) can be reduced by applying a combination of diversion, forced alternation on a non-relevant choice-set, and changing the positions with each trial. Diversion means that the S is presented in each trial with the same set of colours, however each colour serves as a background for a specific symbol. All symbols in the series differ from each other. The S believes that he has to select a specific symbol in each trial; in reality only the background colours matter (the sender only looks at a randomly chosen colour). Alternation on a non-relevant choice-set is automatically provided with this method because all symbols in the experiment differ from each other. Hence in each trial the S is presented with a set of symbols which differs from the one presented in the previous trial. Changing the position means that the background colours which remain the same for all trials are presented in each trial in a random order. Mittenecker's hypothesis, stating that Ss are inclined to call each symbol at least once within a limited number of guesses (the balancing tendency), appeared to be confirmed by the data. Mittenecker believed that this phenomenon is responsible for the tendency to avoid repetition of the previous call. However, the data did not confirm this opinion.

Especially in the case of relatively short response-sequences (n smaller than 75) no correlation appeared between the tendency to avoid repetitions and the balancing tendency. Applying the same technique as was used in reducing the effect of alternating, it appeared that the balancing tendency was eliminated completely. Therefore the combination of diversion, forced alternation on a non-relevant choice-set, and changing of positions can be considered as the condition making up the hoped-for 'random' test situation.

It appeared from all the data that the main response-preference phenomena are the tendency to call centrally-placed symbols more frequently than the others, a tendency to avoid repetition of the previous call and a tendency to balance the frequencies of the symbols within a limited number of guesses. The first and last mentioned tendencies seem contradictory. Higher order-effects can be assumed to be a result of the balancing tendency. No indications were found that higher order-effects other than caused by the balancing tendency exist. These three main response-preference effects can be traced back to some simple principles. It is assumed that the S tries to realize equal chances for all symbols and tries to be non-systematic. The S puts on a level equal chances with equal frequencies, and the latter has two practical implications. In the first place none of the symbols is to be called more often than the others. This causes the tendency to avoid repetitions because repeating the same symbol gives the impression, especially since the S remembers only a very few of the previous calls, of favouring that specific symbol. In the second place none of the symbols is to be called less than the others. This causes the balancing tendency, because the S can only realize this principle by working more or less systematically through all the symbols. So the S chooses each time small sequences of choices which cover more or less all symbols. These sequences will depend greatly on the pattern of the symbols. Being non-systematic is realised by the S by each time selecting a different sequence to balance

the frequencies of the symbols. It can be argued that in such a situation it is more likely for a centrally placed symbol to become part of such a sequence, and therefore a tendency is found to call centrally placed symbols somewhat more frequently than the others. As most Ss apply this strategy it is likely that if differences in the frequencies of symbols appear, these differences will be of the same type for most Ss. Hence for long response sequences or for the response sequences of a number of Ss this effect can become significant. So in spite of the tendency to balance the frequencies of all symbols, the strategy applied often results in a not-intended zero order-effect.

This explanation implies, among others, that one must be careful in assuming that higher frequencies for specific symbols would mean a preference of the Ss for those specific symbols; According to the above mentioned explanation it is more likely that these preferences are the consequence of the tendency of the Ss to show as little preference as possible.

Based on this theory Ss were trained to guess as randomly as possible by stressing that they had to try not to apply any strategy whatsoever to realize a specific concept of randomness. After on average 3.5 sessions 82 % of the Ss showed they were able to generate a nearly random sequence of 400 guesses very rapidly, choosing in each trial from the same set of 6 simple symbols.

For the evaluation of the ESP data different methods have been applied. The distribution of the scores for each test situation has been compared with the theoretical distribution. Based on the V_k - scores an investigation was made with related samples to see whether in specific test situations the Ss scored systematically higher or lower. Analogous evaluations have been carried out on the base of the U_k - scores. It was investigated whether specific testsituations yielded a significant number of extreme scores and whether Ss scored

systematically more extremely under certain conditions. Based on the assumption that possible only a few of the Ss are able to score extremely, it was investigated whether the variance of the scores matched the theoretical variance.

The results of all these analyses showed to be disappointing. No indications were found that ESP or any of the variables had any influence on the scores. A number of further analyses, among them the common types of analyses based on the total number of hits, yielded the same non-significant results. No indications were found that Ss who score extremely in one session will also tend to score extremely in the other sessions. Ss appear to be inconsistent in their scoring, hence it is rather unlikely that it will be possible to find selection criteria for high-scoring Ss.

The end of the investigation was not reached. The data did not yield results enabling the improvement of the standard-method as a research instrument. Indeed the only positive result can be claimed to be that the standard-method has to be considered as statistically sound and a method which does not easily lead to artificial results.

It can be concluded that the standard-method is rather insensitive. Improvement of the method seems hardly possible, since varying the most important aspects of the method as was done in the present investigation appears to have no effect. Moreover it is unlikely that selection criteria for high-scoring Ss can be found. The failure of the method can be due to the fact that Ss always choose from, in principle, equivalent alternatives. Other aspects inherent in the method are that the S always chooses intentionally and that the S has to choose. The last mentioned aspect can be considered as essential to this method, and distinguishes this method clearly from the nature of spontaneous cases.

To explain the negative results by assuming

that the Ss were not able to produce ESP is not a very satisfactory explanation. It merely uses different words to state that the method is too insensitive. It remains possible, of course, that Ss will be found who for unknown reasons show they are able to score highly with the standard-method. This has happened before. In that case it might appear that some of the variables investigated in the present research do have an effect and that for these Ss the method can be improved. In the case of unselected Ss, however, the method is to be considered as too insensitive. It is important that research, aimed at finding a satisfactory method for experimenting with unselected Ss, is to be continued. It seems worthwhile to try find quantitative methods in which Ss do not have to choose. On the other hand it is possible to apply a combination of a gifted S, a research technique adapted to this S which enables process-analysis to some extent, and sophisticated apparatus in order to be able to gather as much data as possible about what is going on within the S. This would lead to a combination of qualitative and quantitative research. This approach is not an easy one, since there are hardly any satisfactory research techniques which can be applied on paragnosts and which allow process-analysis. Moreover it is difficult to detect gifted Ss. In parapsychological research the first aim has to be to establish a network of relations of the type: if ESP takes place one can expect under such and such conditions Only after the establishment of such a network of relations can one attempt to create such a set of conditions that a predictable outcome can be obtained at a given moment. This implies that as long as these stages are not reached, ESP can not be considered as a proven phenomenon.