Developing a "Recipe" for Success in Free-response Ganzfeld ESP Experimental Research

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This work is dedicated to my family

Declaration:

I confirm that this thesis was a product of my own original work and research.

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February, 2003

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ABSTRACT

Extrasensory perception (ESP) is the most broadly studied phenomenon in experimental parapsychology. Individual studies as well as meta-analytic work suggest the existence of an anomalous information transfer process that cannot be explained appealing to the currently known sensory mechanisms for human communication. However, researchers face great difficulty when replicating this phenomenon in the laboratory, with the lack of an "experimental recipe" that can yield consistent results across laboratories being one of the main criticisms to the area. The research carried out in this PhD explores important personal, interpersonal, environmental, and methodological predictors of ESP performance as well as measures taken by the experimenters in order to optimise the study results, in the development of a model of successful ESP performance and replication. From an analytical perspective, it is also intended to demonstrate the utility of logistic regression models for this type of research. The first chapter shortly describes the methodology used in this area of research, paying special attention to the ganzfeld design, and analyses the results achieved, examining the arguments put forward by the critics. In chapter II, I outlined a series of variables and procedures, which have been studied in the previous literature, in relation to ESP success. Most of these variables were experimentally tested in a pilot study under 2 conditions, ganzfeld stimulation and sensory attenuation, using 2 types of targets: pictures and objects. This study revealed an advantage in using objects as ESP targets as well as a higher performance by subjects tested in the ganzfeld condition. There were also a series of significant correlations between ESP scores, individual differences and state factors. Another observation was a significant variation of the variables that predicted ESP success across experimental condition, target type, and participant characteristics. This study is fully described in chapter III. A survey on "potential means of increasing free-response studies hit rates" carried out on parapsychologits provided additional ideas for optimising ESP in the experimental context (chapter IV). The most promising predictor variables, on the basis of the results obtained in the pilot study and the data shown in the literature, were tested in a third study (chapter V). A logistic regression equation revealed a 4-predictor solution that classified correctly 79.55% of the cases. Chapter VI integrates the

knowledge gained from the work carried out in this thesis in an effort to provide a "recipe for success" in free-response ESP research. Conclusions, limitations, directions for future research, and suggestions for ESP experiments are, finally, considered in this chapter.

CHAPTER I: INTRODUCTION, AIMS, AND OUTLINE OF THESIS

1. ESP Research

The term "Extrasensory Perception" (ESP) was introduced by a Munich ophthalmologist, Dr. R. Tischner, to describe the "externalisation of sensibility" in 1921 (Tischner, 1921). Later, in the 30's, J. B. Rhine popularized the term to include psychic phenomena similar to sensory functions. Most accepted definitions view ESP as an human capacity for acquisition of information, not deducible from data already possessed, by a mechanism that cannot be explained by appeal to the classical senses for human perception. The concept might seem controversial in the sense that it appears counterintuitive to our logical reasoning and against our education and current scientific knowledge. However, the ESP phenomenon has been extensively studied within the area of scientific parapsychology. During the 20th century and first years of 21st more than 900 studies on ESP have been carried out and published in the US, UK, and northern Europe mainly. Individual studies as well as meta-analyses show a significant effect supporting the existence of an anomalous process of information transfer that cannot be explained by any form of communication known at the current state of scientific knowledge. However, parapsychologists still do not know the underlying mechanisms at the basis of the phenomenon or have been able to build up a consistent theory for it. Another term commonly used in parapsychology is "psi". Psi is a general label used for all modes of alleged parapsychological phenomena, including ESP as well as PK (psychokinesis) and experiences related to the survival of a "mind/spirit" to bodily death. It is sometimes used as an adjective, e. g. psi-experiment, psi-experience, psi-research, understood as "parapsychological. A similar use and meaning can be applied to a third term, "psychical".

First investigators approached the study of psi phenomena, in general, and ESP, in particular, through the enquiry of spontaneous case reports and certain "gifted" individuals who claimed psychic abilities such as medium D. D. Home, investigated by physician W. Crookes, in 1871; L. Piper, investigated by W. James, in 1886; or H.

Smith, investigated by T. Flournoy, in 1894. The early researchers looked for corroborative material of diverse sources and, if possible, conducted interviews on witnesses of paranormal phenomena. This activity gave rise to case collections such as Gurney, Myers, and Podmore's (1886), who collected over 700 telepathic experiences, or Saltmarsh's collection on precognitive experiences (1934). First studies of ESP were rarely experimental. Many of the individuals studied, self-claimed "sensitives" or psychics, were rarely examined under laboratory conditions. The subjects were interviewed with questions, those standing up the best were judged creditable. In general, what researchers sought during the early stages of ESP research was the authentication of the phenomena. However, there were precocious individuals who, using techniques like content analysis and surveys, showed a dominant interest to uncover diverse aspects of the phenomenon. This approach would develop later in the 20th century in what has been termed *process- oriented research*.

Researchers came soon to realize that when dealing with psi phenomena all possible factors and explanations must be considered. After the establishment of the Society for Psychical Research (SPR), in 1882, there was an increasing conviction of the need to explore the authenticity of ESP under the controlled situation of laboratory experimentation. The basis of the paradigm that would scientifically test the hypothesis of ESP emphasised a controlled observation in which the experimenter would select a target stimulus and invite the individual to "guess" the identity of such an stimulus through psychic means. The experimenter should ensure that the information remained sensory inaccessible to the individual during the evaluation. Some of the SPR's investigations on mental psychics, in its early stages, implied tasks of this sort (e. g. Guthrie and Birchall, 1883; Gurney et al., 1886).

Some other early experimental ESP research is dated back to the first decades of the 20th century. However, it is, in particular, Dr. J. B. Rhine's experiments at Duke University, in 1927, the piece of work that introduces the study of ESP into the scientific community. Rhine used a forced-choice methodology for testing ESP. In forced-choice tests of ESP the individual is required to guess the identity of a stimulus from a series of known choices that repeat a determined number of times. Afterwards, the number of correct guesses are compared to the mean chance expectation (MCE). If

the difference is statistically significant, all channels for sensory communications are ruled out, and the study design does not leaves room for methodological flaws, it is legitimaly assumed that some sort of anomalous cognition transfer occurred. In his series of experiments, Rhine used the Zener cards, where 5 symbols (star, waves, square, circle, and cross) repeat 5 times each. I the prototypical experiment the subject tried to guess the order of the five symbols when they were randomly arranged in a deck of 25 cards, giving rise to an expected probability of 5 right guesses in each run of 25 trials. The early experiments faced immediate criticisms at the time. Two were automatically dismissed: 1) The statistics were unsound which was refuted by the president of the American Mathematical Association. 2) That ESP is physical impossibility which begs the question. Other criticisms were: 1) There may have been sensory cues that permitted the individual to gain information through subtle sensory channels. An example of this is that if a strong light shined on the back of the ESP cards, it might be possible to see the symbol through the back. 2) An experimenter that knows the target might whisper it or otherwise give a cue to the subject. 3) More hits than actually occurred could have been fraudulently recorded. 4) The "file drawer" effect, through which a null effect might seem significant due to the publication of only positive results, could explain the results. 5) Results are inconsistent and not repeatable. This can be remedied statistically through replication. However, despite the results found by Rhine and the studies which also used this methodology, in later years, the lack of ecological validity of the method, among other problems, encouraged researchers to look for an alternative technique that approached more the phenomenology observed in real life case reports. Subsequently, a free-response methodology, the ganzfeld, was adopted. In free-response tests, the potential target information could, in principle, be unlimited. Thus, the experimenter demands from the individual an open response that might include images of any sort, thoughts, feelings, or impressions that come to his mind during the testing period. The individual's mentation is compared to a duplicate of the target stimulus, that is frequently accompanied by a series of decoys that will enable statistical computation. The ganzfeld, a technique for perceptual monotonisation and partial sensory deprivation, previously used in Gestalt psychology, has become the most used protocol in ESP research (see Braud, Wood & Braud, 1975; Honorton & Harper, 1974).

Nowadays, a large variety of tests and materials are used in ESP research, which, generally, fall into one of these 3 categories, depending on the response demanded from the individual: 1) forced-choice tests, like Rhine's series at Duke University; 2) free-response, like the ganzfeld; and 3) somatic-response test, in which the individual, involuntarily, produces a physiological response (e. g. electrodermal activity, heart rate, or blood pressure changes) still being unaware of the target stimuli. Although several accounts have been put forward in an attempt to describe this phenomenon (see e. g. Stokes, 1987), it must be admitted, however, that researchers did not reach a theory that integrates the large amount of data collected throughout these years of experimental research. The over-one-century history of research on ESP seems characterized by what might be termed a consistent inconsistency. A major criticism in the area is the lack of a "experimental recipe" that can yield replicable results across independent laboratories. A clear objective of current ESP research is, therefore, to achieve standard replication of the phenomenon.

2. The Ganzfeld Technique

The ganzfeld protocol consisted of one of the first strategies adopted in order to optimise psi in the laboratory and is nowadays one of the most successful tools for the experimental testing of ESP. The term 'ganzfeld' comes from the German 'ganz', meaning whole, and 'feld', meaning field. This technique was originally used in psychology, in studies of perception (e.g. Avant, 1965), as a sensory deprivation technique for inducing an altered state of consciousness. The ganzfeld induces in the individual an homogeneous, unpatterned visual field that has been used to explore visual perception and mental visual imagery under conditions of visual sensory deprivation (e. g. Bexton, Heron, & Scott, 1958). The initial use of the ganzfeld appeared in studies of three-dimensional space (Metzger, 1930, cited in Avant, 1965), colour adaptation (Hochberg, Triebel, and Seanon, 1958; Weintraub, 1964; Wasserman, 1978), sustained attention (Bexton, Heron, and Scott, 1958), and the hypnagogic state (Witkin and Lewis, 1963). This early research revealed interesting findings on the technique and the individual's experience such as quicker sensory adaptation with the use of red light (Weintraub, 1964), diminished ability to think

systematically and reported periods of black-outs (Cohen, 1960), manifested need for stimulus and pseudo-hallucinatory activity of the mind (Bexton, Heron, and Scott, 1958), etc. This experimental protocol was applied to ESP research, based on the "noise-reduction model" (see Honorton, 1970, 1977). According to this theory, psi information is conceptualised as a weak signal masked by internal somatic and external sensory stimuli, 'noise'. Certain states such as dreaming, meditation, hypnosis, and other altered states of consciousness are hypothesised to improve the signal-to–noise ratio, thus enhancing a person's ability to detect the psi information, by reducing ordinary sensory input. In order to test the hypothesis that a reduction of sensory input facilitates psi performance, ESP investigators adopted the ganzfeld procedure. It was felt that this technique could facilitate the psi process for a series of reasons. As Bertini (1969) noticed the procedure incorporated three features that would facilitate the psi process: a) the reduction of sensory 'noise' through the regulation of perceptual input; b) the establishment of an effective link between the subject and the experimenter or sender, thus increasing the participant's desire for communication; and c) increased imagery and ideation which may serve as 'mediating vehicles' for encoding psi information (e.g., Tyrrell, 1946). Experimental support of psi conducive states comes from studies of psi retrieval in dreams, hypnosis, and meditation (see Braud, 1975; Honorton, 1974; 1977; or Stanford, 1986 for a review). The noise reduction model identifies certain conditions which seemed to facilitate the acquisition and recognition of psi signals: a) somatic relaxation; b) reduced sensory processing; c) the shift of attention towards internal processes; and, d) a level of cortical arousal sufficient to sustain conscious awareness in the absence of sensory input (Braud, 1977; Honorton, 1978). To outline the conditions of psi-conducive states, Honorton (1978) cites five ways in which the ganzfeld satisfies these criteria:

1) The sensory noise level is reduced due to the homogenous visual and auditory stimulus;

2) Attention is directed towards internal mentation processes that may mediate psi;

3) The visual and auditory deprivation produces a 'stimulus hunger', which may facilitate a link between the receiver and the psi source;

4) Provides for retention of the psi information, by means of the receiver's mentation report, and;

5) Facilitates the establishment of meaningful correspondences between the psi source and the receiver's mentation, by objective measurement.

The standard ganzfeld procedure tests ESP in a telepathic fashion, using a sender and a receiver. The sender is presented with a visual stimulus, which can be an art print, photograph, microfilm, or video clip randomly selected from a pool of possibilities (normally several sets of four pictures one of which will be the target for the session and the other 3 will remain as decoys). While the sender concentrates on the target stimulus, the receiver, in an isolated sound-attenuated room, reports spontaneous mental imagery, feelings and subjective impressions that come to his mind. During the session (normally 30-40 minutes), the receiver rests on a comfortable reclining chair. His auditory field is homogenised by playing white random noise through headphones. By taping his eyes with translucent ping-pong ball halves and red flood light directed toward his eyes, an undifferentiated visual field is produced. This homogeneous perceptual environment, in particular, is what is called 'ganzfeld'. On completion of the session, the receiver is shown a set of four pictures, one of which is a duplicate of the one that was presented to the sender and to which the receiver remained blind throughout the session. The subject is asked to rate the degree to which each one matches his subjective impressions, feelings, and mental images experienced during the sensory attenuation. If the highest score is assigned to the target, a 'hit' is counted, otherwise the session remains as a 'miss'. Thus, the hit rate expected by chance is 25% (using sets of 4 pictures, 1 target plus 3 control pictures). It is also a frequent practice to use external judges who blindly score the four pictures in relation to the individual's report.

3. The Psi Ganzfeld Controversy and the State of Evidence for ESP

Since the ganzfeld technique was introduced in the enquiry of ESP, a considerable number of studies have been conducted. As it is not possible to adequately review each and every one of the studies published to date, I will focus on

the meta-analyses that have been conducted on this database. Although this controversy has been broadly considered in several parapsychological publications, I will present a short review in the following paragraphs with the aim to familiarise the reader.

The first meta-analysis on a set of ganzfeld experiments was carried out by Ray Hyman (1985), a sceptical critic of ESP research. His meta-analysis covers 42 studies published from 1974 to 1981. A series of potential problems and weaknesses were identified in these studies that could account for the significant effect found. One of Hyman's main criticisms was in relation to the fact that researchers in these studies used several, different indices as measures of the participants' performance. Hyman pointed out that these indices could have been selected post-hoc on the basis of their level of significance. Another weakness observed by Hyman is that multiple hypotheses were tested without carrying out the appropriate adjustment of the levels of significance. Thus, the probability of accepting wrong hypotheses was inflated in these early ganzfeld studies. Hyman also noticed that the results could have not been independent across the different laboratories. Therefore, the overall statistical significance could be due to only a minority of researchers.

Furthermore, there was (according to Hyman) the possibility that a selective reporting problem could be present in the ganzfeld database. Selective reporting refers to the fact that more successful studies where initial hypotheses are confirmed have a greater probability of publication than studies that show null or contradictory results. This phenomenon could make a null effect seem significant. Hyman also points out a similar phenomenon, in which the researcher carries out a study and, on the basis of its success, the study is submitted for publication or remains as exploratory. According to Hyman, this could have given rise to a "filedrawer" problem in the ganzfeld database.

Another of Hyman's most important criticisms explains that there could have been channels for sensory leakage in the ganzfeld experiments. This is, the individual could have obtained sensory information that would have helped him/her to identify the target. For instance, if the experimenter was aware of the identity of the stimulus, or of clues that could help him/her to identify it, and, afterwards, interacted with the

participant during the evaluation, he/she could induce, unconsciously, the individual to choose the right stimulus in the set. Moreover, it is possible, Hyman says, that the target stimulus was discernible from the decoys on the basis of sensory cues such as fingerprints left by the sender, bends, variations of temperature, etc. Similarly, Hyman posited that the process of transferring the target material from the sender's room could facilitate other means of sensory leakage.

Concerning the randomisation processes conducted in the ganzfeld studies, Hyman exposed that if more attractive stimuli had been selected as targets more often than others, or the target had been presented to the individual in the first positions of the evaluation sequence, it would have been chosen by the participants more often than expected by chance, simply, due to content and position preferences.

Finally, Hyman posited that, even if the effect shown in the ganzfeld database were due to an ESP capacity, its size was still too small to deserve theoretical interest or have practical importance.

Therefore, according to Hyman, there are reasons why these early ganzfeld experiments cannot be strong evidence for the phenomenon of ESP. The use of several, different indices as measures of ESP as well as the testing of multiple hypotheses without adjusting the level of significance would leave room for criticisms. Furthermore, the significant results could come only from the work conducted at a minority of laboratories, by a minority of researchers or be due to the selective reporting of only successful experiments. Similarly, the apparent success could be explained by means of sensory communication due to uncontrolled channels of sensory leakage through the experimenter or other subtle sign left on the target, such as fingerprints, bends, etc. Also inappropriate randomization of the target series could have permitted the participant to select the correct stimulus upon content and position preferences.

In response to these criticisms, a second meta-analysis was carried out by Charles Honorton (1985), a major contributor of the ganzfeld procedure. Most of

Hyman's objections were satisfactorily replied to in Honorton's analysis. These are shortly described next.

In response to the criticism of multiple analysis, Honorton applied a test based only on the hit rate to the set of studies. Even when studies that did not report such statistic were assigned a chance hit rate, the effect was still significant.

Concerning the criticism of non-independence of results, Honorton computed Stouffer's z for the ten different laboratories where the studies had been conducted finding that the combined value was still highly significant, even if two laboratories that reported the highest results were excluded from the calculations. Thus, it was shown that the results were uniform across different laboratories and did not depend on just a minority of researchers.

In response to the criticism of selective reporting bias of more significant studies, Honorton calculated, on the basis of the published studies and the effect size, how many non-significant studies, unpublished during these seven years that cover Hyman's meta-analysis, would have been necessary in order to cancel out the significance of the effect. This number was as large as 423. The author reasoned that it is very unlikely that such a large number of studies have been done during these seven years, especially if we consider that one single session with one single participant usually takes, at least, one hour of work.

Furthermore, Honorton also showed that there was no association between measures of sensory shielding in the study and outcome. Even when studies in which target pool duplicates were not used, an important channel for sensory leakage, were discarded from the database the effect was still significant.

Finally, in relation to the disagreement encountered on the accuracy of randomisation processes, four external statisticians took part in the debate at this point, none of them agreeing with Hyman's criteria (Harris & Rosenthal, 1988b; Saunders, 1985; Utts, 1991a).

The early ganzfeld debate gave rise to a paper co-authored by Hyman and Honorton (1986) in which areas of agreement and disagreement were overtly exposed. As a result, the methodological standards that future ganzfeld experiments should follow in order to overcome the problems identified in the previous database were outlined. Both authors agreed that the early ganzfeld experiments, in general, departed from ideal standards in relation to multiple testing, randomization, control of sensory leakage, application of statistical tests and documentation. However, there was an overall significant effect observed in the database that could not be accounted for by selective reporting or multiple analysis. Therefore, there is something else producing the observed deviation from mean chance expectancy.

The authors concluded, at the time, that the final verdict on the evidence of ESP awaits the outcome of future experiments that adopted more stringent standards. They explained:

> "If the significant deviation from MCE found in the database is produced by an ESP capability and does not come from methodological artefacts, then successful outcomes should still be produced when the problems put forward by the critics have been corrected. If a variety of independent experimenters and labs continue to report significant outcomes under these conditions, then the existence of an anomalous transfer of information would have been fully demonstrated." (Hyman and Honorton, 1986, pp.352-54)

Honorton and his colleagues conducted a new series of experiments at the PRL (Psychophysical Research Laboratory) in Princeton. The design of these experiments eliminated the potential methodological problems previously pointed out and complied with the standards established in the joint communique. The positive results found were considered strong evidence of a means of communication that cannot be accounted for as appealing to any mechanisms known by science today. This finding was published in the *Psychological Bulletin* in 1994 in a paper co-authored by Daryl Bem and Charles Honorton entitled *Does Psi Exist?: Replicable Evidence for an Anomalous Process of Information Transfer* (Bem and Honorton, 1994), being one of the most referred landmarks in the history of parapsychological research.

In a later paper (Hyman, 1994), Hyman criticises, in turn, that the 11 autoganzfeld experiments demonstrate the existence of psi, as a communications anomaly. Hyman criticises Honorton et al. argument that the autoganzfeld results are consistent with previous parapsychological findings and constitute evidence for a replicable psi effect. However, Hyman posits that, although the autoganzfeld experiments are methodologically superior to previous parapsychological experiments, the tests of their randomization procedures were inadequate. He also argues that, although the autoganzfeld experiments consistently produced positive hit rates, whose combined effect was highly significant, these experiments produced important inconsistencies with the previous studies. Hyman concludes that they also showed a unique pattern in the data that may reflect a systematic artefact and that, because of these unique features, parapsychology has to wait for independent replications of these experiments at different laboratories by different researchers before we can conclude that a replicable anomaly or psi has been demonstrated.

Nonetheless, Hyman's criticisms were soon replied to by one of the previous authors, D. Bem, who in one more paper published in the Psychological Bulletin argues against Hyman's objections. In response to the point that the results of the autoganzfeld experiments are not consistent with the earlier database, Bem argues that the claims about the consistency of the autoganzfeld results with the earlier database are quite modest and challenge the counterclaim that the results are inconsistent with it. In response to Hyman's methodological point, Bem presents a series of new analyses that show the adequacy of the randomization procedures.

Nevertheless, recently, in 1998, Julie Milton and Richard Wiseman carried out a meta-analysis of the "new generation" of ganzfeld experiments, compiling studies conducted from 1986, year in which the Joint Communiqué was published, until 1997. Thirty one studies were included in the meta-analysis accounting for 1237 trials. This database excluded those studies conducted by honorton et al. at the PRL. The reported effect size was $r = 0.02$ and the Stouffer's $z = 0.87$ ($p = 0.19$, one-tailed). In principle, this would seem to indicate that the studies carried out from 1986 to 1997 collectively offer no evidence for the ESP hypothesis. Two possible explanations were

put forward by the authors in order to explain this lack of replication. The first one (a sceptical one) posits that low methodological rigour in the PRL studies could explain their success in terms of uncontrolled normal psychological mechanisms of communication or other methodological artefacts. The second explanation safeguards the ESP hypothesis, explaining that insufficient use of psi-conducive practises by the new studies would be responsible of the lack of replication.

However, it is important, at this stage, to notice that several criticisms have been put forward to Milton and Wiseman's work. One of them appeals to the aim with which the later ganzfeld studies were conducted (see e.g. Parker, 2001). It is explained that ESP research is differentiated into proof-oriented research and process-oriented research on the basis of the researcher's intention. In proof-oriented research the researcher aims and designs the study in order to look for a mere manifestation of the phenomenon. In process-oriented research, however, the researcher aims to uncover aspects of psychic functioning manifested, for instance, by a more accurate performance by subjects in one of the experimental conditions or associated to some individual characteristic. After the success of the PRL series, there was a generalised move from proof- to process-oriented research. It was claimed that later studies have not been designed to produce high hit rates as much as to find out about the process. This could have influenced the studies outcome in terms of hit rates. Another important criticism was that Milton and Wiseman's meta-analysis, covering studies that were run only until 1997, leaves out quite successful pieces of work. Probably a better understanding of the variables on which the effect size depends is producing more successful outcomes in later years. In fact, these researchers reanalysed the database to include studies conducted in the 2 years after their work (Milton and Wiseman, 1999). The effect size of these studies in isolation is $r=0.23$ (significant, $p=0.02$). If they are combined with the ones in the database the effect acquires statistical significance again ($r=0.06$, $p=0.019$). However, as the authors point out, it is notable that this effect is nearly $1/20^{th}$ of the effect found by the PRL. For this, we cannot, in principle, say that the successful results of the PRL have been replicated. Another criticism (see Bem, Palmer, and Broughton, 2001) was that Milton and Wiseman failed to note that the results were significantly heterogeneous and, in the opinion of the critics, this heterogeneity invalidated the analysis. Several studies

contributing negative *z*-scores used procedures that differed from the standard ganzfeld protocol and should not have been included with the others. The significant heterogeneity in the database suggests that some sort of procedural elements must have influenced the results. Bem, et al. conducted a new meta-analysis of 40 ganzfeld studies published after the PRL series up to January 2000. The mean effect size for the set of studies showed, again, significant, with an Stouffer's $z = 2.59$ ($p = .0048$). This work also revealed that the effect size achieved in the studies was significantly associated to the degree to which they adhered to the standard ganzfeld protocol. This finding supports legitimately the hypothesis that the observed lack of replication of the PRL results could be due to an "inappropriate use" of the prototypical ganzfeld technique and provides further support for the ganzfeld as an accurate optimising tool in laboratory ESP research.

Summary

In a meta-analysis of a database of ganzfeld experiments, R. Hyman argues that these studies do not evidence the existence of psi. According to Hyman there are a series of problems in those early ganzfeld studies, such as the multiple use of ESP success indices, the testing of multiple hypotheses without carrying out the appropriate statistical adjustment, selective reporting, non-independence of results, sensory leakage, and inaccurate randomisation of targets. Most of Hyman's objections were, however, satisfactorily replied to by Honorton, a major contributor of the ganzfeld technique, who conducted a new series of analyses on the database. In a co-authored paper, Hyman and Honorton (1986) expose areas of agreement and disagreement. Both authors agreed that there was an overall significant effect observed in the database and that the final verdict on the evidence of ESP awaits the outcome of future experiments that adopted more stringent standards. Subsequently, Honorton and his colleagues conducted a new series of experiments at the PRL, eliminating the potential methodological problems previously pointed out. The positive results supported the existence of an anomalous means of information transfer that cannot be accounted for as appealing to any mechanisms known by science today. Nevertheless, a meta-analysis of the "new generation" of ganzfeld experiments, carried out from 1986 to

1997, shows a lack of replication. Several criticisms were put forward to this work, especially because the analysis leaves out quite successful pieces of work and the results were significantly heterogeneous. Bem, et al. conducted a new meta-analysis that revealed a significant effect whose size was associated to the degree to which the studies adhered to the standard ganzfeld protocol. It was explained that expecting a statistically significant amount of ESP in every experiment would seem unrealistic. Most recent ganzfeld experiments are producing more satisfactory results, perhaps because of a better understanding of the variables implied in the occurrence of the phenomenon.

4. Experimental Success and Replication

Repeating other scientists' work plays a key part of accepting a phenomenon as genuine. This will rule out any cheat, mistake, and experimenter effects. A real phenomenon will continue to occur across independent experimenters, places, and time. Parapsychologists have the difficult task of demonstrating the existence of a process difficult to explain under the current scientific paradigm. The proof of psi would require flawless experimentation and analysis. Replication is nowadays a drawback in parapsychology, in general, that can be found at the basis of most criticisms to the area. The PRL series showed that the effect size found in the ganzfeld falls around pi=0.62 (e.g. Bem and Honorton, 1994), which, according to Cohen (1988, 1992) can be regarded as a medium effect size. As noticed by Utts (1986), if the size of this effect in the population is equal to the one found in the ganzfeld studies, a 30 trial experiment has one chance in six to find a significant effect at α= 0.05 with a one tailed test. In a 50 trial experiment, this chance increases to 1/3. For the results to show significance at 0.05, a 100 trial study is required for a 1/2 chance. Therefore, we can expect that for each 100 ganzfeld studies which are conducted only 16, if we test 30 participants; 33, if we test 50 participants; and 50, if we test 100, will reach statistical significance at a .05 alpha level. The rest of the studies may not reach this significance even if a genuine effect exists. Being aware of this, expecting a statistically significant amount of ESP in every experiment would seem unrealistic. It is, therefore,

unfair to attack the credibility of the evidence for ESP on the basis of failure of replication observed in single studies.

Meta-analysis is a statistical technique which enables researchers to merge together a series of individual studies dealing with a determined effect. This technique helps us identify small effects which may otherwise remain unnoticed. Parapsychologists have found a significant effect using this technique to analyse large datasets of ganzfeld studies (as described in the previous section). At this stage, however, there is room to wonder if the size of the effect found in the laboratory is an accurate representation of the size of the real effect. That is, is this human capacity for communication larger than shown in the ganzfeld studies? After nearly a century of experimental work, very little is known about the nature and underlying mechanisms of ESP. Most recent ganzfeld experiments have produced more satisfactory outcomes, perhaps because of a better understanding of the variables implied in the occurrence of the phenomenon. We do not know to what extent the discovery of new factors will lead to more satisfactory results and even to overcome the controversy. We propose the study of ESP correlates and the development of psi-conducive practices as a vehicle to face the problem of replication in the area. Methodologically, due to the nature of the variables that the previous literature points in association to ESP success, advanced statistical techniques such as logistic regression could be useful instruments for this kind of work. Ideally, a profile of the variables determining, or affecting, the effect size of this phenomenon would be achieved, as first step, followed by an understanding of the mechanisms underlying the effects of these predictors. Thus, optimisation practices for research in the area would be more attainable than they are at present. Such an optimisation could cover aspects of individuals training, as well as participant selection, experimenter's guidelines, and other aspects of the design and experimental protocol.

5. Logistic Regression

Logistic regression is a multivariate statistical technique that, being similar to, and answering the same research questions as discriminant function analysis, the

logit form of the multiway frequency analysis with a discrete dependent variable, and multiple regression techniques, is very suitable in parapsychological research. First, it allows us to predict a discrete outcome, that could be for instance an event happening or not, from a set of predictors, which could be continuous or discrete. In addition, another advantage of this technique is that there are not assumptions about the distribution of the variables. Thus predictors do not need to be normally distributed or linearly related. Logistic regression works out outcome probabilities on the basis of the independent variable values. The form of the logistic regression equation is:

$$P(Y) = 1 / 1 + e^{-z}$$

where $z = B_0 + B_1 X_1 + B_2 X_2 + \ldots + B_n X_n + \varepsilon_t$, that is the form of the linear regression equation, with constant Bo, coefficients Bi, predictors xi, and an error term for n predictors. The outcome, Y, can be dichotomous but also trichotomous. In the first case, it is conventionally coded as 1, if the phenomenon being studied occurs, and 0, if it does not occur.

This linear regression equation creates the logit, or log, of the odds:

$$\ln\left(\frac{y'}{1-y'}\right) = A + \sum B_j X_{ij}$$

This equation is the natural log of the probability of being in one group divided by the probability of being in another group.

Through the maximum likelihood method, we calculate coefficients in order to find the best combination of predictors that maximises the likelihood of obtaining the observed outcome frequencies. Comparison of models can be done with logistic regression through goodness of fit tests, in order to reach the best fitting model that does the best prediction with the fewest predictors. Logistic regression is useful for prediction of group membership or outcome and classification of cases on the basis of

the obtained equations. It also shows the importance of each individual predictors and interactions among predictors.

Two types of inferential tests are conducted in logistic regression: tests of models and tests of single predictors. The goodness-of-fit test calculates the log likelihood on the basis of the sum of the probabilities associated to the predicted and the actual outcome in each case. The equation being

$$\log likelihood = \sum_{i=1}^{n} [y_i \ln(y'_i) + (1 - y_i) \ln(1 - y'_i)]$$

Models are compared computing the gains in their log likelihood, using a χ^2 test. The statistic can be calculated as follows:

$$\chi^2 = 2(\text{log likelihood model 1}) - (\text{log likelihood model 2})$$

In this equation 2 multiplies the difference between likelihood in order to obtain a χ^2 distributed value. As predictors are added/removed from the equation this statistic is used to evaluate if the log likelihood of the new model increases/decreases significantly. One first step in logistic regression statistical software consists of comparing the full model containing all predictors with the constant-only model. If the difference in log likelihood between both is not significant the variables are not considered related to the outcome.

Once an acceptable model has been found, each coefficient statistical significance is evaluated. There are 2 major tests that are used in order to evaluate the contribution of the single variable in the prediction of the outcome in a determined model: the Wald's test and the evaluation of the effect of omitting a predictor. The Wald's test is the simplest and most frequently used by statistical software. The Wald statistic is obtained through the formula

$$W_j = \frac{B_j}{SE_{Bj}}$$

where W_j is the Wald statistic; B_j is the coefficient being evaluated and SE_{Bj} is the standard error of the coefficient. The Wald statistic is a z value as it is a score divided by its own SE.

The likelihood ratio is the test that compares the model fit with and without each predictor.

There are 2 possible types of error for a given model: misclassifying 0s as 1s and misclassifying 1s as 0s. Depending on the topic of the study these errors might have a relative level of importance. Therefore, the level of success of a model can be interpreted on the basis of the percentage of cases correctly classified as 0s, the percentage of cases correctly classified as 1s, or a combination of both.

Predictor coefficients can also be interpreted in terms of odds ratios. An odds ratio is the increase in odds of falling into one category when the value of the predictor increases by 1 unit. An odds ratio is computed by dividing the odds of an outcome for cases in a particular category of a predictor by the odds of that outcome for the other category of the predictor.

In logistic regression analysis, coefficients for predictors, β, are given as the change in the logit (the natural logarithm of the odds of the outcome occurring) of the outcome per unit of change in the predictor. The statistical significance of these coefficients is determined through the *Wald's test*. A more intuitive index, since it does not require logarithmic transformations, is $exp\,\beta$, that is the change in odds per unit of change in the predictor. The analogue of R^2 in multiple regression is the *Hosmer-Lemeshow goodness of fit* statistic, R_L^2. Likewise the amount of unexplained information that remains in the model is indicated in the *Log-likelihood* statistic.

As in multiple regression, logistic regression analysis can be carried out taking all predictor variables into the equation at once, through forced entry criteria, or adding predictors one at a time, through a stepwise method, on the basis of their initial correlation with the dependent variable. In stepwise logistic regression, the contribution of adding each new variable can be observed in terms of the gain in the predictive power of the equation. The *step* statistic lets us know the improvement in the predictive power of the equation since the previous stage. Once the final equation is achieved, logistic regression allows us to know the percentage of cases correctly classified as well as misclassified for each category of the dependent variable.

This technique has the advantage in parapsychology, against other parametric methods, of permitting the research to include important discrete and non-normally distributed variables in the equation.

6. Aims

According to Dalton (1997), '...perhaps the most important question one can ask of the ganzfeld technique is, "What have we learned about reliably predicting psi performance in the ganzfeld?"'. In her review paper of attempts to find a formula for success in the ganzfeld two key issues are apparent: 1) attempts to examine predictors of success have been piecemeal and opportunistic in large part; 2) the empirical work attempting to find a formula for success suffers from a lack of an appropriate tool for the examination of separate and joint effects of predictors. At best, studies have used multiple regression techniques to examine ESP predictors performance, but the linear nature of these regression models, and the lack of linearity in ESP scores, or normality in ESP predictors (such as presence or absence of mental disciplines training) makes the linear regression approach to formula development less than optimal.

The research carried out in this PhD has been aimed specifically at exploring important personal, interpersonal, environmental, and methodological predictors of ESP performance, in the development of a model of successful ESP performance. The work is intended to lead to a logistic regression equation for predicting success in the

ganzfeld ESP testing environment. From a methodological perspective, it is also intended to demonstrate the utility of logistic regression models, for this type of research, in a field where they have never previously been used, but are clearly highly relevant.

7. Summary and Outline of Thesis

The ESP phenomenon has been extensively studied within the area of parapsychology. In this chapter we have seen how individual studies as well as meta-analyses show a significant effect supporting the existence of an anomalous process of information transfer. However, a major criticism in the area is the lack of a "experimental recipe" that can yield replicable results across independent laboratories. The ganzfeld, one of the most used tools in the experimental testing of ESP, induces in the individual an homogeneous, unpatterned visual field enhancing a person's ability to detect psi information, by reducing ordinary sensory input.

An extense controversy in relation to the studies that used this methodology was presented. It was described how, in a meta-analysis of ganzfeld experiments, R. Hyman reasones that these studies are not evidence for the existence of psi due to a series of methodological problems. However, most of Hyman's objections were satisfactorily replied to by Honorton in a new series of analyses. In a co-authored paper, both authors agreed that the final verdict on the evidence of ESP awaits the outcome of future experiments that adopted more stringent standards. In a new series of experiments Honorton and his colleagues, eliminating the potential methodological problems previously pointed out, show results that support the existence of a communication anomaly. Nevertheless, the database of the ganzfeld experiments conducted from 1986 to 1997 shows a lack of replication. Most recent ganzfeld experiments are being more successful, perhaps because of a better understanding of the variables implied in the occurrence of the phenomenon. Bem, et al. in a new meta-analysis show a significant effect whose size is associated to the degree to which studies adhered to the standard ganzfeld protocol. It was explained that although

replication is nowadays a drawback in parapsychology, we should not expect to find statistical significance in every experiment.

Logistic regression is a multivariate statistical technique very suitable to formula development research in parapsychology as it allows us to predict a discrete outcome, from a set of predictors, which could be continuous or discrete from a series of predictors that do not need to be normally distributed or linearly related.

This chapter was intended to provide a brief introduction to concepts, problems, and methodological approaches to the scientific study of the phenomenon, its evidence, and possible underlying mechanisms. Next chapter, chapter II, outlines a series of variables and psi-conducive practices found in the literature in relation to the prediction and optimisation of experimental ESP results. Most of these variables were experimentally tested in a pilot study, where an advantage in using multisensorial stimuli was also manifested. This study is fully described in chapter III. A survey on "potential means of increasing free-response studies hit rates" carried out on parapsychologits provided additional ideas for succeeding in ESP experimental research. This work is dealt with in chapter IV. In a third study (chapter V), the most successful predictor variables, on the basis of the results obtained in the pilot study and the data shown in the literature, were tested through logistic regression. Conclusions, directions for future research and suggestions for ESP experimental research are, finally, considered in chapter VI.

CHAPTER II: AN OUTLINE OF STATISTICAL PREDICTORS OF ESP PERFORMANCE AND PSI CONDUCIVE PRACTICES

The literature on the prediction of experimental ESP is broad. A large number of studies has been carried out and many variables have been considered as statistical predictors of participants' ESP performance. These variables have been concerned, mainly, with participants' characteristics, such as personality traits and other individual differences, characteristics of the experimental design and protocol, state of the participants prior to, or when undertaking the test, and environmental factors (e. g. Earth's magnetic activity).

Similarly, diverse means of evoking, or facilitating, psi in a greater degree (called psi-conducive practices) have also been studied. When a psi-conducive practice is put forward in ESP research in order to provoke the appearance of, or enhance, psi under the controlled conditions of a laboratory, it conveys certain underlying beliefs about one or more variables influencing the ESP process and outcome (e. g. relaxation or degree of altered state of consciousness). As such, the development of successful procedures would, in principle, depend upon the knowledge of the variables on which the appearance of the phenomena is based.

In this chapter, I have outlined a series of factors and procedures studied in the literature in relation to ESP success. I DO NOT intend to provide an exhaustive analysis of each of the variables and protocols revised here. Indeed, most of them would deserve an entire PhD each! In order to cope with such a large set of variables and procedures I opted, instead, to show a general picture of the prediction and attempts at manipulation of ESP success and, therefore, an outline of what factors we could work with in future experiments.

The variables found in the literature have been grouped into 6 categories: 1) stable characteristics of participants in ESP tests, such as personality traits and individual differences; 2) more transient characteristics such as state factors; 3) characteristics of the experimental design, protocol, and testing atmosphere; 4) environmental factors; 5) characteristics of targets; and 6) on-session and post-session indicators of psi success.

1. STATISTICAL PREDICTORS OF ESP PERFORMANCE

1.1. PERSONALITY TRAITS AND INDIVIDUAL DIFFERENCES

Nowadays, there is still disagreement among psychologists about the number of core traits that define human personality and individuality. Different aspects can be described at different levels. One can either choose the highest level, at which all the traits are independent of one another, or a variety of lower levels, at which the traits are to varying degrees correlated with each other. The dominant view at present puts the number of independent personality traits at five; this is called the 'Big Five' model of personality (Costa and McCrae, 1992b). The 'Big Five' traits are: Neuroticism, Extraversion, Agreeableness, Conscientiousness and Openness to Experience. These five traits, or factors, are commonly referred to as 'dimensions of personality'. Alternative views range from three to seven. The British psychologist Hans Eysenck originally suggested three Neuroticism, Extroversion, and Psychoticism. However, in the Big Five Model, Psychoticism is broken down into three separate factors (Agreeableness, Conscientiousness and Openness to Experience). Most research indicates that the two most robust traits are those of Neuroticism and Introversion/Extraversion. These are highly replicable, they account for a considerable portion of the variance across a very wide range of measures, and relatively short self-report scales can reliably measure them each.

Using factor analysis, or principal components, it is possible to determine how many independent factors or traits exist within a given body of data, but not how these factors are related. But, from the results of descriptive studies alone, we are unable to tell whether a given dimension of personality merely provides us with a convenient set of coordinates within which to locate an individual's personality, or whether it has a basis in underlying causal reality. Because of this ambiguity, many of the trait terms used in personality and individual differences research do not reflect entirely different traits, but rather rotations of one another. For example, the trait of novelty-seeking blends some lower-order traits that, in alternative descriptive systems, make up Extraversion with others that make up Psychoticism.

A further problem is that different investigators may refer to what is essentially the same dimension by different names, often reflecting different theories into which the dimension has been embedded.

Nonetheless, in this thesis, I would like to detach from any model or theoretical framework on human individuality for 2 reasons: 1) psychologists do not seem to quite agree on a common structure that accounts for human differences and 2), given that our aim is to achieve an empirical prediction of individuals' ESP scoring rather than a theoretical account, any defined and measurable aspect of individual differences could, in principle, be considered for prediction of ESP scoring, regardless of our knowledge, or ignorance, of their underlying mechanisms at the current stage of theoretical understanding of ESP phenomena. In the following paragraphs, I review a series of traits and individual differences found in the parapsychological literature in relation to experimental ESP success.

1.1.1. Personality Traits

Sensation Seeking

Sensation seeking is defined by Zuckerman (1972, 1994) as a personality trait that reflects a tendency to look for varied, novel, and intense sensations and experiences to the point of assuming the risk for the sake of it. Zuckerman argues that there is a human need for a level of sensory stimulation. It could be thought that under sensory deprivation/monotonisation, the sensation seeker would tend to look for ways to increase their stimuli input. One of these ways could be through ESP. Sensation seeking measures have been shown to correlate with psi-related variables such as paranormal belief (Kumar, Pekala, and Cunnings, 1993; Zuckerman, Bone, Neary, Mangdsdorff, and Brustman, 1972) or reporting paranormal experiences (Kumar et al., 1993) as well as theoretically psi-related variables such as interest in internal experiences (Eysenck and Zuckerman, 1978; Glicksohn, 1990; Zuckerman, 1994), absorption (Zuckerman, 1994), and extraversion (Eysenck and Zuckerman, 1978). Other authors have looked directly into the relationship between ESP and Sensation Seeking. For instance, in an experimental study, Curtis and Wilson (1997) examined the relationship between scores in a 40-trial forced-choice ESP test and a series of questionnaires assessing sensation seeking (the Zuckerman's Sensation Seeking Scale), belief, and paranormal experiences in 379 undergraduates. Multivariate analyses revealed experience seeking, a sub-scale of sensation seeking, as the single best ESP scores predictor.

Agreeableness

Agreeable people are defined in the Big Five Model of personality as straightforward and frank individuals, co-operative, yielding rather than aggressive in conflicts, modest, caring, nurturing and supportive, tending to see others as honest and trustworthy.

In theory, more agreeable people would be expected to comply with the experimental demands and, maybe, even make an effort to satisfy them. Such an attitude could also facilitate an artefactual experimenter effect, but could also generalise to the psychic domain and the demands for psi.

Van Kampen, Bierman, and Wezelman (1995) used the NEO-PI in a ganzfeld experiment with 100 Dutch students. They found that agreeableness scores were slightly higher for hitters. However, as these authors point out in their report, the fact that the NEO-PI questionnaire was mailed to the individuals after the completion of the ganzfeld raises the possibility of their responses being biased by knowledge of their ESP results.

Extraversion

Extraversion is defined in the Big Five Model of personality in opposition to introversion. Extrovert individuals are described as sociable, optimistic, impulsive, sensation seekers, aggressive, and can be unrealistic.

The personality trait extraversion has been largely studied in relation to ESP. Positive associations have been reported using large varieties of assessment tools like Cattell's scales (Kanthamani and Rao, 1972; Nicol and Humphrey, 1953, 1955), Eysenck's (Green, 1966; Nielsen, 1972a; Randal, 1974), Guildford's (Nash and Nash, 1967, Nicol and Humphrey, 1953, 1955), the Bernreuter's scale (Casper, 1952; Humphrey, 1945b, 1951a; Nielsen, 1970), the MMPI (Nash, 1966) and even clinical ratings (Shields, 1962). Not all of these studies report significant results but all were in the expected direction. Other validated measures of extraversion such as perceptual tests have also shown this association with ESP (e. g. Schmeidler, 1982; Klintman, 1984). After his meta-analysis Honorton (1992) reports a significant correlation of .18 in an analysis of 221 participants tested in ganzfeld in his own laboratory. Other ganzfeld studies also show the effect of extraversion (e.g. Dalton, 1994; Honorton and Ferrari, 1989; Morris, Cunningham, McAlpine, and Taylor, 1993; Parra and Villanueva, 1998; Schlitz and Honorton, 1992; van Kampen et al., 1994). All this suggest that extraversion is a robust predictor of ESP.

C. Sargent is the author who has most broadly explored this domain. In a series of ganzfeld experiments with 26 and 20 subjects, Harley and Sargent (1980) report significantly higher extraversion scores, as measured by Cattell's 16PF questionnaire,

for binary hitters than for missers. This finding was replicated in his second series of experiments. In a third experiment, Sargent failed to find any association between extraversion and ESP using the same measure of the trait. It must be noticed that, in this third experiment, participants were recruited from the binary hitter population of the 2 previous experiments, which could have affected the magnitude of the extraversion-ESP relationship. In a fourth experiment with only 4 subjects, the extraversion-ESP correlation emerged, in turn, at a significant level. The fifth experiment of his series included 30 participants, 23 of whom had prior ganzfeld experience. This study showed a significant correlation of .40 between ESP and extraversion.

In a later study, Sargent (1981a) found, once more, a significant positive correlation between 16PF extraversion scores and ESP scores, this time, in a complex 3-way interaction with ganzfeld stimulation length and prior psi-testing. The association did not reach significance for 15-min ganzfeld stimulation or for experienced participants. This correlation was .67 for the inexperienced subjects in 30-min ganzfeld exposure. Conversely, in another study, Sargent (1982) tested 2 groups of inexperienced and experienced subjects, failing to find significant results in either group. Moreover, the pattern of scores was the reverse of the one which had emerged in his previous research, showing a higher correlation index in the experienced group (.39), compared to the inexperienced individuals (.06). A further attempt to replicate the previous finding with inexperienced and experienced individuals also failed to show statistical significance (Sargent and Matthews, 1982). Furthermore, Sargent (1981b), in a review paper of English-language reports on the extraversion-ESP association, shows a significant effect by extroverts and only one reversal of such effect. The author concludes that this consistency of results represents a real positive correlation between ESP and extraversion.

More recently, in a meta-analysis of 60 independent studies contributed by 17 researchers, Honorton, Ferrari, and Bem (1992) found a significant positive association between both free-response and forced-choice ESP tests and questionnaire measures of extraversion. The reported effect sizes were .06 and .20 for forced-choice and free-response tests respectively. However, the authors explain that such results could have

been an artefact in forced-choice studies attributable to some participants completing the extraversion questionnaires after receiving feedback on the ESP test. The authors explain that the participants' answers in the extraversion questionnaire could have been influenced by knowledge of the ESP test outcome. This conclusion has been criticised, however, holding the ESP-extraversion relationship (see Palmer and Carpenter, 1998; Thalbourne and Storm, 1999). Furthermore, Krishna and Rao (1991) tested experimentally the hypothesis posited by Honorton. They administered the High School Personality Questionnaire before and after providing feedback on an ESP task. The authors found that their individuals' responses to the questionnaire did not seem to be affected by their knowledge of the ESP task, even when such feedback was purposefully inflated by the experimenters. Nevertheless, the studies used by Honorton in his meta-analysis have been further criticised by arguing that, in fact, the problems extend beyond the ones pointed out by the authors, concerning further psychometric issues (see Houran, 1999).

Another interesting finding was by Honorton and Schechter (1987), who through an examination of the PRL database, noticed that there is a tendency for extroverts to achieve hits when friends were sending. Conversely, introverts would tend to obtain better scores with members of the staff acting as senders.

Van Kampen, Bierman, and Wezelman (1995) used the NEO-PI in a ganzfeld study with 100 Dutch students. They found a non-significant association between ESP and extraversion. They also observed that such association was restricted to the facets of warmth and positive emotions of the extraversion construct. The authors conclude that these findings support the hypothesis that extraversion is effective through the social processes in the experimental situation. However, like Honorton et al., they point out in their report that the fact that the NEO-PI questionnaire was mailed to the individual after the completion of the ganzfeld raises the possibility that their responses could have been biased by awareness of their ESP results.

Attempts have been made to explain the apparent relationship between ESP and extraversion. Some views attribute the effect to the low neuroticism, spontaneity, or the higher comfort presumably experienced by extroverts in the experimental social

setting. Another theory comes from Eysenck (Eysenck, 1967), who explains that the neural ratio of excitation to inhibition is higher for introverts who, therefore, tend to learn quickly and forget slowly. This, applied to the ESP task, could mean that their slow forgetting process impedes them with irrelevant memories of other tasks. Conversely extroverts can forget quicker. This would help them to disconnect from previous habits and inhibit distractions in an ESP test.

Impulsivity

Impulsivity can be defined as behavior without "adequate "thought, or a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to potential negative consequences of these reactions.

Impulsivity has been generally believed to facilitate psi by the parapsychology community, mostly under the hypothesis that less impulsive individuals would detrimentally process the psi signal prior to make an ESP response explicit. However, little formal research has been done in this regard.

In a study carried out by Schmeidler (1985), a measure of impulsivity, achieved through the Matching Familiar Figures Test, showed predictive value of ESP in a sample of 60 individuals. In another study, using a word-association ESP task, Stanford (1973) found with a sample of 60 individuals that impulsivity, in contrast to inhibition, facilitated ESP. In tune, in a ganzfeld experiment with 50 undergraduates, Sudhakar and Rao (1986) observed higher spontaneity in mental imagery of psi-hitters. More research in the area is needed, however, to explore this assumed relationship.

Neuroticism

In general, any variable that is detrimental for psychological tasks would be expected, in principle and from a theoretical point of view, to deteriorate the individual's performance in an ESP task. Neuroticism and anxiety are two of these variables. They have been consistently associated with poor performance in multiple psychological experiments. Neuroticism and anxiety are narrowly associated. Neuroticism could be understood as the personality trait that predisposes the individual to suffer from a state of anxiety.

In ESP research anxiety has been found to be associated with low scoring repeatedly. Overall, results have been either significant or in the right direction for both free-response and forced-choice experiments (see Palmer, 1978, for a review; also Braud, 1977; Carpenter, 1965; Johnson and Houtkooper, 1988; Kanthamani and Rao, 1973; Palmer, 1982; Weiner, 1986).

In an early ESP card forced-choice study aimed at the exploration of different personality factors, as predictors of ESP scoring, Nicol and Humphrey (1953) report a significant correlation of .60 between ESP run-scores and emotional stability, theoretically opposed to neuroticism, as measured by Cattell 16PF. A 2nd study designed for replication purposes (Nicol and Humphrey, 1955) failed to find a significant effect of these variables on the ESP task, though the association was in the right direction.

Kanthamani and Rao (1973) tested the predictive value of a neuroticism scale composed of 9 primary factors (including an anxiety scale) in relation to a series of forced-choice experiments. The neuroticism scale slightly predicted psi scores in all experiments. None of the scales (including the anxiety scale), taken in isolation, did. The author concluded that a broader measure of personality would provide a more reliable prediction of ESP.

In a ganzfeld study, Van Kampen, Bierman, and Wezelman (1995) used the NEO-PI with 100 Dutch students. They found a weak, positive effect of the hostility facet of the neuroticism scale on ESP. However, as previously discussed, the authors point out in their report that the fact that the NEO-PI questionnaire was mailed to the

individuals after completion of the ganzfeld raises the possibility that their responses could have been biased by knowledge of their ESP results. In another ganzfeld study, Parra and Villanueva (1998) did not find any association between ESP scores and neuroticism, as measured by the Eysenck's EPI.

In a forced-choice ESP test, Sargent and Harley (1981) observed that low-anxiety participants scored significantly higher than high-anxiety participants when they were tested individually. However, a non-significant reversal of this effect was observed when participants were tested in groups. These results suggest that the effect of an anxiety-related trait could be modulated by social interaction and support the role of an state factor (e. g. state anxiety) at the moment of the test.

Openness to Experience

Costa and McCrae (1992b) define "open individuals" as curious about both inner and outer worlds, willing to entertain novel ideas and unconventional values, and they experience both positive and negative emotions more keenly than do closed individuals. Openness is one of the factors, together with Neuroticism, Extraversion, Agreeableness, and Conscientiousness, used to describe personality in the 'Big Five' factor model of personality (Digman, 1990; John, 1990; McCrae & Costa, 1989, 1997). There are six sub-factors associated with openness: active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety, intellectual curiosity, and independence of judgement.

There is also evidence in the literature of an association between openness to experience and ESP. Van Kampen, Bierman, and Wezelman (1995), in a ganzfeld experiment with Dutch students, found that openness scores using the NEO-PI were slightly higher for hitters. Furthermore, the facets that showed significant from the factor of openness were openness to aesthetics, feelings, and values. The authors argue that the openness to aesthetic effect would reinforce earlier findings with artistically gifted populations. Similarly, the association between ESP and openness to feelings would be alike to the one found between ESP and the facet FP (feeling-

perceiving) of the MBTI. Although other factors of the NEO-PI showed association with participants' ESP performance, a stepwise multiple regression revealed that the vast majority of the ESP z-score variance was explained by the facet *openness to feelings*. If 32 participants who scored above the mean in openness to feelings were selected from the total sample the hit rate for these participants would increase from 29 to 47%. Another study by Broughton and Alexander (1995) replicates a positive association between ganzfeld ESP and the openness sub-scale of the NEO-PI. However, Bierman (1995) did not find this effect.

Aggression and Hostility

There are some reports of a significant negative association between aggressiveness and forced-choice ESP tests, using primarily either the Rosenzweig's Picture Frustration Test (e. g. Eilbert and Schmeidler, 1950; Schmeidler, 1950, 1954) or the Cason's Test of Annoyance (e. g. Nicol and Humphrey, 1953, 1955). Three other studies by Osis (Osis and Fahler, 1965; Osis and Tuner, 1968; Osis et al., 1971) show inconsistent results. Schmeidler (1950, 1954) argues that such an association only appears for subjects who are moderately annoyed. Along the same line, Haraldsson also reports a negative association between ESP and psychoticism, as measured by the Eysenck's Personality questionnaire and Cattell's 16PF, in a database of 10 forced-choice experiments that were, primarily, used by the author to examine the effect of defensiveness (Haraldsson, 1995).

Similarly, in free-response research, Sargent also reports a significant negative association between bad mood, as assessed by pre-session questionnaires, and ESP scores in 2 ganzfeld studies (Sargent, 1980, experiment-5; 1982). Such an association did not emerge, however, in 3 later studies by the same author (Sargent, 1980b, experiments 1, 2 and 3).

1.1.2. Mental Capacities and Abilities

Intelligence and Education

One of the most ancient theories of the nature of paranormal phenomena views psi as an inborn capacity inhibited by current socialisation and formal education. Some surveys on spontaneous cases show higher reporting of paranormal occurrences among people with low educational background (Haraldsson, 1985; Haraldsson and Houtkooper, 1991). In principle this could be due to 2 factors: 1) lower reporting of these experiences by people with a higher educational background, or 2) truly higher incidence of paranormal phenomena for more poorly educated people.

Level of education has been experimentally tested in relation to forced-choice ESP scoring. Winkelman (1981), hypothesised that formal education would lead to a cognitive style that inhibits psi abilities, tested a sample of 29 Mexican children from 8-14 years old who had received from 0 to 7 years of schooling. The author found a significant negative correlation between ESP scores and years of formal education and a mathematical test. Age showed no association to ESP and was independent of the educational measures, thus, ruling out possible confounding effects. This finding was not replicated, however, in 2 later experiments by Murray (1983) and Giesler (1985) in 2 different cultures: the Philippines and Brazil. Positive association has also been found between ESP and school grade in an experiment in which teachers acted as experimenters (Anderson, 1959b). Schmeidler (1960) also reports similar results. Other studies yielded, however, non-significant results (Anderson and Gregory, 1959; Nash and Nash, 1964; White and Angstadt, 1963b).

What could seem a finding contrasting the previous hypothesis is that of intelligence and ESP. Classifications and definitions of multiple types of intelligence are abundant in the psychological literature. Probably, one relevant for parapsychology refers to the discrimination between crystallised and fluid intelligence. Crystallised intelligence would consist of that knowledge acquired throughout life and experience, therefore, related to education. On the other hand, fluid intelligence would rather draw on an inborn capacity to cope with newly faced problems. Although some studies have shown significant positive associations between ESP and intelligence test scores

(Humphrey, 1945a, Schmeidler, 1962a), most of the attempts have yielded non-significant results, though mostly in the positive direction (Drucker et al., 1977; Humphrey, 1945a, 1948; Kanthamani and Rao, 1971; Nash and Nash, 1964; Shields, 1962; Vasse and Vasse, 1958).

Counterintuitive results have also been reported. For instance, in one study, Brier (1967) carried out 2 long distance ESP experiments by mail on 2 groups of high IQ volunteers. These scores were slightly below chance in both studies. A negative association between ESP and IQ cannot be concluded, however, due the fact that there was no control group. Furthermore, some of the positive results found might have been artefactual (see Palmer, 1978). The diversity of intelligence tests used and types of intelligences taped might have introduced inconsistency in the results. The study of intelligence in relation to ESP seems complex and challenges indeed deep theoretical consideration and much experimental work.

Creativity and Artistic Pursuit

A major drawback in the study of creativity is associated to the large diversity found among the several, and equally valid, definitions and measurements of creativity. At best authors have agreed creativity be a multifaceted phenomenon rather than a single unitary construct feasible of precise definition (see Isaksen, 1987). This leaves room for the possibility that different studies in the literature taped different dimensions of creativity, which could be a source for inconsistency of results and replication.

In his review paper, Palmer (1978) reports 10 studies of ESP and creativity. Four of these studies show significantly higher ESP scores for participants classed as creative than for non-creative participants. These studies used measures of creativity such as the Torrance's Social Motivation Inventory (Honorton, 1967), the Welsh Figure Preference Test (McGuire et al., 1974), teachers' ratings of pupils (Anderson, 1966), and classes-of-uses test (Levine and Stowell, 1963). Along the same line, in 2 free-response GESP experiments, Moss (1969, 1968) reports significantly higher scores for

pairs of subjects of whom at least one was engaged in an artistic profession. In a later study (Moss et al., 1970), the association appeared in the predicted direction but did not reach significance, probably due to small sample sizes. Gelade and Harvey (1975) also report significant results in what would be a replication of Moss's findings. Other studies show null results or even negative association between ESP and measures of creativity such as a classes-of-uses test and Barron's Independence of Judgement Scale (e.g. Schmeidler, 1962b, 1964d).

In a more recent study, Braud and Loewenstern (1982), using an Alternate Uses Test to assess creativity, found a significant association between a free-response ESP test and creativity scores. Another free-response ganzfeld study by Morris et al (1993) shows better ESP performance for participants rated as high on a series of artistic and musical creativity questions than for participants rated as low in these questions. Roe, McKenzie, and Ali (2001) report non-significant high correlation between several creative measures and ganzfeld ESP performance.

It is noticed in the literature that outstanding scores were achieved by (presumably) creative populations, such as musicians, drama students, etc. (e.g. Dalton, 1997; Morris, Cunningham, McAlpine, and Taylor, 1993; Morris, Dalton, Delanoy, & Watt, 1995; Schlitz & Honorton, 1992). In Schiltz and Honorton (1992) ganzfeld experiments, profession (or dedication) was the most successful creativity predictor among other questionnaire measures that did not show significant association to ESP.

Though overall results seem to suggest an asset for creative participants, there are also confusing and even counterintuitive results. As Palmer posits in his review, the ESP-creativity relationship could be determined by the particular test used to measure this capacity as well as the ESP test employed. Perhaps the most consistent findings emerge when creativity is assessed based on profession as in Moss's studies. Although profession might not be a direct measure of creativity in itself and, therefore, this indicator could have validity problems, the high reliability in terms of prediction shown, on the other hand, makes it promising in the development of a recipe for success in ESP research.

Memory Skills

One of the first theories of memory and ESP comes from Roll (1966). This author argues that the ESP response consists of the individual's memory traces being activated by the ESP stimuli rather than of new images or ideas. If memory plays such an important role in ESP, it is reasonable to expect measures of these 2 abilities to show association. One point worth considering is that, according to Roll's theory, in the ESP process the individual would, simply, see the memory trace effortlessly activated by a successfully transmitted piece of ESP information, whereas in a memory task the individual voluntarily retrieves the requested information. The literature on ESP and memory is broad. A salient feature in these studies is the large variety of ESP and memory tasks used by different researchers. This fact might have contributed to the inconsistency of results observed. Some studies suggest a positive association (e. g. Kanthamani and Rao, 1974; Feather, 1967). Many others show null or even contrasting results (Blackmore, 1980; Rao, 1978; Rao, Morrison, and Davis, 1977; Sitamma and Rao, 1995). Irwin (1979b), however, notices an important point. In his review paper of memory and ESP studies, the author argues that there is some evidence that ESP correlates positively with long-term memory and negatively with short-term memory.

In a later study, Irwin (1982) tested the called target familiarity hypothesis, that posits that subjects familiar with the target would produce more extreme ESP scores. This hypothesis relies on Roll's assumption that ESP operates through activation of target-relevant material and associations in memory. Irwin manipulated familiarity by exposing participants to half of the pool and assigning them to either familiar or unfamiliar condition prior to a free-response ESP test. The results were in the expected direction though did not reach significance, probably, due to the small sample size used of 26 participants.

Another interesting finding concerning memory retrieval and ESP comes from Schmeidler (1983). She observed that ESP scores were higher during recall of partially

learned material than during recall of well-learned material. In each of 3 experiments 16 subjects were asked to memorise a list of 50 words in 5 minutes. Twenty of these words were selected as ESP targets and placed in sealed envelopes during the test. The last 25% of each individual's recalled words was assumed to represent weakly learned material and hypothesised to contain more ESP target words. The hypothesis was confirmed and replicated in a 3rd study. An earlier piece of work by Kanthamani and Rao (1975), using high- and low-association pairs of words also found higher ESP scores in relation to poorly learned material.

1.1.3. Values and Beliefs

Self-confidence and Self-concept

In mainstream psychology, an individual's self-confidence is generally referred to as desirable prior to undertaking almost any performance task. In ESP research there is some evidence of this variable playing a role in the session outcome. For instance, in an ESP card forced-choice study aimed at the exploration of different personality factors as predictors of ESP, Nicol and Humphrey (1953) report a significant correlation of .55 between ESP run-scores and self-confidence, as measured by the Guildford-Martin questionnaire. However, a 2nd study designed as a replication of the previous one (Nicol and Humphrey, 1955) failed to find any significant effect, though the association was in the right direction. Also, from mainstream psychology, we know that the individual's self-concept plays a core role in drawing his/her emotional and motivational states as well as his/her self-confidence and expectancies. The role of the individual self-concept could be particularly determining when undertaking a novel task. Such effects could generalise to the ESP task. Though little experimental work has been done to test this hypothesis, there are studies that show how differences in some aspects of the individual self-concept affect ESP performance. Stanford (1964a) found, in 2 forced-choice studies, that subjects who showed a greater difference between their self and their ideal-self concepts in the Osgood's Semantic Differential Test scored significantly higher than their counterpart. This effect was

found in interaction with paranormal belief and was attributed to the effect of motivational factors.

Religious Beliefs

Religiosity and religious beliefs have previously shown association to ESP predictors such as paranormal belief (Haraldsson, 1981; Thalbourne, 1995a, b; Thalbourne and Houtkooper, 2002; Tobacyk and Milford, 1983) or the reporting of paranormal experiences (Haraldsson, 1985; Haraldsson and Houtkooper, 1991).

In a meta-analysis of 8 forced-choice ESP experiments contributed by 462 subjects, Haraldsson (1993) found a significant positive correlation between ESP and both religiosity and the belief in an afterlife. Different questions were used to assess religiosity in the studies as well as 3 different ESP tasks: a computer game clairvoyance task, a paper and pencil precognition test, and a clairvoyance trial. Belief in an afterlife was assessed through a single question: "Do you believe in life after death?", where the individual would respond from 1 (unthinkable) to 4 (certain). The correlation indices between ESP and religiosity varied from -.06 to .26 across the 8 studies, showing independent significance in only 2 studies, with an effect size of .12 for 383 trials. Similarly, correlation indices between ESP and belief in an afterlife varied from -.05 to .18 across the 8 studies, showing independent significance in only 2 studies, and averaging an effect size of .098. Haraldsson's analysis reveals that the question "How religious do you consider yourself to be?", religious reading, attending religious meetings, and frequency of praying were the most successful predictor items. A regression analysis that also included paranormal belief and belief in an afterlife, reveals religiosity as the only significant predictor of ESP. However, the percentage of variance explained was only 1.3%. These 3 variables were significantly and highly related to one another. The authors concluded that religiosity and belief in life after death were better predictors than paranormal belief. Haraldsson (1995), in a new study, further reports positive correlation between religiosity and a forced-choice ESP test. Independent replication attempts with free-response paradigms are needed in the literature.

Locus of Control

Locus of control is a personality construct referring to an individual's perception of the causality of events as determined internally by his/her own behavior vs. fate, luck, or external circumstances.

Some experimenters, generally, try to promote passive "let-it-happen" attitudes in the instructions they give to the receiver of an ESP experiment. The locus of control of the individual regarding, the ESP task, could be related to, and even determine, the strategy to be adopted for "waiting/looking for" ESP information. If the cognitive activity of the individual plays a role in the appearance of ESP, locus of control could be highly relevant for the session outcome.

Though some experimental studies report no relationship between ESP and locus of control (e. g. Broughton, 1976; Wollman, 1982), there are some points worth considering. An important one is that there are several measures of locus of control. This facet is, mostly, assessed as a *general* trend in the individual to attribute causality of different circumstances to either internal or external factors. We know that this attribution process might very well differ from one situation to another. Under this perspective, what would actually be relevant to us is the individual's attributions for the particular ESP task to be carried out rather than a general tendency.

Paranormal Belief

In experimental ESP research, it has been observed that subjects who believe in the possibility of psi phenomena, in general, and within the context of the experiment, in particular, tend to score above chance whereas participants who feel more sceptical tend to do below chance expectation. This has been called the sheep-goat effect. Though this effect is small, it has shown largely significant in meta-analyses of forced-

choice ESP studies (e. g. Lawrence, 1993; Palmer, 1971). No similar meta-analysis has been carried out on free-response studies. However, individual results suggest a similar picture. In ganzfeld ESP research, in particular, this effect has replicated notably (see Broughton, Kanthamani, and Khilji, 1989; Honorton, 1985; Honorton et al., 1990; Honorton and Schechter, 1987; Morris et al. 1993; Morris et al., 1995; Parker et al., 1998).

Schmeidler explains that some people with quite strong beliefs in the paranormal still might feel doubtful about the possibility of producing such phenomena as ESP on demand of an experimenter and under the strangeness of a parapsychology laboratory situation. This is why she recommends, in the assessment, not asking participants if ESP exists but if it can be possible in the experimental situation. Schmeidler and McConnell (1958), following this criterion, found significant psi-hitting in paranormal believers and psi-missing in non-believers. The results found with Schmeidler's criterion were replicated in several other independent studies (Carpenter, 1971; Eisenbud, 1965; Schmeidler, 1971). It must also be mentioned that some other forced-choice experiments have failed in such replication.

Other researchers did not settle for correlating scores and went one step further by trying to manipulate beliefs experimentally. Layton and Turnbull (1975) told a group of participants that ESP had been scientifically verified and that the experiment was expected to yield positive results, and gave a second group the opposite information. Although the belief manipulation proved successful there were no ESP differences between these 2 groups in 2 successive experiments. Taddonio (1975), in 2 studies with similar design to Layton's, obtained significant differences in ESP higher for the believer group. One substantial difference pointed out (Palmer, 1978) between these 2 authors' designs was that Taddonio stressed the adequacy of the test to measuring ESP while Layton stresses the existence of ESP. This further supports the accuracy of Schmeidler's criterion.

In mainstream psychology, Rosengberg and Houland's theory (1960) explains how attitudes can be understood as made of 3 components: a system of beliefs itself, an emotional component, and a behavioural trend. These 3 components would appear

consistent with each other. Parapsychology, in general, has always been a controversial discipline and, therefore, many individuals have developed attitudes, rather than only beliefs, against and in support of paranormal concepts. According to Rosengberg and Houland's theory, in the case of parapsychology, the individual would have a system of beliefs in relation to the paranormal, associated to an emotional reaction, and to a behavioural trend in concordance to this, which, from my point of view, could very well be an unconsciously-driven psi-hitting/psi-missing response in a standard ESP test.

Palmer (1972) explains a further distinction, pointed out by Martin Fishbein, between belief and attitude. Belief in ESP would refer to the individual's assessment of the probability for ESP to exist, while attitude towards ESP would refer to the desirability or undesirability for ESP to exist. Palmer points out an experiment by Fishbein and Raven (1967) that shows how belief in and attitude toward ESP are not interchangeable. Palmer (1971) reports 3 experiments, in his review paper, containing measures that could indicate attitudes toward ESP, with questions such as "I would/would not be disturbed if my scores on this test contributed substantial evidence of the existence of ESP", or "would you like to have the ability to predict the future?", or simply "would you like to have ESP ability?" (Ryzl, 1968; Schmeidler and Lindermann, 1966). Two of these studies (Kahn's 1952 study and Ryzl's) found significantly better performance in subjects who showed more positive attitude to ESP, as measured by the above questions. Schmeidler and Lindermann's study showed a marginally reversal of this effect.

Along the same line, in a study with an ingenious design, Lovitts (1981) divided a total of 40 participants in 2 groups. One of the groups was told that the experiment tested for subliminal perception and that high scores would discredit ESP. The other group was told that the experiment was actually an ESP experiment and as such high scores would prove ESP. Lovitts found an interesting interaction between paranormal belief and the participants understanding of the purposes of the experiment. In particular, there were above chance scores for sheep (believers) in the prove-ESP conditions and goats (non-believers) in the disprove-ESP condition, and below chance scores for sheep in the disprove-ESP and goats in the prove-ESP condition. This

finding is in tune with the hypothesis stated previously on the attitudinal view of the sheep-goat effect. The difference in scoring between believers and non-believers might not represent a difference in ESP abilities in itself but a behavioural tendency consistent with their attitudes. However, the effect found by Lovitt's was not replicated by Lawrence (1993) in a later study.

Magical Ideation

Magical ideation could be defined as the tendency to develop beliefs in causations that are invalid by conventional standards (Eckblad and Chapman, 1983).

Research on magical ideation and ESP has not been broad. Only in the latest years some interesting studies appeared in the literature. For instance, Parker, Petterson, and Grams (1998) report a significant positive correlation between scores in Eckblad and Chapman's Magical Ideation Scale, developed originally as a measure of psychosis proneness, and ESP in a series of ganzfeld experiments. This association still appeared after deleting items referred to paranormal experiences from the Magical Ideation Scale. Other studies also show association between magical ideation and ESP-related variables such as paranormal belief or creativity measures (Thalbourne and Delin, 1994; Thalbourne, Dunbar, and Delin, 1995).

1.1.4. Experiences and Practices

Prior Psi Testing Experience (Other Than Ganzfeld) and Ganzfeld Repeaters

Participants with prior psi testing other than ganzfeld have shown better ganzfeld performance rather consistently (Bem and Honorton, 1994; Honorton, 1992; Honorton and Schechter, 1987; Morris et al., 1993; Morris et al., 1995). This could be attributed to a calmed and less anxious state in the test situation or, also, to learning from previous experience.

There is a difference in the case of ganzfeld repeaters, participants with ganzfeld testing experience. Whether the individual is able to learn from a ganzfeld experience and how this can be manifested in terms of psi success in a later experiment has long been questioned in the parapsychological community. Psychologically, prior ganzfeld experience is also expected to decrease test anxiety, any feelings of confusion, task ambiguity, as well as increase self-confidence and affect other variables that could facilitate the appearance and magnitude of ESP. Regretfully, little systematic work has been done in order to test these hypotheses explicitly. The evidence available comes from post-hoc findings or under the shadow of other prioritary hypotheses.

In one of his ganzfeld studies Sargent (1982) tested 2 groups of 16 inexperienced and 16 experienced participants reporting significant above-chance scores for experienced subjects, and null results for inexperienced subjects. The difference between both groups was not significant though. In a meta-analysis of the PRL series Honorton et al. (1990) report a significantly higher performance for repeater participants in their ganzfeld series. Parker (2000) also reports higher ESP scores for repeaters in his ganzfeld series at Gothenburg. Some other studies have shown this association too (Sargent, 1980; Sargent, Barlett, and Moss, 1982). This apparent effect could be mediated through psychological variables, such as the ones mentioned above, or be due to learning.

Dissociation Experiences

Dissociation is defined in DSM-IV as an alteration in the normal integrative functions of identity, memory, or consciousness. It can appear in association with other mental pathologies and disorders. Dissociation, however, can also appear alone in the normal, non-clinical individual.

Some theoretical perspectives defend the association between dissociation and psi (e. g. Murphy, 1966; Roll and De-A-Montagno, 1985). Murphy, for instance, in a review of the literature comparing psi and creativity concludes that there are 3 factors

facilitating both creativity and ESP: 1) relaxation, 2) positive motivation and, 3) dissociation. In addition, early psi researchers observed in the study of mediums how these ones showed some degree of dissociation (Irwin, 1994; Richeport, 1992). In mainstream psychology, Ross (1989) points out that the reporting of ESP experiences might be associated with a dissociative trait (but not a dissociative disorder). Along the same line, Richards (1991) found a relationship between Bernstein and Putnam's Dissociative Experiences Scale and a variety of psychic experiences in a non-clinical adult population.

In experimental ESP research, Schmeidler (1982) found evidence of the association between dissociation and psi success. Other laboratory work also provides results in support of this hypothesis (e. g. Pekala, Kumar and Marcano, 1995).

Practice of Mental Disciplines

There is quite an old tradition that relates mental disciplines with parapsychological phenomena (see Bernardi, 1966, for a review). In psychical research, practice of mental disciplines such as meditation, yoga, biofeedback, etc., as reported by participants, has been a rather consistent predictor of ESP in several studies (e. g. Bem and Honorton, 1994; Bierman et al., 1993; Broughton et al., 1989; Honorton, 1985, 1992; Honorton et al., 1990; Morris et al., 1993; Morris et al., 1995). In these studies, mental discipline practitioners show higher scoring than their counterparts with less or none experience. Explanations based on the noise reduction model and the signal detection theory have been attempted. It has been explained that it could be the training provided by these techniques in calming internal sources of noise, as well as in disconnecting from external ones and become attentive to the internal world, that produces the effect. It has also been explained that it could be a mere interest in, and attitude towards, a broader body of similar disciplines that leads to both practice and psi-hitting.

Paranormal Experiences

The literature appear rather consistent showing higher ESP scores by participants who report having experienced paranormal occurrences compared to participants who report not having done so. For instance, in the PRL series of ganzfeld experiments carried out by Honorton et al., higher ESP scoring was observed for paranormal experiencers (Bem and Honorton, 1994). Also, Parker (2000) reports a significant better performance for subjects recruited from new age groups and who reported having experienced paranormal occurrences compared to psychology undergraduates whose performance was rather poor. Other study results also showed this trend (e. g. Bierman, Bosga, Gerding, and Wezelman, 1993; Broughton, Kanthamani, and Khilji, 1989; Honorton, 1985, 1992; Honorton et al., 1990; Honorton and Ferrari, 1989; Morris et al., 1993; Morris et al., 1995).

Reporting paranormal experiences would have, at least, 2 stages clearly defined. First, the individual would interpret an occurrence as paranormal, and then he/she would report overtly such experience as paranormal. Certain psychological variables, such as paranormal belief, extraversion, or self confidence (given the social pressure that can be observed in most cultures), would play a important role in this process and, therefore, bias the accuracy of the data collected. One account for the apparent association between the report of paranormal experiences and ESP scoring is that both could be the result of a genuine psi ability that made the individual experience psi phenomena in his life as well as produce it in the parapsychology laboratory (Lawrence, personal communication). Another account is that having experienced paranormal occurrences would increase paranormal belief, expectancies, and motivation in the subjects undertaking the test, that would contribute to the positive results obtained. It would be interesting, though, to discern participants who report paranormal experiences, in general, from those who report ESP experiences in future research.

1.1.5. Cognitive Differences

Cognitive Lability

Braud (1980, 1981) proposes a theoretical model of psi functioning in which, in a telepathy protocol experiment, the sender of the information would produce a PK influence on the receiver's brain that would yield a correspondence between their experiences. The magnitude of the effect would be proportional to the degree of free-variability or "lability" of the percipient's brain. Some studies provide, in fact, experimental support for this hypothesis (see e.g. Braud, 1980; Stanford, 1979). However, a major drawback consists of defining what we understand as lability in relation to brain functioning and how it can be assessed. Braud, Shafer, and Mulgrew (1983) define lability as "the degree of free variability of mental processes". These authors report 2 experiments aimed at testing the cognitive lability hypothesis. In experiment one, cognitive lability was assessed by presenting the individuals with an ambiguous stimulus and observing the range of structured responses that the individuals perceived. The assumption was that the individuals with a more labile nervous system would project a greater number of meanings on the unstructured stimulation. It could be argued that this test could be assessing creativity. However, regardless of the extent to what such a task assessed the cognitive lability construct, the subjects with more responses scored slightly higher in the psi test. It must be noticed that the psi task consisted of a telepathic agent trying to influence the individual's responses to the ambiguous stimulus towards a determined target meaning. This test, however, can be interpreted as both an ESP test and a PK test. Half the subjects were tested under ganzfeld and half under a control condition. In the 2nd experiment cognitive lability was assessed by a task in which participants were asked to observe a Necker's cube and, without trying to influence it, report spontaneous changes in it, immediately after a ganzfeld/control session. The number of the reported changes was taken as an indicator of cognitive lability. In this experiment the psi test consisted of an agent trying to influence the receiver's perceived rate of reversal of the figure at determined intervals. Though there is a positive association between psi scores and number of changes, presumably cognitive lability, reported by the participants, it did not reach statistical significance.

Though we must be cautious about generalizing the results of these studies, given the peculiarity of the psi tasks used and the ESP/PK overlap, the concept could

be tested as an ESP predictor. A major challenge would be to achieve psychometric validation of the construct "cognitive lability".

Mental Imagery

Mediation of psi into the individual's awareness through mental imagery can be inferred from spontaneous case reports. This triggers the idea that characteristics of mental imagery might be used to predict ESP success. Variables such as vividness, complexity, or controllability of imaging have been tested in relation to ESP in the literature. However, conclusions are still uncertain. Honorton et al. (1974) report significant psi-hitting for above average imagers on the Betts Questionnaire of Mental Imagery (QMI) and psi-missing for below-average imagers. However, Schmeidler et al. (1975) found a significant reversal of these results in a replication attempt. Another study by Pleshette (1975) reveals a significant negative association between ESP scores and Betts scores. Honorton (1975) reviewed a series of studies relating ESP to the vividness of mental imagery, as measured by Betts questionnaire. He found 3 forced-choice studies producing significant scoring differences between vivid and weak imagers, with higher performance by weak imagers in 2 of them. Three other free-response studies showed no significant association between ESP and mental imagery. The author concluded that a better measure is needed and suggests the combination of subjective, behavioural, and psychophysiological measures. In free-response studies no ESP-Betts relationship has been found (Palmer and Liberman, 1975; Roll and Solfvin, 1976).

In a review paper, Weiner (1982) argues that the individual's coding preference (preference for verbal or visual processes) may modulate the ESP success on the basis of the characteristics of the ESP task. From this perspective, ESP tasks that rely on mental imagery would be more suitable for participants who prefer visual processes and vice versa. Weiner reports a series of studies that would provide evidence in support of this hypothesis. Along the same line, Irwin (1979) found an association between visual/verbal coding preferences and characteristics of reported spontaneous ESP experiences in a survey study.

In relation to the controllability of visual imagery, Price (1973) found significantly more between-subjects variability in ESP scores on a forced-choice test for participants classified as "autonomous imagers" (with low control on their mental imagery), vs. "controllers" (with high control on their mental imagery), using the Gordon's Test of Visual Imagery Control.

Training in mental imagery capacities has generally failed to find association or to improve ESP (e. g. Friedman, Gantz, and Sinclair, 1973; George, 1982; Morris and Morrell, 1985). Schmeidler (1993) in her review of ESP experiments points out the possibility that the relationship between ESP and imagery is not a causal one but comes from the effect of a 3rd variable that would operate by triggering the entry into consciousness of both ESP and mental imagery. This imagery would not cause but accompany ESP, being therefore an indicator of it rather than a predictor. Accordingly, attempts to increase ESP through mental imagery training would not be successful.

In another study, Sudhakar, Vindhya, and Rao (1986) found a positive association between ESP scores and self-rated spontaneity and dream-likeness of mental imagery during ganzfeld stimulation. Along the same line, Sargent reports a significant positive correlation between ESP performance and a post-session questionnaire item related to spontaneity, dream-likeness, and bizarreness of mental activity during the ganzfeld stimulation. According to Sargent, these results are a replication of an early finding by Stanford and Neylon (1975) and of his own work (Sargent, 1980b, experiment 5). However, Palmer et al. (1979) did not find any significant correlation between ESP scores and these items, neither did other studies (Sargent, 1980b; experiments 1, 2, and 3). In 2 of his experimental series, Sargent (1980b, experiment 5; 1981) reports a significant correlation between ESP scores and an auditory imagery factor extracted with a factor analysis. The correlations were .51 and .47 in the respective studies. In a later study the author failed to replicate this association (Sargent, 1982).

Indeed more work is needed to test for the predictive validity of mental imagery measures, especially due to the large number of parameters that can be considered.

Transliminality

The concept of transliminality has its origins as "trans-liminal" in the late 19th and early 20th centuries with the work of W. James, Myers, Ushers, and Burt. However, the concept was further developed from factor-analytic work on paranormal belief by Thalbourne and Delin (1994) who gave the concept the name "transliminality". These authors define transliminality as "a largely involuntary susceptibility to, and awareness of, large volumes of inwardly generated psychological phenomena of an ideational and affective kind" (Thalbourne and Delin, 1994, p. 25). Transliminality measures are contributed by, and correlate highly with, items from the Australian Sheep-goat Scale (Thalbourne and Delin, 1993), a creative personality scale developed by Thalbourne and Delin (1994), the Mystical Experiences Scale (Thalbourne, 1991), the Absorption Scale (Tellegen and Atkingson, 1974), the Inventory of Childhood Memories and Imagins (Myers, 1983), a hyperaesthesia scale compiled by Thalbourne (1996a), the Magical Ideation Scale (Eckblad and Chapman, 1983), the Manic-depressiveness Scale (Thalbourne and Bassett, 1998), and an item on the frequency of dream interpretation created by Haraldsson (1981).

Thalbourne (1996) administered a transliminality item questionnaire, the Transliminality Scale, to 99 psychology students along with a forced-choice precognitive ESP test. Although none of the scores yielded significant correlations with ESP, the author argues that different tests of ESP could show more positive results. In a later study, Grainger (2001), using a different ESP paradigm, carried out a correlational study on 26 participants finding a positive association between transliminality and ESP scores.

In his ganzfeld series at Gothenburg, Parker (2000) distinguished between positive, or apparently healthy, experience items and negative, or apparently unhealthy, experience items of the Transliminality Scale on the basis of the origin of the items. Thus, the positive item sub-scale comprised those concerning creativity, psi belief, religious and mystical experiences, dream interest and absorption. Conversely,

the negative item sub-scale consisted of the items related to schizotypy, hallucination proneness, mania, magical ideation, and dissociation. However, neither the total transliminality scale or either of the sub-scales was useful in significantly discerning hitters from missers in his studies.

Overall, the transliminality scale was not as successful in predicting ESP scores as expected from the theoretical concept. In principle a high susceptibility to, and awareness of, mental processes in the individual, as referred to in the definition of transliminality (Thalbourne and Delin, 1994, p25), could help in the detection of weak ESP signals as conceptualised in the Noise Reduction Model. As previously explained, the Transliminality Scale was derived from factor analytic work on a series of other scales. This raises the question whether a theoretically-driven instrument, made of items derived from the concept of transliminality, would show more successful in the prediction of ESP.

Perceptual Defensiveness

The author who has most extensively studied the relationship between ESP and perceptual defensiveness has been E. Haraldsson. In a meta-analysis of 10 forced-choice studies, contributed by 462 participants and 65 experimenters, Haraldsson (1995) found a highly significant overall effect predicting higher ESP scores for non-defensive (vigilant) participants. Defensiveness was measured through the DMT (Kragh's Defence Mechanisms Test, Kragh and Smith, 1970) in all the studies in the database. In fact, most of the studies in the literature used this test as measure of perceptual defensiveness. The DMT is a projective test originally developed to predict performance in stressful situations. It consists of pictures of threatening motifs. As the pictures are presented tachichoscopically in increasing intervals a perception takes form gradually in the observer's mind. Through examination of the formation of the perception and the outcome, individual differences and psychological factors that affect the formation of the perception at a subconscious level can be estimated. It must be noticed too that the use of the DMT is time-consuming and requires prior intensive training.

Further evidence comes from other experimenters. In a review paper, Schmeidler (1988) reports a rather consistent tendency of studies to show high scores for low defensive subjects. Similarly, in a meta-analysis of 13 forced-choice studies, Watt (1993) shows a highly significant relationship between ESP success and low defensiveness, which averages a correlation of .23. Replication failures also exist. For instance, Parker et al. (1998) reports no association between defensiveness, as measured by the DMT, and ESP scores in his ganzfeld series at Gothenburg.

A different measure was used by Watt (1995). She used neutral and unpleasant slides presented to the individuals at increasing subliminal levels. The measure of perceptual defensiveness was the difference between the exposure level needed for the individual to become aware of the existence of the stimulus for neutral and unpleasant pictures. In a second session a percipient was presented only blank slides and was asked 1) if an agent was looking at them and 2) if such slide was pleasant or unpleasant, in, therefore, 2 ESP tasks. The correlation indices between defensiveness and the 2 ESP tasks were, .31 and .15 respectively, not significant but in the expected direction, which, at least partly, supports the relationship.

Absorption

Absorption is understood as a mental state of calmed and internally focussed concentration. The most frequently used scale to assess absorption in ESP research is the Tellegen Absorption Scale (TAS) (Tellegen and Atkinson, 1974). TAS scores have been found to relate to variables which have occasionally shown association with participants' ESP performance in ESP studies such as hypnotizability, dream recall, creativity, and the reporting of spontaneous paranormal experiences (see Irwin, 1985).

Stanford and Angelini (1984) administered the TAS and tested their participants in a ganzfeld experiment using either pink noise or silence. They report a significant positive correlation between absorption scores and ESP only in the noise condition but not in the silence one. In another study Stanford, Kass, Frank, and Skoll (1989) found

a significant correlation only in a 3-way interaction with gender and noise. In a 3rd study Stanford and Frank (1991) report overall null scores. Parker (2000), also using the TAS and ganzfeld, and Gordon, Steggles, and Fehr (1982), using a different measure and a forced-choice ESP task, also found null results.

Irwin (1994) explains that there are 3 important conditions needed for absorption to take place, these are: 1) a situation conducive to absorption (such as sensory deprivation), 2) an absorption capacity in the individual, and 3) a need, or motivation, in the individual for absorption. In tune with this hypothesis, Irwin (1985, 1989) observed, in 2 previous studies, a positive correlation between a questionnaire on the need for absorption and the reporting of ESP subjective experiences, and other paranormal experiences such as OBEs, reincarnation memories, and appearances, in undergraduates. Irwin's point is worth taking into account in further ESP research.

Feeling and Perception (FP) Type of the Myers-Briggs Type Indicator (MBTI)

The definition of the FP individual taped in the MBTI would be of someone who is flexible and adaptable, with interpersonal sensitivity, who seeks new experiences, and that analyses subjective activity. Here, we find, from the start, that the prototype of the FP individual would fit the demands suggested in some theories (see e.g. Braud – in Wolman, 1977-; or Honorton, 1978) and other latent hypotheses of ESP. In fact, the experimental research carried out in order to explore the potential asset of FP individuals, mostly, complies with these expectations.

In the PRL series (Bem and Honorton, 1994), participants classified in the categories of Feeling and Perception in the MBTI achieved higher scores in the ganzfeld ESP test. Independent studies, conducted later, show similar results (e. g. Broughton, Kanthamani, and Khilji, 1989; Palmer and Kanthamani, 1992). It must be noticed that contrasting results are also reported. For instance, Schlitz and Honorton (1992) found a negative correlation of .38 between ESP and feeling scores on the MBTI with a sample of creative novices. Also Kanthamani and Palmer (1993), in another ganzfeld

study, failed to report any significant association. Other replication failures are reported by Alexander (2000) and Parker (Parker, 2000).

Hemispheric Dominance

Psychoneurological research indicates that the left side of the brain specialises for language and for analytic thinking whereas the right side does for spatial and holistic thinking. It has been hypothesised that psi is right hemispheric controlled and, therefore, right hemispheric dominance would be expected to facilitate psi (Braud, 1975b). Broughton (1976) suggests that ESP would work best when the left hemisphere is occupied with a competing task. Accordingly, in 3 experimental series participants undertook an ESP task consisting of lifting one of 5 wooden objects, each representing one of the ESP symbols, using either their right or left hand. At the same time subjects were engaged in a mental task that supposedly occupied the left hemisphere. Results were significant in 2 of 3 series, suggesting that ESP occurred when the individual responded with the left hand and the left hemisphere was distracted with a mental task. In another study Broughton (1977a) used a reaction time task as the ESP task. He aimed to see if having an agent listening to a tone would influence the participants' reaction time when they made their responses with the left but not with the right hand. Broughton found a significant effect only when participants were engaged in a reading task, presumably left hemisphere distracting. Other experimental results support this hypothesis. For instance, in a free-response test Braud and Braud (1975) asked a group of subjects to solve logic and mathematical problems (a left-hemisphere activity) while another group listened to sounds suggesting mental imagery (a right-hemisphere activity). The first group scored significantly below chance while the second group did at chance. The difference between both group scores was significant. In a ganzfeld experiment with 50 pre-selected subjects, Alexander (2000) found non-significantly fewer direct hits with participants classified as right hemisphere dominant, as assessed by the Cognitive Laterality Battery. Though the difference between right and left hemisphere dominant groups did not reach statistical significance, these results suggest that, at least for gifted participants, brain dominance might not be an important factor in ganzfeld ESP

performance. Nonetheless, it must be noticed that the fact that Alexander pre-selected the participant for this study narrows the generalizability of those results. Other experimental results provide further support for this hypothesis (e.g. Maher, 1986; Maher, Perasakis and Schmeidler, 1979; Palmer, 1978). There is also evidence that links right hemisphericity to paranormal belief, an ESP predictor (see, for instance, Irwin, 1990; Roig and Neaman, 1992).

Conversely, Maher and Schmeidler (1977) found results that would suggest the opposite hypothesis, that the ESP is a left hemisphere function, though their findings were only marginally significant. These authors conclude that either hemisphere is capable of producing ESP on a task related to its skills, and that occupying the other hemisphere with an irrelevant task can enhance ESP.

1.1.6. Other Individual Differences

Gender

One generalised belief in the western culture is that females are more intuitive. From this believe, if intuition is any form of ESP, females would be expected to overscore males in an ESP test. Some experimenters have tested sex differences in ESP studies. For instance, van Busschbach (1959) reports significant differences in favour of girls in a forced-choice ESP task of first and second grade Dutch school students. In a sample of participants from a different culture, van de Castle (1970) tested a sample of 285 young Cuna Indian subjects, inhabitants of islands off the coast of Panama. The results also revealed significantly higher scores for girls. However, the authors point out that such differences could have been an artefact coming from a high proportion of boys scoring below chance. In dream ESP, Krippner (1970) found that only the pooled results of males were significant and the results were not affected by the gender of the agent, in a review of the Maimonides series. Nonetheless, many other experiments with forced-choice clairvoyance and precognition designs failed to find significant sex differences (see Palmer, 1978, for a review).

It is noticeable in the literature, however, that, although efforts have been focused on sex, understood as genetic gender, little attention has been paid at sexual roles, as a social factor, in relation to ESP.

Fear of Psi

Though I could not find any experimental studies that tested systematically the effect of fear of psi on ESP scoring, it has been suggested that it could also affect the individuals' performance. Theoretically, fear of psi would place the individual in a defensive and evasive state that could inhibit the appearance of the phenomena. It could also be detrimental through mediation of increased levels of anxiety and discomfort during the test. Tart (1984) argues that unacknowledged fear of psi can create unconscious motivations and behaviours and inhibit or distort the operation of psi in the laboratory. He also posits that unacknowledged fear of psi is widespread among parapsychologists and other people. Survey studies, in fact, have found respondents expressing anxiety to the existence of psi and ESP (see Irwin, 1985c; Tart, 2000; Tart and LaBore, 1986). Creating an informal, playful, and joking atmosphere would probably be one accurate strategy for the experimenter to help the participants overcome fear of psi. In his paper, Tart proposes cognitive/affective acknowledgement, acceptance, adaptive coping skills, and personal growing as the most desirable strategies to cope with fear of psi.

Dream Recall

In a forced-choice study with adult education students, Honorton (1972a) found that participants who reported recalling their dreams at least once a week scored significantly above chance expectation and higher than the rest of the participants. Other authors, like Johnson (1968), also report a significant positive correlation between dream recall and scores on forced-choice ESP tests. However, Randall (1972) did not find significant effects in an independent study. Haraldson (1975, 1976) also

failed twice to find any significant association using high school and college students. In free-response research, Sondow (1979) also failed to find any correlation between ESP and dream recall. She found, however, a curvilinear relationship showing greater success for subjects reporting the highest and lowest dream recall frequency. However, Sargent (1981) reports the successful use of a 5-trait questionnaire, comprising dream recall among other variables, in the prediction of ESP scores in a series of ganzfeld ESP experiments. The overall inconsistency of results and small number of studies carried out impede us from drawing any definitive conclusions on the relationship between this variable and ESP.

Other reports of association between subjects scoring in a large variety of ESP tests and diverse aspects of their individuality appear in the literature. For instance, in an ESP card forced-choice study aimed at the exploration of different personality factor, Nicol and Humphrey (1953) report a negative significant correlation of -.44 between ESP run-scores and worrying and suspiciousness, as measured by Cattell 16PF. A later study designed for replication purposes (Nicol and Humphrey, 1955) failed to find a significant effect of these variables on the ESP task, though the association was in the right direction. In the same study, these authors also report a significant correlation of –.27 between ESP run-scores and low irritability, as assessed by the Cason's Annoyance Test. A later study failed to replicate this effect, though the association was in the right direction too. In a ganzfeld experiment with 50 undergraduates carried out by Sudhakar and Rao (1986), using the 16PF, ESP scores correlated significantly with aloof character in the experimenters.

1.1.7. Summary

There is disagreement among psychologists about the number of core traits that define human personality and individuality. Many of the trait terms used in personality and individual differences research do not reflect entirely different traits. In this section I reviewed a series of traits and individual differences found in the parapsychological literature in relation to experimental ESP success.

Personality traits have been paid most attention in previous research. The experimental evidence suggests that participants who share characteristics such as extroversion, sensation seeking, agreeableness, or openness tend to perform higher in ESP experiments. Conversely, neurotic, aggressive, or hostile individuals tend to perform worse. The literature on other traits, e. g. impulsivity, and ESP is more confusing.

Mental capacities such as intelligence or creativity are associated to the additional difficulty that the large diversity of conceptual approaches and measures used implies. High hit rates have been observed with participants selected from *creative* populations such as musicians, artists, or drama students. Other mental capacities, such as memory, do not show clearly simple effects in ESP studies. The large diversity of ESP and memory tasks used by different researchers makes the relationship difficult to interpret.

Other cognitive differences also appear in the literature. Characteristics such as cognitive lability or transliminality have been hypothesised, under theoretical grounds, to contribute to the experimental ESP success. The experimental evidence, however, is scanty. Perceptual defensiveness is one of the variables that have appeared in association to ESP most consistently. The trend is for low defensive participants to score higher. Most of these studies, however, used forced-choice ESP tests. Mental imagery variables, such as vividness, controllability, spontaneity, richness, etc., have also been studied. However, more work is, indeed, needed to test for the predictive validity of mental imagery measures, especially due to the large number of parameters that can be considered. The experimental research carried out in order to test the potential asset of FP individual, as measured by the MBTI, in ESP tests mostly comply to the expectations. It has also been hypothesised that psi is right hemispheric controlled and, therefore, right hemispheric dominance would be expected to facilitate psi. However, the experimental work suggests that either hemisphere is capable of producing ESP on a task related to its skills, and that occupying the other hemisphere with an irrelevant task can enhance ESP.

Participant's values and beliefs may also play a role in the experiental outcome. Paranormal belief is one of the clearest examples. Meta-analytic work in forced-choice studies shows that believers in the paranormal tend to score above mean chance expectation while non-believers do below. Religious beliefs have also been associated to high scoring. Other variables such as locus of control, self-confidence, and self-concept do not show as clear effect on the participants ESP scoring as could be deduced from the theory. Magical ideation, defined as the tendency to develop beliefs in causations that are invalid by conventional standards, has also shown a positive association with ESP scoring in previous research, though the number of studies reporting on this relationship is not large.

Individuals who report paranormal or dissociation experiences have scored higher in previous ESP experiments, the same as practitioners of yoga, transcendental meditation, biofeedback, or other mental disciplines. Similarly, participants with prior psi-testing experience and ganzfeld repeaters also produce a higher scoring.

Other individual differences have been tested in relation to ESP performance. Many studies failed to find significant scoring differences between males and females. It must be noticed, however, that most studies focussed on genetic gender, paying little attention to social roles. Though I could not find any experimental studies that tested systematically the effect of fear, it has been suggested that it could also affect the individuals' performance, under theoretical grounds. Dream recall has also been a variable of interest to researchers in the prediction of participants' success. The overall inconsistency of results and small number of studies carried out impede us from drawing any definitive conclusions on the relationship between this variable and ESP.

There are other reports of association between subjects scoring in a large variety of ESP tests and diverse aspects of their individuality appear in the literature. However, the lack of studies as well as the diversity of ESP tasks and measurements used by different researchers warns us from drawing definitive conclusions.

In the next section we explore a series of variables that appear more volatile and changing across situations in the psychological literature than the previous ones. These are related to mood and other mental state factors.

1.2. MOOD AND STATE FACTORS

Unfortunately, mood and transient state factors have not been explored in the same degree as more stable characteristics in the populations of ESP studies. Even so, a considerable body of research provides interesting data. Early exploratory ESP forced-choice studies by Nielsen (1956 a and b) and Fisk (1957) showed that mood could influence scoring. Also, Fisk and West (1956) through a forced-choice ESP mail experiment, in which subjects, at home, were asked to rate their moods in a continuous scale from "elation" to "depression" prior to their guess, found higher significant positive scoring when moods were rated as pleasurable. Later, Freeman (1964) observed how the individuals' performance in an ESP test could also be influenced by brief emotional states such as hypothetically conditioned emotional responses to words on a trial-by-trial basis.

Although several other forced-choice experiments have failed to replicate significant effects of mood variables (e.g. Palmer et al., 1976, Pleshette, 1975), the positive results found encourages further enquiry using a free-response paradigm. However, the overall picture is that free-response studies have generally failed to show simple associations between mood variables and ESP performance (Braud and Braud, 1974; Braud et al., 1975; Palmer and Vassar, 1974; Stanford and Mayer, 1974). Nonetheless, we outline, in the following paragraphs, a series of mood and state variables that are suggested in the literature as predictors of ESP scores.

Anxiety

In the psychological literature, anxiety has been associated to poor performance in multiple tasks. It could be inferred that the detrimental effects of this state could generalise to the ESP tests too. In fact, in ESP research, anxiety has been found associated to low scoring in several occasions. Overall, results have been either significant or in the right direction for both free-response and forced-choice experiments (see Palmer, 1978, for a review; also Braud, 1977; Carpenter, 1965; Johnson and Houtkooper, 1988; Kanthamani and Rao, 1973; Palmer, 1982; Weiner, 1986). Nonetheless, there have been some contrasting results too. For instance, in a series of forced-choice experiments with high school students, Freeman and Nielsen (1964) found that high anxiety people, as measured by the Taylor Manifest Anxiety Scale, achieved the highest scores. The author found the same results in a sample of university students. Palmer (1994) also reports a positive correlation between anxiety and a perceptual ESP test.

However, it is important to notice that there can be individual differences in the extent to which anxiety levels deteriorate performance. In psychological research, it has been noticed how small increases in tension or anxiety is quite detrimental for some individuals whereas others find this mild level of activation helpful. There are also results in ESP research that supports this hypothesis (e. g. Braud, 1977). In tune to the well-known Yerkes-Dowson law, results like these suggest an optimum level of anxiety/tension, which would be related to a correspondent level of arousal, particular to every individual. In fact, Carpenter (1971) and Schmeidler (1960) have reported interactions between neuroticism, understood as a predisposition trait to suffer from anxiety, and several other variables.

Graphic Expansiveness

Although graphic expansiveness of freehand drawings has never been formally associated to a determined mood state, it has been suggested that expansive drawings could indicate a more positive and less inhibited mood than compressive drawings (Palmer, 1978). The concept has also been indicated to posses construct validity as a

measure of emotional adjustment (Elkisch, 1945; Humphrey, 1946a). Results with drawing and card guessing forced-choice ESP tests suggest a tendency for participants who made expansive drawings to achieve higher ESP scores in clairvoyance tests and a reversal of this trend in general ESP studies with the use of a sender (Bevan, 1947a, b; Caspers, 1951; Humphrey, 1946a, b; Kanthamani and Rao, 1973; Stuart et al., 1947; see also Palmer, 1978, for a review). Interactions of this construct with personality variables like extraversion have also been reported (Kanthamani and Rao, 1973; Shrager, 1978). Actually, there is no clear explanation for the effect. Humphrey (1946b) posits that compressiveness in a telepathic situation may reflect some kind of social responsiveness to the agent. Other studies show null results too (Nash and Richards, 1947; West, 1950).

Expectancies of Success

Related, to certain degree, to paranormal belief are expectancies of success, that is believing that the ESP task is going to be accomplished successfully at the concrete moment of the experiment and as it is requested by the experimenter and experimental protocol. In fact, the sheep-goat effect, already mentioned, seems to appeal more to expectancies than to paranormal belief. Expectancies of success might concern the participant, the experimenter or experimental team, and even external observers. The participant's expectancies generally would result from the process of evaluating personal, or external, resources against difficulty of the task, and can vary largely across time and situations. Moreover, expressing overtly their positive or negative expectancies of success in an ESP task might create some kind of ego-involvement or commitment and somehow make the participant seek for an outcome consistent to what was expressed.

Expectancies of success have mostly been assessed through single, direct questions to the participants and reported results are diverse. Some forced-choice studies (e.g. Nash, 1958) report a negative significant association between predictions of success and ESP scores. Other items indicative of pre-session expectancies of success failed to show any accuracy for predicting scores in several other forced-choice

studies (Eilbert and Schmeidler, 1950; Osis and Dean, 1964; Ryzl, 1968a; Schmeidler, 1964e, 1971).

In his series of ganzfeld experiments, Sargent reports quite a consistent association between ESP and pre- and post-session expectancies of success. In experiment-one (Sargent, 1980b) of his series, Sargent reported that pre- and post-session expectancies of success correlated positively and significantly with ESP performance. These results failed to replicate at a significant level in his 3rd experiment, though the correlation between ESP and pre-session expectation was high (.29) and in the right direction. In experiment-five the association reached significance for post-session expectancies of success (.38) and was in the right direction for pre-session expectancies (.33). In a different study, Sargent (1982) reports a .57 correlation between post-session expectancies of success and ESP z-scores for experienced participants. For pre-session expectancies the correlation was in the right direction but did not reach significance. Other many free-response studies, however, report no expectancies effect (Braud and Braud, 1974; Braud et al., 1975; Sargent, 1982; Sargent and Matthews, 1982; Stanford and Mayer, 1974; Palmer et al., 1979)., or even negative associations (Sudhakar and Rao, 1986).

In a different study, conducted by Taddonio (1976), expectancies of success were manipulated in 6 college students acting as experimenters. Half of the experimenters were explained that the test was highly psi-conducive and that high scoring could be expected in their subjects. The other half of the experimenters was told that the test only produced psi-missing. Participants within each group scored significantly above and below chance expectation respectively. Casler (1962) also manipulated expectancies of success through pre-session hypnotic suggestions. However, although the study was successful in achieving a significant hit rate, the inclusion of concomitant suggestions and the lack of a control group were expectancies would have not been manipulated restrains us from drawing any safe conclusions.

Along the line of the hypothesis of a positive association between ESP and expectancies of success, Parker (2000) noticed that increases in expectancies of success from pre- to immediately post-session for hitters were slightly higher than for

missers in one of his studies at Gothenburg. The author argues that this could be indicative of certain awareness of the occurrence of psi in the session.

Relaxation

Relaxation is one of the conditions most commonly believed to be, not only desirable but also, essential for ESP to take place. Spontaneous case reports, where many experiencers converge in reporting a calmed, physically and mentally, relaxed state at the time of the paranormal occurrences, are in tune with this hypothesis. Theoretically, according to the Noise Reduction Model (Honorton, 1978), ESP, viewed as a weak signal masked by external and internal stimuli (noise), would be more detectable if sources of noise were attenuated. Mental and physical relaxation would be a means of enhancing the signal-to-noise ratio by reducing somatic and cognitive noise.

However, the experimental evidence is not as clear as can be expected from the theory. Several studies in support of an ESP-relaxation positive association are reported in the literature. For instance, Sargent (1982) reports positive and significant correlation indices between ESP and both pre- and post-session relaxation. This association did not appear in his previous studies (Sargent, experiments 1, 2, 3, and 5). Also Braud and Braud (1973) report a study in which participants were taken through a procedure combining muscular relaxation, suggestions of mental and physical relaxation, and suggestions to promote high expectancies of success under relaxation states. The authors report significant above chance scores in their participants after application of this procedure. Stanford and Mayer (1974) report a replication of these results too. However, many studies have failed to find a significant association between ESP and level of relaxation (e. g. George, 1982; Morris and Morrell, 1985; Musso and Granero, 1982). Some researchers have combined relaxation with meditation techniques showing diverse results (see Rao, 2001).

It is revealing, however, to notice that relaxation has appeared to interact with personal factors in some studies too. For instance, Kanthamani (1985), in a forced

choice experiment, separated high school students recruited from either a psychology club or a psychology class into 2 groups. One was given instructions for a pleasantly passive attitude while making ESP calls. The second group was given instructions for a more active attitude, trying hard, and being alert. The relaxing instructions group overscored the alert one in 2 series. Conversely, when subjects were recruited from a science club, in a different series, ESP scores were higher with non-relaxing instructions. Here, we find a similar picture to that one in the case of anxiety. Certain individual differences, and maybe characteristics of the task too, could determine a particular level of both physical and mental relaxation at which each individual would make a profit.

Motivation

In psychology, motivation is generally viewed as a facilitator of good performance. However, motivation has also been said to be detrimental at too high levels, especially when it produces success anxiety, a kind of anxiety that emerges as a results of fear of failure.

Motivation in the participants of an ESP experiment could be hypothesised as a mediator of the effects of several predictors of ESP performance such as expectancies, paranormal belief, or social interaction. Experimental results appear in the literature in support of the hypothesised positive effects of motivation in ESP scoring (e. g. Braud & Braud, 1973). However, little systematic work has been done regarding this presumable relationship. Extrinsic motivation such as monetary reward has produced null or even detrimental results (Casler, 1976). As in the case of anxiety, a Yerkes-Dowson like law could be hypothesised for the motivation-ESP association too.

Phase of Menstrual Cycle

Mainstream psychology has considered the effect of biological rhythms on behaviours as well as cognitive activity, mood states, and other psychological

parameters. The menstrual cycle in females, one of the most powerful rhythms, has proved to affect a large variety of psychological and physiological processes. From this, it would not seem that surprising to find similar effects too on an ESP task.

Schmitt and Stanford (1972), in a ganzfeld study with 20 females, observed a nearly significant effect of menstrual cycle on ESP. Fifteen females were in the pre-ovulatory phase and achieved 11 hits. Five were in the post-ovulatory phase producing only 1 hit. The effect of menstrual cycle on ESP suggested in this study could be more or less direct as well as mediated through other psychological and state variables. As Schmitt and Stanford argue, this variable warrants further research and could show great usefulness in participant selection for future studies. It must also be noticed, however, that due to the small number of participants that formed the post-ovulatory group, only 5 women, we must be cautious when drawing conclusions. Furthermore, no replication of this effect has been reported.

Further Mood Studies

In a series of forced-choice experiments with high school students, Freeman and Nielsen (1964) found a differential effect on the basis of likeness/dislikeness of words associated to the ESP task in each trial. Also dislikers (participants that disliked more words from the list) achieved higher scores than likers. Although the differential effects observed in the previous study did not replicate in a sample of university students. The same authors provide further support of these results in a later study (Nielsen and Freeman, 1965). However, it must be noticed that the significance is given almost entirely by data only in one of the tasks used.

Furthermore, Nielsen (1956b, 1970) conducted a series of experiments using a scale measure of physical, mental, and emotional vitality. This author observed higher scores for subjects who rated their moods consistently across these 3 domains. Nielsen interpreted these results as an association between extremeness of mood and ESP. Nielsen also observed that this effect interacted with a personality factor, being only evident for introvert participants, as measured by the Bernreuter's Personality

Inventory. Such interaction effect was confirmed in 2 later studies using a different measure of introversion, the Eysenck's Personality Inventory (Nielsen, 1972a, 1972b).

Another 2 studies by Rogers and Carpenter, also found mood effects in relation to variability of forced-choice ESP run scores variance. Rogers (1967b) reports significantly higher run variance when participants were in a "good mood" than when they were in a "bad mood". Carpenter (1968, 1969) used items from the Nowlis' Mood Adjective Checklist and observed an interaction between pleasantness and extremity of mood in relation to ESP run score variance consistent across 3 experiments. Variances were consistently higher for moderately pleasant than for moderately unpleasant moods. The effect was independently significant in 2 of 3 experiments. When moods were rated as extreme, then, unpleasant moods were associated with the higher variance. In another 5 subsequent studies Carpenter (1973) used a scale composed only of those items that successfully predicted ESP scores in his previous experiments. The previous results were replicated in 2 of these 5 series of experiments and showed the predicted trend in other 2. Further interactions between mood effects and attitude and personality variables were also observed.

Schmeidler (1971) in a series of 3 forced-choice experiments found a complex association between ESP run-score variance and a mood index composed of concentration, surgency, and social affection from the Nowlis' Adjective Check List. This effect interacted with participants' pre-session expectancies, correlating negatively for subjects who expected high scores and positively for the rest. These results failed to replicate in 3 later experiments by the same author (Schmeidler and Craig, 1972). In this study Schmeidler reports another complex association between ESP score variance and an index made of egotism minus the sum of aggression and anxiety.

There are other forced-choice experiments that concerned with the possible influence of aspects of mood on ESP. However, findings have been, in those studies, inconsistent (Friedman et al., 1976; McGuire et al., 1974; Osis and Bokert, 1971; Osis and Turner, 1968). Carpenter (1983) computed a mood item scale, the V scale, through step forward multiple regression from previous studies data for the prediction of run-score variance in a forced-choice precognition test. He reports 9 cross-validating

studies with 130 subjects. The V scale showed successful in the prediction of forced-choice precognition ESP scores for relatively low authoritarian individuals. The predictive value of the scale also interacted with the type of target, being effective only with neutral targets in contrast to personally salient targets.

Summary

In general, it could be argued that mood and transient state factors have not been explored in the same degree as more stable characteristics in the populations of ESP studies. Nonetheless, a series of mood and state variables are suggested by the literature as predictors of ESP scores. *Anxiety* has been associated to poor performance, though there have been some contrasting results too. Anxiety could be detrimental for some individuals whereas others find this mild level of activation helpful. Participants who make *expansive drawings* tend to achieve higher ESP scores in clairvoyance tests. A reversal of this trend has been found in general ESP studies with the use of a sender. *Expectancies of success* have mostly been assessed through single, direct questions to the participants and reported results are diverse. Studies in which expectancies of success were manipulated show more consistent results. *Relaxation* is one of the conditions most commonly desired in ESP experiments. However, the experimental evidence is not as clear as can be expected from the theory. Many studies have failed to find a significant association between ESP and level of relaxation. Relaxation has appeared to interact with personal factors and characteristics of the task. It was posited that there could be a particular level of both physical and mental relaxation at which each individual would make a profit. *Motivation* in the participants of an ESP experiment could be hypothesised as mediator of the effects of several predictors of ESP performance such as expectancies, paranormal belief, or social interaction. Experimental results appear in the literature in support of the hypothesised positive effects of motivation in ESP scoring. However, little systematic work has been done regarding this relationship. The effect of other variables, such as *menstrual cycle*, requires further replication and could show great usefulness in participant selection for future studies. There are other experiments that

concerned with the possible influence of aspects of mood on ESP. Nonetheless, findings have been, in those studies, inconsistent and more research is needed.

1.3. EXPERIMENTAL DESIGN, PROTOCOL, AND TESTING ATMOSPHERE

Commonly, experimenters in ESP follow a previously standardised protocol (e. g. the ganzfeld, a series of guessing trials using the Zener cards, etc.). However, particular features of the experimental design, procedures, laboratory characteristics and physical setting, as well as experimenter-participant interaction frequently introduce considerable variation among ESP experiments. There is work in the literature that suggests that these differences might be playing a role in the study outcome. In the following paragraphs we deal with some factors in the experimental design, protocol, and atmosphere that draw differences among studies and their apparent impact on the study outcome.

The Experimenter

Although only as a subjective impression in parapsychological research, it is observed that consistency of results seems, to the naked eye, more notable within experimenters than among them. In mainstream psychology, differences of results between experimenters have also been observed and explained through psychological mechanisms. Some experimenters motivate, encourage and make their participants feel comfortable at the test through their behaviours, politeness, tone of voice, etc. However, other experimenters, through similar mechanisms, might transmit messages of disinterest, discomfort, and discourage their participants or make them feel anxious. This factors might contribute to the outcome of the experiment. This issue has been referred to as the *experimenter effect* (Rosenthal, 1980).

In the history of parapsychology, as well as at the current moment, there have been researchers that were more successful in finding (or producing) significant effects than others in their psi-studies. An hypothesis to account for this fact, parallel to the above explanation, is that these experimenters could facilitate, somehow, the appearance of the paranormal phenomenon, through their own psi-abilities. This has been referred to as the *psi-experimenter effect*. In her paper, Schmeidler (1997) resumes the above and explains how experimental results, in general (not only in parapsychology), can be confused by experimenter and psi-experimenter effects. She posits that these 2 explanations are not mutually exclusive and can account for the difference in experimental success. The experimenters might influence their participants' scoring behaviour through psychological factors such as fomenting comfort, motivation, and a co-operative attitude through a relaxed and warm experimental atmosphere. Schmeidler calls this kind of experimenter psi-permissive. Other experimenters by their behaviour, tone of voice, character, etc. might produce opposite effects in the subjects. The second explanation is that the experimenter can also use his/her psi abilities to make participants produce high scores. These are psi-conducive experimenters, in contrast to psi-inhibitory experimenters who would equally use their capacities to make their participant fail in their ESP tests.

Evidence for this effect has been observed in terms of significantly different hit rates produced by different experimenters involved in the same study and under the same experimental protocol and design (e.g. Morris, Cunningham, McAlpine, and Taylor, 1993; Morris, Dalton, Delanoy, and Watt, 1995; Parker, Fredericksen, and Johansson, 1997; Radin, McAlpine, and Cunningham, 1994).

Although the fact that ESP results vary across experimenters seems noticeable in the literature, it is not so clear what characteristics or behaviours in them are responsible of this variation. Being polite, socially open, smiling, looking at the eyes, pay attention to participants, offering them refreshments, etc. have been both unanimously recommended and accepted. These behaviours could be expected to be associated to a warm, pleasant, and encouraging experimental climate, and also to a response of interest, co-operative attitude, comfort, and motivation in the individuals. In fact, some studies are reported in which warmer and friendlier intentionally

manipulated experimental conditions were associated with higher scoring compared to cooler and more unpleasant atmospheres (see e. g. Crandall, 1985; Honorton, Ramsey, and Cabibbo, 1975). As an example, we can cite a study in which Taddonio (1976) manipulated expectancies of success in 6 college students acting as experimenters. This was expected to promote differences in the way the experimenters treated the participants. Half of the experimenters were explained that the test was highly psi-conducive and that high scoring could be expected in their subjects. The other half of the experimenters were told that the test only produced psi-missing. Participants within each group scored significantly above and below chance expectation respectively.

The topic of the experimenter and psi-experimenter effects arouses more controversy that it would seem at first sight. If the outcome of a study, not only in parapsychology, is partly on the basis of the experimenters' personality, behaviour, beliefs, expectancies, motivation, wishes, etc., caution would be needed when interpreting and generalising results.

Sender-Receiver Pairings

An alternative mode of approaching the study of gender effects in ESP is looking for differences in scoring on the basis of sender-receiver pairings. McBain et al. (1970) found higher scores for same-sex pairings than for mixed-sex pairing in a forced-choice ESP task. Using a series of miscellaneous tasks (e. g. perception of auto-kinetic effect or awareness of subliminal stimuli) Kreitler and Kreitler (1972, 1973) report no sex pairing effects in 4 GESP studies. In contrast, in a ganzfeld experiment, Habel (1976) found significant psi-missing across male pairs and non-significant psi-hitting among female pairs. Mixed pairs produced null results.

Dalton (1994) reports a series of informal ganzfeld experiments, run at the Institute for Parapsychology, in combination with other 2 studies (Schlitz, 1992, and Morris et al., 1993), which were also concerned with the sender/receiver sex pairing. The author reports an effect size of .61 for the male-female paring condition, .52 for the

female-male condition, .35 for the female-female condition, and .30 for the male-male one, for all the 3 studies combined with the mixed sex-pairings achieving the most successful outcomes and the same sex pairs obtaining the lowest scores. However, it must be noticed that if we analyse the studies separately, this effect appears only in Dalton's study and, furthermore, one of the other 2 studies, the Cunningham's study, shows a reversal of this effect. These results (partly) contradict Habel's too.

Although it is commonly believed in the parapsychological research community that mixed gender pairs show better performance, the experimental evidence for a gender effect on ESP is unclear and sometimes results appear to contradict these expectancies. This could have been, in part, due to the diversity of ESP task employed and different experimental conditions in the studies.

There is, however, more convincing evidence for higher ganzfeld ESP performance when sender and receiver are close friends, or relatives, than when participants are paired with members of the staff (e.g. Bierman et al., 1993; Broughton et al., 1989). Broughton and Alexander (1995) in a post-hoc analysis of the PRL data and the their own work found that parent-child pairs achieved higher hit rates than other, non-biologically related, subjects. This finding was also replicated by Dalton (1997). The study of spontaneous cases, frequently, reveals a high incidence of reports protagonised by biologically related individuals (e. g. parents and children).

Decline and Incline Effects

Researchers in ESP have observed, in several occasions, in their studies, what is called decline effects, a decrease in the success rate throughout a series of experiments. This has been observed especially in forced-choice tests (see Carpenter, 1967, 1968; Kelly and Kanthamani, 1972; Sargent, 1978; Schmeidler, 1944, 1968; Rogers and Carpenter, 1966). Meta-analytic studies confirm this finding (Haraldsson and Houtkooper, 1995; Nash, 1989). From a psychological point of view, decline effects are expected to arise from increases in boredom, and tiredness in participants and/or experimenters as well as from decreases in enthusiasm, interest, and motivation.

Incline effects have also been registered in forced-choice studies. These later ones have been mostly attributed to learning and relaxation of any anxiety. Number of sessions conducted per day has also shown to bear effects on participants' scoring, probably, through similar mediator variables. For instance, Sondow (1979) reports a decline in the hit rate of her ganzfeld study as the number of sessions run per day increased. Other independent studies also report this effect (Honorton, 1992; Morris et al., 1995). In another study, Sargent, Bartlett, and Moss (1982), by splitting their ganzfeld sessions in 2 parts, observed that psi-hitting was given mainly in the second part of their sessions. This could be viewed as a within-session incline effect.

It is important to notice that only a small percentage of studies report on decline/incline effects, and, moreover, they do it as a post-hoc finding. Studies that included these effects in their initial hypotheses are thin on the ground. This lack of reporting could be due that it has not been within the researchers' interest but also to lack of replication, which would arise the possibility of a filedrawer problem. This criticism is commonly noticed in relation to any post-hoc findings. Nevertheless, the theoretical basis underlying the phenomena, as well as the empirical and meta-analytic results, warrants further exploration of this effect.

Summary

Although most researchers follow a previously standardised protocol, particular features of the experimental design, protocol, and atmosphere draw differences among experiments. Similarly to stable individual differences and state factors, described in the previous section, these variables could influence the study outcome. Through the *experimenter effect* different experimenters, might provoke different experimental results. Similarly, experimenters could also affect the experimental outcome through their own psi-abilities. This is called the *psi-experimenter effect*. Significantly different hit rates observed with different experimenters involved in the same ESP study supports this hypothesis. The experimental evidence for a gender pairing effect on ESP is unclear. This could be, in part, due to the diversity of ESP task employed and different experimental conditions in the studies. There is, however, more convincing

evidence for higher ganzfeld ESP performance when sender and receiver are close friends or biologically related than when participants are paired with members of the staff. Researchers in ESP have also observed in their studies what is called decline effects, a decrease in the success rate throughout a series of experiments. Meta-analytic studies confirm this finding. Incline effects have been mostly attributed to learning and relaxation of any anxiety.

In the next section we will explore a series of other environmental factors external to the experimenter, participant, or experiment itself that could also be playing a role in ESP success.

1.4. ENVIRONMENTAL FACTORS

The literature suggests that several sources, external to the experimenter, participants, or experiment itself, such as the Earth geomagnetic activity, the local sidereal time, and other environmental factors, could also influence the study outcome.

The Earth's Geomagnetic Activity

A large amount of studies in parapsychology, rather consistently show an association between geomagnetic field (GMF) activity parameters and the onset or effect size of ESP phenomena under forced-choice and free-response experimental studies as well as spontaneous case reports, and even dream ESP studies (e. g. Berger and Persinger, 1991; Haraldson and Guissurason, 1987; Persinger, 1975; Persinger and Krippner, 1989; Radin, McAlpine, and Cunnigham, 1993; Spottiswoode, 1997, see also Persinger, 1989, for a review). The Earth's GMF has several components, being the GMF coming from the Earth itself its main component. There are small regular variations in the activity of the GMF but also irregular and unpredictable variations. It does not seem to be intensity of, but changes in the terrestrial geomagnetic field, what shows association with ESP performance. The accumulated evidence suggests that ESP is enhanced during periods of quiescence in the geomagnetic field activity. Most of the studies have used the aa or the ap indices as measure of the terrestrial GMF activity. The ap index reflects the maximum fluctuation within a 3-hours period. The aa is a daily index of the mean change in the global GMF. It is curious that 2 studies, though, converged to encounter the same relationship in opposite direction in creative individual populations (Dalton and Stevens, 1996; Radin et. al., 1993).

In some dream ESP studies (e. g. Krippner, Vaughan, and Spottiswoode, 2000 and Persinger and Krippner, 1989) quieter GMF activity on the nights of reported telepathic and clairvoyant dreams was noticed. Krippner et al. (2000) ran a post-hoc analysis on 61 subjective precognitive dreams from an old database, finding

significantly quieter geomagnetic activity at the time of the dreams compared to 61 nights selected randomly from the same database for control. It must be noticed, however, that these 2 studies achieved their results through post-hoc analyses on a similar database, the experiments carried out at the Maimonides Dream Laboratory between 1968 and 1977 and, therefore, cannot be considered totally independent. What could be considered as independent evidence supporting this finding is found in a naturalistic study by de Pablos (1998). This researcher took records of his own dreams for over a year and compared them with real life events on the day after. De Pablos found a significant correlation between degree of dream-events correspondence and GMF activity.

The Local Sidereal Time

Another interesting finding is that of Spottiswoode's (1997) in relation to the local sidereal time (LST) at which ESP trials are run. According to Spottiswoode, the LST is the right ascension of the meridian. The right ascension is a co-ordinate for directions in the sky analogous to longitude. Spottiswoode analysed a database of 1468 free-response trials and observed that the ESP effect size increased significantly 340% for experiments run within 1-hour range of 13.50 hours LST. Similarly, he reported the lowest effect size for 18.50±1 LST. The author repeated the analysis on an independent 1015 trial database finding similar results (see Spottiswoode, 1997). Moreover, Spottiswoode (1993) in a previous meta-analytic study found out that the relationship between ESP and the geomagnetic field activity strengthens during the 13.50 ± 1 hours local sidereal time band. Another analysis is reported by May (2001), who discusses 3 physical correlates of psi: the gradient of Shannon's entropy, LST, and GMF activity. A replication failure is reported by Alexander and Broughton (2001). It is curious that the studies reporting on (apparently) such a large effect are scarce.

Spherics

Another geophysical variable that could affect ESP are spherics. Spherics are electromagnetic impulses generated by electrical discharges during thunderstorms, able to travel up to 1,000 kms. Spherics have been reported to affect reaction times, pain syndromes, and EEG activity. In ESP, Borkenau and Ostendorf (1993) report a negative correlation between natural spheric activity and scores on an ESP task. Houtkooper et al. (1999) report a replication of this finding. The authors carried out a forced-choice test on 100 subjects, finding a negative correlation between ESP performance and spherics activity around the time of the session and, especially marked, 24-48 hours prior to the session. The authors also report interaction effects with personality variables such as neuroticism and openness. Houtkooper, Schienle, and Vaitl (2001) report 3 further studies with 37, 100, and 68 participants. The association between ESP and Spherics did not reach significance in any of the studies. However, the results for all combined data did.

Summary

These section comprised variables that being independent from the experimenter, participants, or experiment itself, could influence the study outcome.

The parapsychogical literature shows an association between the Earth's geomagnetic activity and the onset or effect size of ESP phenomena. According to these studies, ESP is enhanced during periods of quiescence. A relationship in the opposite direction has been found in studies with artistically gifted populations. Another interesting finding is that of Spottiswoode's (1997) in relation to the local sidereal time (LST) at which ESP trials are run. The ESP effect size seems to increase significantly for experiments run within one hour range of 13.50 hours LST. Similarly, he reported the lowest effect size for 18.50±1 hours LST. Another geophysical variable that could affect ESP are spherics, electromagnetic impulses generated by electrical discharges during thunderstorms. A negative correlation between ESP performance and spherics activity around the time of the session has been reported.

1.5. TARGETS

Characteristics of the information that participants of ESP tests are required to retrieve also seems to play a role in the outcome of the experiment. Using emotionally arousing, interesting, meaningful, and attention-catching stimuli in ESP experiments is commonly recommended in the parapsychological community. Frequently, reports of spontaneous cases contain targets with similar characteristics and, therefore, are in tune with this hypothesis. However, the data provided by the experimental work are confusing. Type of target, for instance using art-prints, video clips, remote places, objects or even human behaviours, seems to affect the success rate of the experiment. In the PRL series a significant advantage was reported for trials where video clips were used as targets compared to trials that used art prints (Bem and Honorton, 1994). Other forced-choice experiments have explored a large diversity of target types such as coloured pictures of objects (Thalbourne, 1980), human behaviours (Hagio, 1992), letters and numbers (Blackmore, 1983), and even minerals (Vallee, 1988). However, all of these experiments report null results.

Whether some physical features of the target such as colourfulness, complexity, etc. might affect the outcome of the study is still unclear. In forced-choice ESP research there is evidence that suggests that the success of a stimulus as ESP target might depends on psychological, rather than physical, factors such as the participants' preferences, and therefore interact with individual differences. For instance, in a very much cited experiment, Carpenter (1971), by attaching erotic and neutral pictures to the ESP cards, found out that more anxious subjects scored better on the cards linked to neutral pictures while less anxious individuals scored higher on the erotic ones. In another experiment with a single neurotic subject, Johnson and Nordbeck (1972) found higher scoring in relation to emotionally positive words in contrast to emotionally disturbing (for the subject) ones. Along the same line, Dean and Nash (1967), using a measure of physiological arousal as index of the extrasensory awareness of a target word, found out greater responsiveness in participants when the target words were the names of their friends than when they were names of strangers.

A fourth study can be cited in which Price (1973) found a significant interaction between mood and type of target. This author describes how a state of negative affect, egocentricity, and hyperdistractibility was associated with the highest rate of scoring for non-erotic (vs. erotic) targets. Watt (1996) reports no differences in a forced-choice psi task with emotional and neutral targets.

In comparing target emotionality, some ganzfeld studies have shown higher scoring with material conveying either positive or negative emotions in contrast to neutral targets (Bierman, 1995; Dalton, Steinkamp, and Sherwood, 1996; Honorton et al., 1990). This is in tune with features of reported spontaneous cases. Parker, Grams, and Persson (1998) also observed that subjects did slightly better with films showing dramatic changes in their ganzfeld series at Gothenburg University.

Palmer et al. (1980) compared sites (typical remote viewing psi targets) and pictures in 2 conditions, ganzfeld and relaxation. He found no significant differences or interactions, in terms of ESP scores, nor was there evidence of psi.

Sondow et al. (1982) tested, in another study, some relevant questions in relation to target characteristics. Among other hypotheses, they tried to contrast natural scenes pictures to manmade objects; emotional versus non-emotional pictures; negatively emotional versus positively emotional, or likeness of the target and decoys for hitters and missers. The author reports confirmation of the asset shown with the use of natural (vs. manmade) targets as well as of the hypothesis that participants would like more the target than the controls, as expressed prior to judging, and that psi-hitters would like the target more than missers. However, it has been posited that some of Sondow's findings could have been artefactual (see Stanford, 1992).

Another interesting finding is reported by Kreitler and Kreitler (1974b). From the analysis of 4 experiments, these authors concluded that ESP is enhanced when it conveys information that is contrasting to internal and external stimuli. Kreitler and Kreitler explain that internal and external stimuli could be viewed as the noise background against which the ESP signal must be differentiated. They recommend selection of targets that convey different messages to whatever internal and external

stimuli might be occurring at the time of the experiment. These authors' theory seems quite in concordance with the noise reduction theory and the signal detection theory applied in ESP research.

Using ganzfeld, Bosga, Gerding, and Wezelman (1994) tested the relationship between target affinity and ESP as well as target affinity and judging rank. The authors found a highly significant correlation between affinity and called rank but no differences in hit rates between preferred targets and less preferred ones. These results were not replicated in a study carried out by Lantz et. al. (1994). These authors conducted 2 experiments comparing static versus dynamic targets in sender/non-sender conditions. The first experiment showed significant psi-hitting for static targets and null results for dynamic targets. The authors explained their unexpected results in terms of the target-pool bandwidth concept (May, Spottiswoode, and James, 1994a), which is defined as the number of differentiable cognitive elements in a target pool. In the second experiment, the researchers redesigned the dynamic target pool in order for it to match more closely the characteristics of the static target pool. In this second study a significant increase in ESP for dynamic as well as for static targets was observed. The ESP scores on dynamic targets were higher than on the static ones in this second study though not at a significant level. The authors present a new concept, Gradient of Shannon Entropy, and conclude that, all else being equal, dynamic targets should show superiority to static targets.

Overall, the experimental evidence is in tune with the hypothesis that argues that individual differences play a role and interact with type of target. Therefore, a 'perfect' (standard) target material could not, in principle, be established for general ESP research. Nonetheless, some of the findings could still draw guidelines for target selection and optimisation in ESP experiments (see chapter VI).

Summary

It has been argued that characteristics of the ESP target also seem to affect the study success. Several studies show data in support of this hypothesis. There are

beliefs shared in the research community about what characteristics make a successful ESP target. For instance, using emotionally arousing, interesting, meaningful, and attention-catching stimuli in ESP experiments is commonly recommended. However, the experimental work conducted so far is not conclusive. There is evidence that suggests that the success of a stimulus as ESP target might depends on psychological, rather than physical, factors and that features of the stimuli might interact with participants' characteristics. Therefore, it was argued that standardising a type of target that would be successful acrosss different experiments would be rather complicate.

1.6. ON-SESSION AND POST-SESSION (PRIOR TO RESULT CHECKS) INDICATORS OF PSI

At times, occurrences during the ESP session or characteristics of the individual's experience might prognosticate the experimental outcome. For instance, experiencing time contraction during ganzfeld experiments, that is, perceiving the length of the period of ganzfeld stimulation shorter than it really was, has shown predictive of psi-hitting quite consistently in several studies (Palmer et al., 1977; Stanford, 1979; Sargent, 1980b, 1982; Stanford and Neylon, 1975). This phenomenon could be an indicator of an altered state of consciousness (ASC) during the ganzfeld. Some replication failures are also found in the literature (Palmer et al., 1979; Sondow, 1979). Measurement of this variable has been done through one single question that asks the participants how long the ganzfeld *seemed* to them, immediately after the stimulation. Notice that this is different from asking them how long they thought it *actually* was. Sondow's failure to replicate the effect could be related to this issue (see Stanford, 1992). As Stanford already pointed out in his review paper, it is interesting to see that no significant reversal of these results have been reported so far.

Based on previous research, Palmer et al. (1977) hypothesises that when subjects tend to psi-hit, the degree of ASC would correlate positively with ESP scores.

However, in a study where, for any reasons, ESP would manifest as psi-missing, an opposite effect would be expected. In concordance, Harley and Sargent (reported in Sargent, 1980) found significantly greater shift of consciousness experienced by binary hitters during the ganzfeld. These results were observed in 2 series of experiments within the same study. Sargent (1980) also reports significant results, in experiment 5 of his series, and non-significant in the predicted direction, in experiment 3.

In a ganzfeld experiment with 30 participants, Palmer, Bogart, Jones, and Tart (1977) administered a post-session scale containing items describing the individual's experience during the session. A factor analysis of the scale revealed 3 factors, one of which was interpreted as indicator of the development of an altered state of consciousness. This factor was loaded by items: how successful the ganzfeld was to produce an altered state of consciousness (.67), level of relaxation during the session (.63), level of body awareness (-.63), expectancy of success (.57), how pleasant the session was (.51), and how dreamlike and bizarre the mental imagery during the ganzfeld was (.44). Participants' scores on this factor correlated significantly -.38 with ganzfeld ESP z scores, indicating higher performance by individuals who experienced a lesser pronounced altered state of consciousness. Items that correlated significantly and independently with ESP scores were: loss of body awareness during the session (-.51) and success of the technique in altering the state of consciousness (-.37).

In a factor analysis of a post-session questionnaire, Sargent et al. (1982) reports a significant high correlation of .39 between ESP scores and a factor loaded by items measuring post-session expectancies of success, abundance and clarity of visual images, loss of body awareness, lack of effort to obtain visual imagery, state of consciousness shift, and percentage of time spent in an altered state of consciousness during the ganzfeld stimulation. The correlation analyses of the individual items revealed state of consciousness shift as the only significant correlation, with a value of .49. Sargent reports another significant association between ESP and an item, presumably, assessing success of the ganzfeld technique in altering the state of consciousness. This correlation coefficient was .42. Honorton (1977), and Palmer et al. (1977) have also provided results in support of this hypothesis. Replication failures also exist (see Ashton et al., 1981; Sargent et al., 1981; Sargent and Matthew, 1982).

Furthermore, it has been noticed that the tendency to report a high shift of consciousness after the ganzfeld correlates with extraversion (Harley and Sargent, 1980; Sargent, 1980). The question here would be whether extroverts actually experience a higher shift of ASC, or simply, for their condition, tend to report it more than introverts.

In another ganzfeld study, Stanford (1989) shows how temporal trends in the characteristics of participants' utterances such as average length of utterances, variation of utterance length, or course of verbal utterances could be used as indicators of arousal, spontaneity, and entry into an internal attention during the reception period. In a later study (Stanford, 1989b), ESP ratings by 2 experienced external judges showed association with spontaneity of verbal utterances. A 3rd study by the same author replicates this finding. Stanford attributes this failure, at least in relation to the development of an internal state of attention, to the fact that subjects in this study were, on average, less disposed to internal attention state than those in the previous studies. The data confirmed this sample bias. In turn, in a ganzfeld experiment with 50 undergraduates carried out by Sudhakar and Rao (1986) ESP scores correlated significantly with length of individuals' mentation. These authors also observed higher spontaneity and dream-likeness in mental imagery of psi-hitters as well as a negative association with post-session expectancies of success.

Summary

Once the ESP experiment is running or has been completed we can still observe certain occurrences or characteristics of the individual's experience which might be used to prognosticate the experimental outcome. Experiencing time contraction during ganzfeld experiments, degree of ASC, relaxation, experiencing bizarre, dream-like mental imagery, or auditive imagery have shown useful in predicting ESP success. Other items describing the individual's experience during the session, such as comfort, clarity of mental imagery, loss of body awareness, of characteristics of the participants verbal utterances, have also been explored. Post-session indicators, such as post-session expectancies of success or post-session relaxation, have also been studied as

predictive of ESP scores. However, further research with this kind of variables is needed.

2. PSI-CONDUCIVE PRACTICES

Psi-conducive practices in ESP research can be defined as measures taken by the experimenter in order to increase the probability, or degree, of the study psi success.

From a series of visits to different parapsychology laboratories, Delanoy (1997) points out 4 broad categories of psi-conducive practices: laboratory design, orientation towards participants, participants/experimenters interaction, and experimenter orientation and preparation.

In relation to laboratory design, this researcher observed some common factors viewed as important in the different laboratories visited. In general, a comfortable and reassuring environment that, at the time, conveys an image of professionalism was desired. There might be individual differences in terms of preferences in this aspect though. The creation of a comfortable sitting area where participants would be welcomed prior to the experiment was another important practice indicated by the researchers. An informal chat held in this room by the experimenters and participants would ideally help to diminish any worries in the participants and the usual test anxiety.

Orientation towards participants, such as waiting for their arrival, not leaving them unattended, offering them refreshments, and other courtesies would make participants feel highly valuated. This is expected to help to increase their confidence and motivation. It would also prevent the individual from developing insecurities or anxieties prior to the experiment. Actually, many experimenters take considerable time

chatting with participants in order to decrease anxiety and to place them in a positive orientation toward the experiment.

A good participant-experimenter interaction was also viewed as an important factor in psi success. In order to establish a good rapport, some experimenters hold an informal chat with the participants before the session, as pointed out above. Such social interaction would promote a feeling of trust and co-operative attitude in participants.

Experimenter orientation and preparation could be gained, for example, by participating in one's own experiment and exploring, in detail, all aspects of the procedure. Delanoy reports that some experimenters suggest that the session should be taken as the highlight of the day, not booking more than one session per day. Also that sessions should be booked with some free time prior and after so that it is never harried. Some others recommend avoiding unpleasant task on the day of the session as well as to prepare and check all aspects of the experiment in advance. Positive expectancies of success in the experimenters were also recommended.

In her paper, this author stresses the subjective character of the practices exposed, making clear that they do not constitute an experimentally defined "recipe for success". This author was not blind to the laboratories success rates either, which could have biased her impressions. However, I consider that her paper is a valuable source for hypothesis testing in further studies in search for the recipe for success.

Auditory Monitoring of the Receiver's Response

From a theoretical perspective, the auditory monitoring of the receiver's mentation could contribute to the study success by providing the sender feedback on his activity, helping him to perceive himself more "in contact" with the receiver, and to focus attention on the receiver diminishing, thus, external distractions. We could hypothesise that the role of the sender in an ESP test is to influence, through psychic means (i. e. PK), the receiver so that he experiences target-relevant imagery and/or

produces target-relevant mentation (see Braud, 1980, 1981). In this sense some authors argue that feedback is essential in PK processes (e. g. Lucadou, 1987). However, it is necessary to test whether this procedure works in the experimental practice.

Parker (2000), based on his own ganzfeld work, argues that this feature of the experimental design could be psi-conducive. In his series at Gothenburg, Parker reports one non-auditory monitored study and 4 monitored ones, showing a substantial difference in hit rates (20% for the non-auditory monitored study vs. 40% average for the monitored ones). Though these results cannot be conclusive, given that there was only one non-auditory monitored study, this finding is worth further exploration.

Psi-missing and Displacement Effects

Although, in theory, the psi-missing effect, through which the individual fails the target at a level significantly below chance expectation, supports the operation of psi as much as psi-hitting, it is generally undesirable as it constitutes a source counteracting the hit rate in the study.

The psi-missing effect has been studied in relation to another effect called the displacement effect. In forced-choice studies it was observed that when the individual consistently psi-misses on the actual target, he/she tends to score above chance on an alternative target, that is usually the next card coming, the previous one, or even the correspondent card from a parallel deck. This phenomenon has been called the displacement effect (see Crandall, 1991, for a meta-analysis). Crandall reports several studies in which displacement effects are more noticeable under favourable conditions. Broughton (1992) reports a partial replication of these results in a post-hoc analysis of 2 forced-choice ESP tests. Broughton found +1 and –2 significant displacement in runs carried out under favourable conditions where individuals produced below chance scores.

In free-response studies this effect would correspond to a significantly high level of correspondence between the individual's mentation and one of the decoys. Though psi-missing does not always implies displacement, displacement would always bring confusion when judging the target and decoys in a free-response experiment and, therefore, would tend to be highly detrimental for the study hit rate.

In a paper titled "Dealing with Displacement" Braud (1987) writes a series of recommendations for minimising displacement effects as follows:

Minimise negative aspects of the experiment. The author explains that displacement might be triggered by negative experimental conditions such as illness, poor interpersonal relationships, emotional conflicts, etc. Therefore, attenuating these factors would reduce the likelihood of displacement. Measures such as optimising these and similar variables in advance, or even postponing the session until the problems have been solved, would be ideally taken by the experimenters. The author also stresses the complexity and the need of caution when taking measures. He mentions that some studies have shown that the displacement effect is enhanced by conditions that are normally believed psi-conducive (e. g. Crandall, 1985a, 1985b; Crandall and Hite, 1983).

Maximising attention to the target. The author suggests trying to increase the participant's absorption and commitment to the ESP task and his/her focus on the location of the target in terms of space and time. Participants could also be pre-selected o the basis of characteristics such as concentration or absorption.

Use favourable targets and exclude unfavourable ones. Attractive, interesting and attention-capturing targets are recommended against negative or potentially threatening items.

Minimise heterogeneity of salience of pool items. Braud explains that if some items in a pool of targets are more attractive than others, displacement would be expected. Therefore paying attention to the characteristics of the items in order to assemble a homogeneous target pool is recommended.

Minimise the percipient's exposure to items in the pool other than the correct target. Avoiding any pre-trial contact with the material of the pool is always recommended. According to Taylor's theory of precognitive feedback (Taylor, 1998), the individual would be able to gain knowledge about an item or event by scrutinising his/her own experience in a future observation of it. Thus post-session exposure to anything other than the target could be self-defeating, including the judging sequence of target and decoys.

Maximising exposure to the correct target. The author points out that several experimenters have suggested "opening as many psi-channels as possible" in an experimental design. This could be operationalised by permitting the participant to gain psi information about the target through clairvoyance, by mediation of a sender, or precognitively by exposing him/her to the correct target post-session. Braud explains that such redundancy could provide the actual target with greater salience in comparison to non-target items.

Do not dwell on target pool items during pool establishment, target selection, or judging. Minimise interactions with non-target objects during all phases of the experiment is also recommended. The author refers to a procedure in which participants judge from memory after having been shown the objects in situ (see Puthoff, 1985).

Have target items and judging items take different forms. The author explains how this could be achieved, for instance, by using slide images for target presentation and print images for judging.

Decrease the size of the judging set. With larger judging pools there is a higher likelihood of both encountering more attractive items than the actual targets and of finding chance correspondences with the individual's mentation. In this case reduced judging sets would be more accurate for avoiding displacement.

Set up targets or judging pools in the future or have no pre-established pool. Limiting the length of time a target or judging pool is in existence might reduce the opportunities for displacement. An alternative would be not having a pre-established pool but generating non-targets according to some pre-established criteria. Braud calls caution to prevent from any knowledge of the percipient's response influencing any later selection process.

Provide definite points of closure of trials. This would be like asking the individual to stop scrutinising for psi information and, thus, introducing noise after the session.

Space trials further apart. Isolating individual targets or separating consecutive sessions may also minimise possible between-sessions displacement.

Never reinforce putative displacements. Encouraging correspondences with the decoys encourages the participant to think that there are multiple ways to success on an ESP task, by hitting different material.

Add distinction to the target by personalising it. In addition to selecting an item from a pool as the actual target for a given experiment, this stimulus can be further differentiated from the decoys, for instance, by labelling it with the individual's name or even attaching a picture of him/her to the target.

Satisfy the percipient's curiosity/playfulness motive. If displacement is motivated by a tendency to explore the surrounding environment, satisfying such motivation in advance might help to minimise displacement in the actual session. The author refers to an uploading technique used in problem solving psychology. The individual could be encouraged, in advance to the ESP task, to draw and write irrelevant and distracting thoughts that might be related to recent sensory experiences, memories, pending work, etc.

Finally, Braud points out that investigators' expectancies might also influence the likelihood and magnitude of the displacement effect in their studies. His reasoning

is that ambivalent attitudes might trigger displacement as a means of providing less threatening evidence for ESP. Similarly, researchers who feel more concerned with the displacement phenomenon might find more quantity of it in their experiments than unconcerned experimenters. As the author concludes, it is important to know the extent to what displacement effects are present in our experiments and, if they occur in abundance, what the laws than determine them are.

Consensus Judging

Judging, that is, looking into correspondences between the target stimuli and the individual's call, is generally done either by the own individual or by an external expert. There is not clear empirical evidence that shows advantage of one of the techniques in comparison to the other. More recently, a new method for judging has been introduced, in which analyses are carried out jointly by a group of judges, who sit down together to discuss the called and target materials. This has been called consensus judging. Dalton, Steinkamp, and Sherwood (1999) provide evidence for the appropriateness of this evaluation technique. However, a more recent study on dream precognition (Sherwood, Roe, Symmonds, and Biles, 2002) failed to replicate these results.

The reader might feel disappointed to see what little we are able to safely conclude from the huge amount of work done. It must be admitted that inconsistency in the findings is a salient characteristic in the parapsychological literature. Furthermore, it is noticeable that approaches to the prediction of ESP mostly opportunistic, with a lack of systematic studies trying to combine together large number of variables. However, some interesting data are present, from which a series of guidelines could be, at least intuitively, recommended (see chapter VI).

The following chapters (II, IV, and V) describe 3 studies, 2 of which are experimental, that explore a large number of potential predictors of laboratory ESP scoring and psi-conducive practices, in search of a more precise recipe for success in ESP experimental research.

Summary

In this section we dealt with psi-conducive practices in ESP research, measures taken by the experimenter in order to increase the probability, or degree, of the study psi success. It was argued that a comfortable and reasuring environment that, at the time, conveys an image of professionalism is desired. Orientation towards participants, such as waiting for their arrival, not leaving them unattended, offering them refreshments, and other courtesies are often viewed as psi-conducive too. A good participant-experimenter interaction is also viewed as an important factor in psi success. Other measures, such as providing auditory monitoring of the receiver's response to the sender, or consensus judging, have shown successful in increasing scores in previous ESP studies. There are practices as well oriented to dealing with psi-missing and displacement effects, in an effort to reduce the amount of irrelevant psi. It has been recommended, among others, to minimise negative aspects of the experiment, hetereogeneity of salience of pool items, percipient's exposure to the item, maximise attention and exposure to the target, space trials further apart, not reinforce displacements, personalise the target, or have no pre-established pool.

3. CHAPTER SUMMARY

This chapter was intended to provide the reader with an overview of a series of variables and procedures appeared in the literature in relation to the prediction of ESP success and its experimental optimisation. A large range of variables has been explored. Similarly, diverse means of evoking, or facilitating, psi in a greater degree (called psi-conducive practices) have also been studied. I grouped these variables into 6 categories: 1) stable characteristics of participants in ESP tests, such as personality traits and individual differences; 2) more transient characteristics such as state factors; 3) characteristics of the experimental design, protocol, and testing atmosphere; 4) environmental factors; 5) characteristics of targets; and 6) on-session and post-session indicators of psi success.

Personality traits have been most broadly studied in previous research. It was explained how the experimental evidence suggests that extroversion, sensation seeking, agreeable, or open to experience people tend to perform higher in ESP experiments. High success rates have been obtained with participants selected from creative populations. Other cognitive differences such as cognitive lability, transliminality or perceptual defensiveness (vigilants) have been hypothesised to contribute to the experimental success too. It was argued that more work is needed to test for the predictive validity of mental imagery measures. FP individuals, as measured by the MBTI, perform higher in ESP tests. The experimental work suggests that either hemisphere is capable of producing ESP on a task related to its skills. Participant's values and beliefs may also influence the experimental outcome. Meta-analytic work reveals differences in the scoring patterns of believers and disbelievers of the paranormal. Religious beliefs and magical ideation have also been associated to high scoring. Individuals who report paranormal or dissociation experiences have scored higher in previous ESP experiments, the same as practitioners of yoga, transcendental meditation, biofeedback, or other mental disciplines and participants with prior psi-testing experience and ganzfeld repeaters. However, the lack of studies as well as the diversity of ESP tasks and measurements used by different researchers makes complex the task of drawing definitive conclusions.

Mood and other state factors have not been explored in the same degree as more stable characteristics of individuals. Even so, some data can be abstracted from the literature. For instance, anxiety has generally been associated to poor performance. However, it was explained that the experimental evidence concerning relaxation is not as clear as can be expected from the theory. Participants who make expansive drawings tend to achieve higher ESP scores in clairvoyance tests. Studies in which expectancies of success were manipulated show that this variable can contribute to the ESP success. The positive effects of motivation in ESP scoring have also been supported in previous research. There are other experiments that concerned with the possible influence of aspects of mood on ESP. Nonetheless, findings have been, in those studies, inconsistent.

Although most studies share a previously standardised protocol, particular features might draw differences among experiments, which could influence the study outcome. The experimental evidence for a gender pairing effect on ESP is unclear. Researchers in ESP have also observed a temporal decrease in the success rate throughout a series of experiments. Incline effects have also been observed and are mostly attributed to learning and relaxation of anxiety. Similarly, the literature suggests that several sources, external to the experimenter, participants, or experiment itself, such as the Earth's geomagnetic activity, the local sidereal time, and other environmental factors, could influence the study success too. Also, characteristics of the target seems to play a role in the outcome of the experiment. However, there is evidence that suggests that the success of a stimulus as ESP target might depends on psychological, rather than physical, factors and interact with individual differences. Certain occurrences or characteristics of the individual's experience, such as experiencing time contraction or characteristics of mental imagery might be used to prognosticate the experimental outcome. It was argued that the exploration of this kind of variables could be fruitful.

There are measures and procedures emploied by the experimenters, such as participant-oriented behaviours, auditory monitoring of the receiver's response by the sender, or consensus judging, which have contributed to success in previous ESP studies.

In the next chapter, I describe the first experimental study in this project, where a large number of variables predictors of ESP success were tested under two experimental conditions: ganzfeld stimulation and sensory attenuation. The results of using two different types of target stimuli, pictures and objects, will also be presented.

CHAPTER III: EXPERIMENTAL STUDY I (PILOT STUDY)

AN EXPLORATION OF INDIVIDUAL DIFFERENCES AND STATE FACTORS AS PREDICTORS OF FREE-RESPONSE ESP SCORING IN A GANZFELD AND SENSORY ATTENUATION CONDITIONS COMPARING OBJECTS AND PICTURES AS ESP TARGETS

1. INTRODUCTION

As previously mentioned, the literature on the prediction of ESP success based on more or less stable characteristics of the participants is large, as well as the diversity of factors considered. In chapter 2, we could observe that there is a large number of variables that remain barely explored but that, counting on theoretical or opportunistic experimental evidence, could be hypothesised as potential predictors of ESP performance. This is the case, for instance, of sex role, comfort, motivation, collaborative attitude, private self-consciousness, need for cognitive closure, optimism, self-disclosure, health state variables, etc. This study is intended to contribute to the exploration of those variables which count on a lesser degree of experimental work as well as other that have never been studied in relation to the prediction of ESP scores but that, upon theoretical approaches or findings in main stream science, would be expected to play a role in the prediction of a successful ESP outcome. It is also intended to compare the effects of the sensory monotonization, achieved in the prototypical ganzfeld design through pink noise and red light projected on a translucent cover on the individual's eyes, to a sensory attenuation condition, achieved by the use of a cotton mask on the individual's eyes and earplugs. Also, a pool of objects was used simultaneously to a pool of pictures in order to compare both types of stimuli as ESP targets. Personality and individual differences variables were assessed prior to the free-response ESP experiment through a psychometric session. State factors were assessed on the ESP experiment day through pre-session and post-session questionnaires.

Hypotheses

On the basis of previous research, it was hypothesised that the overall hit rate would be significantly higher than expected by chance for both objects and pictures as well as for the ganzfeld and the sensory attenuation experimental conditions at a .01 α level. The hit rate for objects was expected to be significantly higher than for pictures ($p=0.05$, one tail) under the reasoning that objects would imply more sensory modalities than pictures and, therefore, there would be more channels to communicate the psi-information. Objects could also seem more interesting to the individuals than pictures. There was no hypothesis concerning any advantage of either experimental condition in respect to the other. The study was exploratory in this sense.

Positive significant associations were hypothesised between ESP and the variables: self consciousness, self-perceived artistic ability/interest, self-concept and its sub-scales, self-reported mathematical ability, schizotypy and its sub-scales, hallucinatory predisposition and its sub-scales, dissociation, optimism, self-disclosure and its sub-scales, cognitive sensitivity to spontaneous mental imagery, lucid dreams, dream recall, dream interpretation, proneness to enter sleep as an ASC, self-perceived luck, self-perceived well-being, paranormal experiences, state self-esteem and its sub-scales, task-orientation, expectancies of success, willingness and collaborative attitude, mood (happiness-sadness), comfort at the test, locus of control for the task, task success motivation, pre-session relaxation, physical health variables, sleeping patterns, post-session relaxation, sensory adaptation, success of the technique in altering state of consciousness, imagery parameters, level of confidence of the call, impulsivity, empathy, richness and vividness of imagery, visualizer cognitive style, visual memory span, visual retention (number of correct answers), visual perceptual lability, and intuition. Conversely, negative correlations were hypothesised for the variables: errors in the visual retention task, need for cognitive closure, gender, richness of mental imagery, stimulant drinking, response constrains, controllability of mental imagery, processing of mental imagery, effort made to obtain mental imagery and menstrual cycle phase in women.

2. METHOD

2.1. Participants

A sample of sixty unselected volunteers was recruited through advertisement of the study amongst the student population at Coventry University. As incentive, £30 were paid, through a lottery-like system. Participants' were clustered into groups of ten, using their participant number. The same RNG used in the study was used to select one participant out of each ten, who would be paid £30. Twenty participants were males and fourty females, with ages ranging from 17 to 36. The average age of participants was 23.

2.2. Design

The study used a 2 x 2 mixed design. Subjects were randomly assigned to either a ganzfeld or sensory attenuation condition (between-subject independent variable), using a true random number generator, whereas target type (within-subject independent variable) was administered using a within subjects design.

The hit rate (dependent variable) for the study was defined employing a nominal scoring method, for being this method the most commonly reported in the parapsychological literature. The participant simply picked on a 'blind' basis the one of the 4 pictures, or groups of objects, which corresponded most closely to his/her experience during the reception period. If the stimulus chosen was the target used for the session, one hit was counted. Otherwise, the trial was regarded as a miss. The order of presentation of the 2 types of stimuli to the sender was counterbalanced.

2.3. Materials

2.3.1. Questionnaires and Variables[1]

A series of questionnaires, scales, and other psychometric tools were used in the assessment of the individual differences and state factors variables. When a concrete psychometric instrument had showed success in the previous literature in revealing an association between participants of ESP studies scoring and a determined variable, that questionnaire, scale, or psychometric tool would be used in the present study. In the cases where the previous literature did not point toward a concrete measurement tool or did but the instrument was not appropriate for the study, due to time constrains, required training, or other reasons, an alternative measure would be used. It was intended, in all cases, to find an instrument for which satisfactory psychometric properties had been reported. In those cases where an appropriate instrument could not be found, or the variable could be easily assessed through direct, simple questions (e. g. hours of sleep) the experimenter constructed the items. The questionnaires, scales, and other instrument used in this study are listed in the next paragraphs.

2.3.1.1. Personality traits and individual differences questionnaires

Questionnaire i: This was an 80-item individual differences questionnaire. The items had a four-choice liker scale format and were scored from 1 to 4 to reflect the degree in which the respondent agreed with the item statements. The questionnaire was structured in a way that high scores in the items, scales, or sub-scales would reflect a high amount of the dimension measured in the individual. Scale total scores were calculated by adding up the means of the participants scores in the sub-scales. This questionnaire consisted of the following scales:

- Private Self-Consciousness sub-scale, from the Fenigstein's Self-Consciousness Scale (Fenigstein, A; Scheiner, M.; and Bush, A., 1975).

Self-examination enables the individual to recognise his thoughts, motives, and other internal and external aspects of him-self, resulting into greater self-awareness. The Self-consciousness Scale contains 23 items grouped into three factors, namely, private self-consciousness, public self-consciousness, and social anxiety. Factor analytic work (Mittal and Balasu-Gramanian, 1987) reveal that private self-consciousness is made up of two factors, namely, internal awareness and self-reflectiveness. Empirical work by Scheier and Buss (1975) support this structure. Their data reveal an absence of gender differences and a test-retest reliability, with two weeks intertrial, of .84 for the public self-consciousness scale, .79 for private self-consciousness, and .73 for the social anxiety sub-scale, and a score of .80 for the whole scale. Due to time and resources constraints, only the private self-consciousness scale was used in this study. It was thought that as this factor is concerned with attending to one's inner thoughts and feelings, it could contribute to the individuals' performance by allowing a greater awareness of psi information. Positive scores between ESP and participants' scores in these two factors: internal awareness (see items 1-4) and self-reflectiveness (see items 5-8) and in the total sub-scale were hypothesised.

- Self-reported artistic ability and artistic interest: The individual self-perceived artistic ability and artistic interest were assessed through two direct, single questions constructed by the experimenter (see items 9-10). It was hypothesised, on the basis of previous research (see e. g. Dalton, 1997), that both these variables would show a positive association to the participant ESP scoring.

- Self-concept: This variable was also assessed through direct, single questions constructed by the experimenter. It was intended to assess self-concept in relation to three dimensions:

  Mental abilities (see item 11)
  Psychic abilities (see item 49)
  Luck (see items 13-15)

[1] A copy of questionnaires I and II, post-session, and pre-session questionnaires can be found in appendix-I

It was hypothesised, for all these three dimensions, that a high self-concept in participants would help them in the completion of the ESP task by reducing anxiety, insecurities, and increasing expectancies of success and motivation.

- Feeling vigorous: Individuals were asked to indicate in a four-point Liker scale how vigorous they normally feel (see item 16). It was thought that this variable could be an indicator of well-being, healthy state, and low stress and contribute to the individual's experimental performance.

- Gender (as sex role): A series of items reflecting social roles in males and females were created by the experimenter and used in order to achieve an indication of this construct in the participants. A high score would indicate that the individual tends to engage in behaviours and hold beliefs and attitudes culturally associated with males. A low score would represent the opposite trend (see items 17-26). Females are commonly believed to be more intuitive in western cultures. Assuming that there could be an ESP component in intuition processes through which the individual arrives to the correct solution of a problem on the basis of scanty data, and in order to test for the above belief, a negative association between scores in this scale and ESP was hypothesised.

- Need for cognitive closure: Cognitive closure is a dimension of individual differences related to an individual's motivation with respect to processing and judgement. Need for cognitive closure is defined in terms of a desire for "an answer on a given topic, any answer,... compared to confusion or ambiguity" (Kruglanski, 1990b, p. 337). This variable is manifested through several aspects, namely, preference for predictability, preference for order and structure, discomfort with ambiguity, decisiveness, and close-mindness. Empirical work (Webster and Kruglaski, 1994) suggests that the Need for Cognitive Closure Scale is a reliable and valid instrument. It was hypothesised that need for cognitive closure in the participants would result in detrimental cognitive processing of unstructured psi information. Therefore, a negative correlation was hypothesised between this variable and ESP.

Twenty items were randomly selected from Neuberg's Need for Closure Scale (Neuberg, S.; Judice, T.; and West, S., 1997), including the following sub-scales:

Preference for order (see items 27-30)
Preference for predictability (see items 31-34)
Decisiveness (see items 35-38)
Discomfort with ambiguity (see items 39-42)
Closed-mindedness (see items 43-46)

- Self-reported mathematical ability: Participants were asked to indicate their abilities in Maths by pointing out their degree of agreement to a single question item (see item 47).

- Mason's Schizotypy Scale (Mason, O., Claridge, G., and Jackson, M., 1995): Schizotypy is an aspect of personality which has been studied as relevant to the predisposition towards schizophrenia disorders. While experimental findings have been forthcoming with a variety of instruments, there has been widespread criticism of their psychometric properties. The highly skewed nature of symptom-like scales weakens their applicability to the normal population. Four sub-scales compound Mason's Schizotipy Scale: unusual experiences, cognitive disorganisation, introvertive anhedonia, and impulsive non-conformity. All these sub-scales have been found to have adequate internal consistency (alpha > .77). Also, factor analytic work supports the structure (Mason, Claridge, and Jackson, 1995). Questionnaire I included the following subscales:

  Unusual experiences (see items 48-53)
  Cognitive disorganisation (see items 54-59)
  Introvertive anhedonia (see items 60-65)
  Impulsive non-conformity (see items 66-71)

- Launay & Slade's Hallucinatory Predisposition Scale, (Launay, G. and Slade, P., 1981): A large amount of the population can experience hallucination in absence of identifiable cerebral pathology or mental illness (see Sidgewick, 1994). Given the pseudo-hallucinatory nature of large number of the ESP experiences reported in the literature and of experimental technique (e. g. the ganzfeld), it was hypothesised that this predisposition would appear positively associated to ESP scores. This scale includes both pathological items and other items which appear to represent sub-clinical forms of the hallucinatory experiences. Bentall and Slade report adequate test-retest reliability of .84 ($p<.01$). Through this scale the following variables were assessed:

  Vivid thoughts (see items 72-73)
  Intrusive thoughts (see item 56)
  Auditory hallucinations (see items 75-77)
  Vivid daydreams (see items 78-80)
  Visual hallucinations (see item 81)

Questionnaire ii: This was a 70-item individual differences questionnaire. The same as in Questionnaire I, the items had a four-choice liker scale format and were scored from 1 to 4 to reflect the degree in which the respondent agreed with the item statements. High scores would reflect a high incidence of the dimension measured in the individual. Scale total scores were calculated by adding up the means of the participants' scores in the sub-scales. This questionnaire consisted of the following scales:

- Riley's Dissociation Scale (Riley, 1988). Dissociation is a lack of the normal integration of thoughts, feelings, and experiences into the stream of consciousness and memory. Dissociation also occurs in normal individuals to some degree. Upon the grounds of previous research (e. g. Schmeidler, 1982) it was hypothesised that high dissociation individual would score higher in the ESP task. Riley's Dissociation Scale is a single easily administered instrument for the quantification of

dissociation experiences. Riley reports evidence for concurrent validity and a Cronbach internal reliability score of .77 ($p<.01$). This scale was reduced to the 13 items showing the highest correlation with total score (see items 82-94).

- Scheier's Optimism Scale (Scheier, M. and Carrer, C., 1985): This scale was used in order to assess the participants' trends for appraisal of events and life. Participants were asked to point out, in a four-item scale, their degree of agreement to a series of statements. High scores indicated a participant's tendency to interpret life events in a more hopefully and positively manner (see items 95-102). It was hypothesised that high scorers in this scale would undertake the ESP task with a more positive mood, self-confidence, and expectancies of success than low scorers. A positive correlation with ESP was hypothesised.

- Chelune's Self-disclosure Situations Survey, (Chelune, G., 1976). An individual develops a particular, relatively stable, style of self-disclosure as a response of social learning (West, 1970). Situation factors may, however, regulate the amount of information revealed. Chelune's Self-disclosure Situations Survey is sensitive to the social and situational determinants of the individual's level of disclosure. There are data supportive of the survey's construct reliability (Chelune, 1976). Two items per category were randomly selected from this scale. The sub-scales measure self-disclosure behaviour when the individual is involved in the following types of situations:

  With a stranger (see items 103-104)
  With a group of strangers (see items 105-106)
  With a friend (see items 107-108)
  With a group of friends (see items 109-110)

  It was hypothesised that self-disclosure would reflect a kind of willingness for communication that could generalise to the ESP task. Therefore, positive correlations between ESP scores and the individuals' self-disclosure scores in these four situations were expected.

- Cognitive sensitivity to spontaneous mental imagery. Three items were developed by the experimenter in order to assess the participants' degree of sensitivity to, and incidence of, spontaneous mental imagery in the hypnagogic state and when awake (see items 111-113). It was hypothesised that participants scoring higher on these items would also do in the ESP task due to a greater awareness of imagery-mediated psi signals.

- Dreaming related variables. A series of questions were asked to participants in order to assess whether they experienced lucid dreams (see item 114), recalled frequently their dreams (see items 115-116), tended to interpret their dreams (see item 117), and other qualitative aspects of their dreams (see item 118). Positive correlations with ESP were hypothesised for all these variables on the basis of previous research (see e. g. Sargent, 1981).

- Proneness to enter sleep. Three items were developed by the experimenter in order to find out the easiness with which subjects entered the sleep state. These three items regarded three different situations (see items 119-121). It was hypothesised that participants who frequently fall asleep during diverse situations in their waking life could relax more and develop an altered state of consciousness easier during the sensory monotonisation/attenuation period. It was expected that this tendency would contribute to success.

- Self-perceived luck: Another question asked the individuals how lucky they thought themselves to be (see item 13). Theoretical reasoning and experimental work suggest that psi could take place in everyday situations (Stanford, 1974). Participants' self-perceived luck could reflect both the degree in which they use their own psi abilities in everyday life (to be lucky) and the degree in which they potentialy possess these abilities to be used in an experimental situation. Therefore, a positive correlation between this variable and ESP was hypothesised.

- Self-perceived well-being: Well-being was assessed through a single item created by the researcher (see item 132). It was hypothesised that participant who felt more comfortable and satisfied in their lives would undertake the experiment more positively and in a better mood and that this could help them to perform higher in the ESP task.

- Paranormal experiences: A series of items were developed by the experimenter in order to assess whether the individuals had experienced the paranormal ever in their life and within the last year (see items 133-149). It was hypothesised on the basis of previous research (e. g. Honorton, 1985, 1992) that paranormal experiencers would score higher.

Eysenk's IVE (Impulsivity, Venturesomeness, Empathy Personality Inventory, Eysenck, H. J. and Eysenck, S. B. G., 1991): The IVE is a well-know reliable and valid measure to assess the constructs of impulsivity, venturesomeness, and empathy. Because of time and resource constrains only the sub-scales of impulsivity and empathy were used in this study. Positive correlations were hypothesised between ESP scores and these two constructs on the basis of previous research (e. g. Schmeidler, 1985; Stanford, 1973). The hypothesised correlation between ESP and empathy was further based on the argument that an ESP mechanism could be implied in empathy, as the process of understanding other's feelings, views, and impressions.

Gordon's CVIQ (Controllability of Visual Imagery Questionnaire): In this questionnaire the participants were required to produce voluntarily determined mental images. The questionnaire assesses the degree in which the individual is able to control his/her mental imagery. Individuals are, therefore, classified as controllers, if they are able to exert a great degree of control over their mental imagery, or autonomous, if they are not. It was thought that controllers would tend to manipulate and distort psi-mediated imagery in a greater degree than autonomous individuals. Therefore, a negative correlation was hypothesised for this variable.

Moreover, the following variables were assessed in the way specified below.

- Richness and vividness of imagery: A combined questionnaire was made of the Memory Style and Vividness of Visual Imagery questionnaires. VES and Marks' VVIQ (Marks, 1973). The Memory Style Questionnaire comprises a series of tasks in which the individual is required to visualise an object for a determined short time. Afterwards, this questionnaire assesses the individual's richness of mental imagery by exploring the degree in which the requested image brought with it a rich, complementary picture of elements into the individual's consciousness. It was hypothesised that this characteristic if the participant's imagery would result in psi-irrelevant associations and information that could mask the psi-signal. The VVIQ asks the individual to rate the vividness of their mental imagery in a given rating scale. It was thought that participants who experience more vivid images would realise of any psi-mediated imagery easier. A positive correlation between ESP and this variable was, therefore, hypothesised.

- Verbalizer-visualizer cognitive style (10 items were randomly selected from Richardson's VVQ, 1977). Richardson's VVQ assesses the individual's cognitive performance when thinking, studying, or problem solving. Individuals are clasified as verbalisers if they tend to think, above all, in terms of words, or as visualisers if they do in terms of visual images. Because the experimental ESP task used in this study, and by most researcherss nowadays in the area, is basically a visual one, it was hypothesised that visualisers would score higher.

- Visual memory span. This was assessed through a spatial location sequence task similar to the Corsi block task (see Corsi, 1972). The experimenter marked a pre-established visual sequence by touching a series of squares on a 6 x 6 white and black chess-like pattern. The individual was required to repeat the sequence by touching the same squares as the experimenter did in the same order. There were three trials per sequence length, starting by a sequence length of four squares and increasing in one in the following trials. The individual visual memory span was

registered as the largest all-correct response. It was hypothesised that the individual's memory span would contribute to psi success through facilitating awareness and retention of a larger number of imagery items at a given moment.

- Visual retention: A computerized test based on Benton's Visual Retention Task (Benton, 1974) was used to assess capacity for visual retention in the participants. An abstract graphic design was presented on a computer screen to the individual for half of a second. The participant was required to sketch the figure on a piece of paper based on his/her memory trace. The sketches were assessed by the experimenter according to Benton's criteria. Two scores were derived (number of errors and number of correct answers) and utilised in the analysis. It was hypothesised that the individual's visual retention capacity would contribute to psi success through facilitating retention and reporting of spontaneous imagery.

- Visual perceptual lability: This variable was derived from the concept of cognitive lability, or degree of free variability of cognitive processes, described by Braud (1980). It was assessed through a task in which the individual was shown 6 Holztman's inkblots during one minute each, and asked to report any thing that the whole smear or parts of it could seem to him. Participants were instructed to "let the picture influence [them] instead of looking for things voluntarily". The score was the total number of responses given for the 6 pictures. A positive association between ESP and this variable was hypothesised on the basis of previous studies (Braud et al., 1983).

- Intuition-like task: The participant was asked to identify a list of six key words made by the experimenter, consisting of three concrete plus three abstract ordinary words, one by one, in six trials. Seven clues were given, for each word, in temporal order as in the following example:

1st clue: word length e.g.	b-------
2nd clue: central letter	b--i----
3rdclue: last letter	b--i---s
4th clue: second letter	bu-i---s
5th clue: letter after the central one	bu-in--s
6th clue: last but one letter	bu-in-ss (business)

Each trial was scored from 1 to 7 according to the number of clues needed to identify the key words, being 1= no identification of the word and 7 = immediate identification after the 1st clue. Words were not revealed to participants in order to avoid later participants being aware of the keywords beforehand. Adding the participants' scores for each of the trials and dividing it by 6 computed the final score. There could be an ESP component in the intuition process through which the individual arrives to the correct solution of a problem on the basis of scanty data. A positive association between scores in this task and ESP was, therefore, hypothesised.

2.3.1.2. Pre-session state variables

Pre-session questionnaire: This was a state factor questionnaire administered to the participants prior to the ESP test. It consisted of the following scales:

- Heatherthon's State Self-esteem Scale (Heatherton, T. and Polivy, J., 1991): There is evidence that suggests that the individual self-esteem is not a stable trait (Markus and Kunda, 1986). Heatherthon's State Self-esteem Scale is a self-esteem measure sensitive to manipulations designed to temporarily alter state self-esteem. Factor analytic work reveals three correlated factors: performance, social, and appearance self-esteem (Heatherthon's, 1991). It was hypothesised that

participants with higher self-esteem, as assessed prior to the ESP task, would feel more self-secured, motivated, and would develop higher expectancies for success. It was hypothesised that this could contribute to the ESP success. Therefore, positive associations for the total and sub-scales scores were expected. The variables included in the questionnaire were:

Performance self-esteem (see items 1-7)
Social self-esteem (see items 8-14)
Appearance self-esteem (see items 15-20)

- Task-oriented vs. Ego-involved (adapted for the ESP task from the Motivational Orientation Scales –Duda and Nicholls, 1992): This is a motivational construct used mostly in organisational psychology. Task-oriented individuals find satisfaction in the task to be carried out itself and their particular contribution to a fruitful outcome. Ego-involved individual, conversely, would feel motivated by what gains a good performance would mean to themselves. I adapted a series of items from the Motivational Orientation Scales by Duda and Nicholls to the ESP task (see items 21-26). It was hypothesised that task-oriented individuals would score higher given the characteristics of the particular ESP task which demended an altruistic effort from the participants giving little instead. Thus, it was thought that task-oriented individuals would feel motivated while ego-oriented could find the experiment frustrating.

- Expectancies of success: The individuals' expectancies of success in the forthcoming session were assessed through one single question constructed by the experimenter (see item 27). It was hypothesised on the basis of previous research (e. g. Sargent, 1980b) that expectancies of success would correlate positively with ESP.

- Willingness and collaborative attitude: The participants' willingness to help in the present study was assessed directly through one single question (see item 28). It was though that participants who were more willing to help would contribute to the ESP success through higher motivation.

- Mood (happiness-sadness): Participants were asked to indicate the degree of happiness/sadness they felt prior to the test in a six-point scale (see item 29). It was hypothesised that participants who were in a happier mood would undertake the task more positively and that this could facilitate their ESP performance.

- Feeling vigorous: Participants were asked to indicate how vigorous they felt prior to the test in a six-point scale (see item 30). It was thought that this variable could be an indicator of well-being, healthy state, and low stress at the moment of measurement, just before undertaking the ESP task, and contribute to the individual's experimental performance. Therefore, a positive association was hypothesised between this variable and ESP scoring.

- Comfort at the test situation: Participants were asked to indicate how comfortable they felt prior to the test in a six-point scale (see item 31). It was expected that participants who felt more comfortable would perform better in the ESP experimental task through higher motivation and a more positive attitude. Conversely, participants who felt uncomfortable would be demotivated and frustrated, which could be detrimental to their performance.

- Locus of control adapted to the ESP task: The causal appraisal of the experimental outcome was also assessed through one single item. Participants were asked to indicate the degree in which they thought that the experimental outcome could be due to internal or external factors (see item 32). The locus of control of the individual regarding, the ESP task, could be related to, and even determine, the strategy to be adopted for "waiting/looking for" ESP information. It was hypothesised that external locus of control individuals would adopt a more passive attitude when carrying out the ESP task, which would interfere less with the psi communication process. Therefore, a positive correlation (towards a external locus of control) was hypothesised between this variable and ESP.

- ESP task success motivation: A single item (see item 33) was used to assess participants' motivation for success. It was hypothesised on the basis of previous

research (Braud and Braud, 1973) that highly motivated individuals would perform better.

- Eating/drinking: Amount of food taken or of stimulant drinks, such as coffee, tea, or coke, prior to the experiment was assessed by asking the participants directly (see items 34-35). It was thought that having large amounts of food prior to the experiment would physiologically predispose the individual to relax. Conversely, taking stimulant drinks would increase participants' nervousness, which would interfere with the ESP process through increasing physiological and cognitive noise. Therefore, it was hypothesised that amount of food taken prior to the experiment would appear positively associated to ESP and that taking estimulant drinks would do negatively.

- Pre-session relaxation: Participants were asked to indicate their degree of relaxation prior to the experiment in a six-point scale running from very tense to very relaxed (see item 36). It was assumed that participants who already felt relaxed prior to the session would continue to be relaxed or do in a greater degree during the sensory monotonisation/attenuation. According to the Noise Reduction Model, a positive association was hypothesised between ESP and pre-session level of relaxation.

- General health variables: It was also intended to achieve a self-reported indicator of the participant's state of health during the week and day prior to the experiment through a series of items constructed by the experimenter. The items concerned general health, stress, vigour, and sleeping patterns, as follows:

  Physical health (see items 37 and 44)
  Feeling vigorous (see item 38 and 45)
  Stress (see item 39 and 46)
  Sleeping patterns (see items 40-43 and 47-50)
    Hours of sleep
    Time taken to fall asleep
    Quality of sleep

It was thought that particapants who enjoied a healthier state would feel more motivated and in a more positive mood to undertake the experiment. Positive associations with ESP were hypothesised between ESP and all these variables, except for time taken to fall asleep which would be viewed as an indicator of stress.

2.3.1.3. Session and post-session state factors and characteristics of the participants' experience

Post-session questionnaire: This was a questionnaire filled in by the individuals after the sensory monotonisation/attenuation, prior to judging. It consisted of the scales and items described below.

- Degree of imagery processing before reporting: Participants were asked the degree in which they thought and process their mental imagery before reporting (see item 1). It was hypothesised that high processing of mental imagery would distort any psi signal. Therefore, a negative association was hypothesised between ESP and scoring on this item.

- Post-session relaxation: The same item used in the pre-session questionnaire was used for the participants' to state their degree of relaxation after the session (see item 2). It was hypothesised that high relaxation would reflect success of the technique and would appear positively associated to the experimental success.

- Response constraints: Participants were also asked to estimate the percentage of the mental imagery and subjective impressions experienced that they managed to report (see item 3). It was thought that through response constraint psi information which could have been useful to judge the target set would be missing. Therefore, a negative correlation was hypothesised between this variable and ESP.

- Sensory adaptation: This variable was assessed by asking the participants about their degree of awareness of stimuli that would be present during the period of sensory monotonisation/attenuation (i. e. the noise, the light, the tactual stimuli of the chair, the cotton mask, etc. - see items 4-6). It was hypothesised that individuals who lost awareness of these stimuli gradually throughout the session would reduce the input of irrelevant noise into consciousness. This phenomenon could reflect an internal attention state similar to absorption. This variable was expected to show a positive association with ESP.

- Success of the technique in altering state of consciousness: One single item asked participants to indicate how much they felt the technique altered their normal state of consciousness (see item 7). It was hypothesised, upon previous work (e. g. Palmer et al., 1979) that scores on this item would correlate positively with ESP.

- Concentration: Level of concentration during the ESP task was assessed by asking the participants about the degree in which their mind wandered and fantasised (see items 8-9). It was hypothesised that low concentration would result in irrelevant information in the individual's mentation. Therefore, participants' scores in these items would appear negatively associated to success.

- Imagery parameters: Characteristics of the individual's mental imagery experienced during the session were assessed by post-session self-reports. The following parameters were considered:

  Effortlessness (see item 10)
  Strangeness (see item 11)
  Auditory imagery (see item 12)
  Dynamic (see item 13)
  Vividness (see item 14)
  Controllability (see item 15)
  Novel images (see item 16)
  Memories (see item 17)

Positive correlations were hypothesised, on the basis of the previous literature (see e. g. Sargent, 1980b, 1981; Sudhakar et al., 1986; Stanford and Neylon, 1975), between ESP scores and all the above variables, except controllability which was thought to distort psi-mediated imagery.

- Level of confidence of the call: Two questions asked the participants to state how confident they felt that they chose the right picture or set of objects among the judging series (see item 18-19). It was hypothesised that participants would be able to estimate their degree of success. Therefore, a positive association was expected between ESP and these two variables.

- Menstrual cycle phase (in women): The effect of biological rhythms on cognitive processes and mood states has been widely studied in mainstream psychology. The female menstrual cycle is one of the most powerful rhythms. Female participants were asked three questions: 1) in which phase of their menstrual cycle they were and 2) whether they were taking at the moment oral contraceptives or 3) had an irregular menstrual cycle (see items 20-22). Answering yes to either of the latter two questions would discard the case. Only females who reported having a regular menstrual cycle and who were not taking oral contraceptives were considered for this particular correlation analysis. Females who reported being at the premenstrual phase were coded as 0s, those who did at the post-ovulatory were as 1s. A negative correlation with ESP was hypothesised upon previous work (Schmitt and Stanford, 1972).

2.3.2. Other Apparatus and Materials

Microphone and tape recorder: Recording was made of participants' mentation during the reception period. A clip-on microphone was used in all sessions plugged into a Sony TCM 939 tape recorder.

Personal audio compact disc player: A Sony D-EJ760 personal CD player was used to generate pink noise via headphones (model Technichs RP-F295).

Radio transmitter and headphones: Senders were provided with feedback of the on-going receiver's mentation through wireless headphones. A Philips HC 8349 radio-transmitter set up at the experimenter's room received the receiver's mentation input through the tape recorder and transmitted it to the sender's headset.

Random Number Generator (RNG). This was used to select the target picture, the target objects, order for sending picture/objects, order for presentation (pictures and objects separately), and condition (ganzfeld stimulation vs. sensory attenuation). The RNG functioning was not tested prior to the series of experiments. Nonetheless, its appropriate functioning was supported by the outcome randomicity checks conducted in the study.

Targets

There were two target pools. One of them consisted of 40 real photographs selected from a pool by the experimenter. The photographs were selected so that they were clear, colourful, and could be interesting and attention catching, in terms of contained elements and theme, for the participants. These were divided into ten sets of four photographs each. There was also a pool of 16 groups of objects (four items per group) divided into four sets, also selected by the experimenter under the same criteria. Among the objects there were above all small handy toys, but also figures and other daily utensils like key rings, a coffee cup, a sponge, a biro, a CD-Rom, a bulb, a chocolate, a piece of soap, a hat, a glasses, a small ball, etc. The items in each set were selected to be as different as possible in terms of colours, utility (objects), theme, and

content. There was a exact duplicate of both pools used for judging. Each picture was labelled on the back with the set number and the letter a,b,c, or d. Each group of objects was enclosed into a small plastic bag, and each set (of four bags) was kept into a small box. Bags were labelled with the set number and, as was also done with the pictures, a letter from a to d. Boxes were labelled with the set number they contained. Therefore, there were two targets per trial and individual, a picture and a group of objects. Target selection was carried out using a true random number generator.

2.4. Procedure

The study was advertised as an ESP study and it was made explicit that £30 would be paid to 1 participant out of each 10, through a lottery-like procedure. Individuals would also be encouraged to come along with somebody else who could act as his/her sender.

When participants approached the experimenter, normally at the main experimenter's office, with the intention to take part in the study, they were shortly explained about aims and procedures and scheduled for 2 sessions each on 2 different days. Thus, each participant was tested twice, attending a psychometric session and a free-response ESP test. Two experimenters were involved in the study: myself (experimenter A) and a co-experimenter (experimenter B). The main experimenter (experimenter A) tested participants in the psychometric session and ran the ESP sessions. The psychometric session consisted of the administration of the questionnaires and assessment of the individual differences variables. Subjects completed first a computerised version of the Benton's visual retention test at the main experimenter's office. Then, they moved to the parapsychology laboratory to complete the individual differences questionnaires I and II, Eysenck IVE, Gordon CVIQ, Marks VVIQ, a visual memory span task, a visual perceptual lability task, and a intuition-like test in this order. This was intended, in addition, to familiarise the participants with the laboratory and experimental settings. Individuals were also explained in more detail about the procedure to be followed in the ESP session. Participants took on an

average one hour to complete the psychometric materials. The second session was a free-response ESP test using either ganzfeld stimulation or sensory attenuation as between subjects conditions. In the ganzfeld condition sensory monotonisation was achieved through pink noise, provided through a personal CD player via headphones, and a red light projected on a translucent paper mask on the individuals eyes. For the second condition earplugs and a mask made of cotton were used instead, to provide sensory attenuation. The translucent paper mask was used in the ganzfeld condition instead of the standard ping-pong balls in order to achieve more equivalent conditions in terms of materials used. Both sessions were designed 30 minutes long.

Random selection of targets was carried out independently for pictures and objects prior to the test was carried out using a true RNG. The outcome of the randomization process was sealed into envelopes and kept away from the experimenter. Similarly, the experimental condition to be used in each session (ganzfeld vs. sensory attenuation) was also randomised. Both experimenters were kept blind to these data until the time when experimenter A started the session after testing and giving standard instructions to the participants. At the time of the session, experimenters A and B met the participants at A's room, on the 6th floor of B-block of the School of Health and Social Sciences of Coventry University, that was also the sending room. The receiver was accompanied to the laboratory, on the 4th floor in the same building, and asked to fill in the pre-session questionnaire. Meanwhile, experimenter A gave the instructions to the sender, when one accompanied the receiver, at the sending room. If participants came alone, a member of the staff (normally experimenter B) would act as the sender. Then, when experimenter A left the room, experimenter B opened the envelopes containing the code for the target picture and objects, and gave them to the sender. At this time, experimenter A, in the laboratory, gave the instructions to the receiver in a standard manner[2], set up the radio transmitter and recording apparatus, opened the envelop revealing the experimental condition, and started the session. Experimenter A remained all the time outside the receiver's cubicle, within the lab, listening to the individual's mentation through headphones, which also attenuated any external stimuli, and writing down his/her comments. In 30 minutes from the commencement of the session

experimenter B, without knocking and trying not to produce any noise that could be regarded as a signal, passed a computer-typed note under the laboratory door (always double-bended, face down, and by the right frame of the door) containing the set number of pictures and objects and a randomised sequence for presentation of the targets and decoys. Experimenter A ignored this note until the time of the judging. After the 30 minutes of receiving period experimenter A released the subject to remind and review his mentation prior to judging. Then, the participant was asked to fill in the post-session questionnaire. Next, the judging for pictures and objects was carried out. The experimenter tried not to influence the participants' selection when judging. Nobody at all was allowed to enter the laboratory until the participant's response had been registered. Finally, the experimenter accompanied the participant to the sending room to find out the identity of the targets.

3. RESULTS AND DISCUSSION

3.1. Exploratory Analyses

Prior to further analyses, variables were examined for accuracy of data entry, missing values, and distribution. 1.2% values were missing randomly across the items. These values were replaced with the mean, except for the variable phase of menstrual cycle whose entry criteria, not being taking contraceptive drugs and having a regular menstrual cycle, produced 46 missing values. Two outliers were detected with a z score larger than 3.29, that corresponds to a p-value below .001. However, both values were within the possible range of scores and, therefore, were not deleted. Four variables were transformed for moderate departure from normality with skewness or kurtosis values beyond ± 2. The new variables were checked and confirmed the accuracy of the transformation.

Given the multiplicity of contrasts to be done on the data of this study, α significance levels were adjusted to .01 in order to decrease the probability of type-I

[2] A copy of the instructions given to the participants in this study can be found in the Appendix D.

error. The power of the analyses, as a consequence, was rendered at .55 for the whole sample and .25 for contrasts made within either the ganzfeld or the sensory attenuation conditions, assuming a low-medium ESP effect size in the population, as suggested in previous research (see Bem and Honorton, 1994).

Bearing in mind ramdomicity criticisms made to previous ESP research (e. g. Hyman, 1985), target selection bias was tested for equiprobability of target, set number, and doublets intertrial independence. Operating at an α level of .01, the distribution of targets for the 60 sessions proved to be random for target alternatives and set number for pictures ($\chi 2 = 2.14$, n. s.; $\chi 2 = 8.03$, n. s.) and objects ($\chi 2 = 0.94$, n. s.; $\chi 2 = 1.74$, n. s.). Intertrial independence was also tested for the 16 combinations of doublets (i. e. AA, AB, AC, AD, BA, BB, etc.) as the target could appear in each 2 consecutive sessions, showing further the accuracy of the of the target distribution for pictures ($\chi 2 = 8.34$, n. s.) and objects ($\chi 2 = 11.06$, n. s.)

3.2. Hit Rates and Experimental Conditions

Each participant in the study contributed 2 individual calls on 2 independent targets within a session, one on the picture and another one on the object (see Table IIIa). The 60 participants who took part in the study produced, therefore, 120 calls, of which 32 were hits. The overall hit rate, 26.6%, did not differ significantly from the 25% expected by chance ($z = 0.42$, $p = 0.33$, one tail), rejecting, thus, our main hypothesis. Twelve of these hits were achieved on the picture, that is a hit rate of 20% ($z = -0.9$, $p = 0.18$, one tail), and 20 on the objects that would be equivalent to a 33% hit rate ($z = 1.52$, $p = 0.06$, one tail). In contrast to our hypothesis, the difference between both percentages did not reach significance, though the effect was in the predicted direction and the p-value was close to .05 ($z = 1.613$, $p = 0.053$, one tail).

	Pictures	Objects	
Ganzfeld	5 16% N-30	13 43% * N-30	18 30% N-60
Sensory	7 23% N-30	7 23% N-30	14 23% N-60

Attenuation			
	12 20% N-60	20 33% N-60	32 26% N-120

Table IIIa: Number of hits and hit rates for ganzfeld and sensory attenuation using pictures and objects as targets. (*) indicates statistical significance at $\alpha = .01$

More hits were registered in the ganzfeld condition, 18 hits (30%, z = 0.9, p = 0.9, n. s., one tail), than in the sensory attenuation condition, 14 hits (23.3%, z = -0.3, p = 0.38, n. s., one tail). This difference did not reach significance (z = 1.23, p = 0.218, two tails) either. This advantage observed for the ganzfeld condition is in tune with an earlier finding by Bierman et al. (1983), who comparing a ganzfeld to a non-ganzfeld condition, where the subjects listened to classical music, obtained more hits, though not to a significant degree, in the ganzfeld. Van Dalen, Murre, Dias, and Schouten (1987) also report a study in which there were no differences between a ganzfeld and a control condition. It must also be stressed that, although the variations I introduced in my study (i. e. the use of a translucent white paper mask instead of the classic ping-pong balls) were helpful, in principle, to achieve more equivalent testing conditions, this feature could have been detrimental for the hit rate. In fact, there is recent empirical evidence from Bem, Palmer, and Broughton (2001) that showed how studies which adapted to the standard ganzfeld protocol obtained significantly higher results than those which introduced variations in the design.

Under the ganzfeld condition, 5 hits were achieved on the picture (16%, z = -1.09, p = 0.13, one tail) and 13 on the objects, with the latter reaching statistical significance (43%, z = 2.52, p = 0.006, one tail). The difference between both percentages is highly significant too (z = 3.176, p = 0.0008, one tail). These results support the hypothesis that multisensorial stimuli would show a higher hit rate when used as targets in ganzfeld ESP research. Conversely, for subjects who were tested under the sensory attenuation condition, 7 hits (23%) were equally registered for objects as well as for pictures.

Restricting the individuals' ESP calls to those produced on the picture, the sensory attenuation condition showed more psi-conducive than the ganzfeld, yielding 7 (23%) and 5 hits (16%) respectively. This difference was not significant though ($z = 0.684$, $p = 0.48$, two tails). However, with objects as target, the ganzfeld produced more hits, 13 hits (43%), than the sensory attenuation condition, 7 hits (23%). This difference was not significant with a 0.01 α level ($z = 1.74$, $p = 0.08$, two tails).

Table IIIa shows number of hits and hit rates per cell resulting from the combination of target type and technique. Overall, subjects showed more success at the ESP task under ganzfeld stimulation than in sensory attenuation. Though this difference is suggestive of an asset of a ganzfeld stimulation technique compared to sensory attenuation to evoke psi in the lab, it does not reach statistical significance. Similarly, participants were more successful with objects as ESP targets than with pictures. This difference did not reach significance, either, operating at a .01 α level. However, power analyses revealed that the probabilities for these differences to reach statistical significance at this α level were less than .10 and .20, assuming population effect sizes of $h = .14$ and $h = .07$ respectively[3]. As can be observed subjects under the ganzfeld stimulation on multisensorial objects target achieved the highest performance. Such a high hit rate would represent an effect size of $\pi = .69$[4]

Nonetheless, it must be noticed that from this study design it cannot be concluded whether objects-like stimuli are more suitable than pictures as targets. In our study, the objects and the pictures content were different in themselves. Whether either modality is associated with any advantage in relation to the other can only be tested if we use pictures of the same objects that are to be employed in the experiments. In any case, the high hit rate achieved by participants under ganzfeld stimulation on the objects and warrants further enquiry.

3.3. Variable Assessment

[3] Effect sizes were estimated through the formula $h = \arcsin .30 - \arcsin .23$ (see Cohen, 1992).
[4] Rosenthal's effect size (see Rosenthal, 1994).

One hundred and twelve variables were explored as predictors of participants' ESP performance in this study. Sixty two of these variables referred to *personality traits and other individual differences*; 31 consisted of *pre-session state factors and other indicators of recent physical and psychological states*; 16 were in relation to individual's *cognitive, psychological, and physical activity* during the reception period; and 3 others were potential *post-session indicators of success* such as relaxation, call confidence, and general comfort at the test situation.

	Pictures (overall)	Objects (overall)	Pictures (Ganzfeld)	Objects (Ganzfeld)	Pictures (sensory attenuation)	Objects (sensory attenuation)
ESP as mental abilities task	-.33*	-.19	-.34	-.30	-.33	-.03
Need for cognitive closure	-.07	-.30*	.07	-.40	-.24	-.14
Preference for order	-.21	-.31*	-.05	-.38	-.37	-.38
Empathy	.05	.22	.15	.42*	-.09	.03
Dream recall	.17	-.04	.15	.29	.19	-.43*
Verbaliser-visualiser	.14	-.007	-.17	.01	.50*	-.09
Visual cognitive lability	.26	-.12	.23	.27	.43*	.02
Locus of control	-.41*	-.09	-.34	-.07	-.50*	-.04
Awake mid night last night	.30*	.03	.38	-.005	.24	.01
Processing of imagery	-.32*	-.01	-.24	-.02	-.39	-.10

Table IIIb: Significant correlation indices between ESP and predictors across technique and target type. (*) indicates significance at α= 0.01.

Given the large amount of correlation indices to be compared, the significance level was kept at α = 0.01. Any more conservative adjustment would have rendered the power of the analyses below .40, for the whole sample, and .15, for within condition contrasts, assuming medium effect sizes in the population correlations. For pictures overall, combining ganzfeld and sensory attenuation, there were 4 correlation indices significant at α= 0.01 (variables *viewing the ESP task as a mental ability task*, *locus of control*, a sleep pattern indicator -*awakening in the mid night on the previous night*-,

and *processing of mental imagery* before reporting). Only 1 of the indices would have been expected to reach statistical significance at this level just by chance, if the measures were independent. If we restrict this sample to the ganzfeld condition, we observe no significant correlation at .01 α level. In the sensory attenuation condition, 3 variables (*verbaliser-visualiser, visual cognitive lability*, and *locus of control*) correlated significantly with the participants' ESP performance on the picture at an α level of 0.01. Similarly, for objects, 2 correlation indices (*need for cognitive closure* and *preference for order*) showed p-values below 0.01. Only 1 significant correlation was found per condition (*empathy*, in the ganzfeld, and *dream recall*, in the sensory attenuation) between the explored predictors and ESP on the objects, as expected by chance. Table IIIb shows variables and correlation indices between ESP and predictors across technique and target type. It was noticeable that none of the correlation values showed statistical significance in more than one cell, except *locus of control* that appeared significantly associated to ESP for call on the pictures (overall) and call on the pictures by participants in the sensory attenuation condition.

Viewing the ESP test as a matter of mental abilities showed negative association to the individual scores across all cells resulting from combining experimental condition and target type. The correlation indices were homogeneously medium-low size, except for the cell defined by individuals in the sensory attenuation condition calling on the objects, that showed a minute -.03 value. A significant correlation index of -.33 was registered for calls on the picture. These results contradict our hypothesis.

Similarly, *need for cognitive closure* showed negative correlations across all cells, supporting our hypothesis, except for calls on the picture under the ganzfeld condition, with a near-zero correlation index of .07. The sizes of the values were, however, more heterogeneous, ranging from .07 to -.40. The association reached statistical significance for calls on the objects (overall) with an index of -.30. The highest value, however, was shown by individuals' call on the object in the ganzfeld condition.

Preference for order, as hypothesised, registered negative associations with ESP consistently across cells, reaching significance for calls on the objects (-.31) and also showing homogeneous values (except for a minute -.05 correlation in the

ganzfeld/pictures cell). The largest correlation between ESP and this variable was shown as well by individuals calling on the objects under the ganzfeld condition (-.38).

Empathy registered positive, and heterogeneous in size, correlations across all cells, as hypothesised, except for calls on the pictures by subjects in the sensory attenuation condition where a -.09 value was registered. The highest index was .42, significant for subjects' calls on the objects, in the ganzfeld.

Positive values ranging from .15 to .29 where shown for variable *dream recall*, except for the cell corresponding to the individuals' calls on the objects that showed a minute -.04 correlation, and the cell determined by participants in the sensory attenuation condition calling on the objects too, that showed the significantly negative value of -.43. Correlation indices for this variable, as well as for the next 5 ones, were notably heterogeneous across condition and target type.

Variable *verbaliser-visualiser* showed overall small correlations around zero ranging from -.17 to .14, except for individuals' calls on the picture under the sensory attenuation condition which registered a significant correlation index of .50. This positive association is aligned with earlier findings in the literature (see Weiner, 1982; Irwin, 1979) standing for an asset by subjects with a visual cognitive style. However, the consistent near-zero values observed in the rest of the cells debilitate the reliability of this statistic.

Visual cognitive lability scores correlated positively with ESP across all cells, as hypothesized, except for calls on the objects (-.12), with indices ranging from .02 to a significant .43 for subject in the sensory attenuation condition calling on the picture.

Except for a very small correlation of -.005, the sleep indicator "*awaking in the mid of the night last night*" showed also positive association to ESP scores across condition and target type, with the highest correlation registered for individuals calling on the pictures overall (.30, significant) and on the picture under the ganzfeld condition (.38).

The approach used in this study to evaluate *locus of control* differed from standard instruments in the literature in that I asked the individuals if they viewed the outcome of the session as produced by themselves (internal factor) or due external factors such as the experimental setting, the sender, luck, etc. Like this, I tried to tap, rather than a general trend, a particular appraisal for the ESP task. There is also the possibility that their responses be influenced by paranormal belief. Previous literature on the relation between locus of control and ESP failed to find any significant association. Contrary to expectancies, locus of control showed negative values consistently across conditions and target type, with values ranging from -.04 to -.50, reaching statistical significance for 2 cells defined by the calls of individuals on the pictures overall and under the sensory attenuation. These correlations reflect higher scoring by participants who showed an internal locus of control for the ESP task.

Similarly, and according to our hypothesis, degree of *mental imagery processing* registered negative correlations across all cells, with a significant value of -.32 for calls on the picture overall. Higher and more homogeneous correlation values are clearly observed in the cells that were defined by calls on the picture overall as well as under either experimental condition (-.32, -.24, -.39) in contrast to the small association indices registered when the call was made on the objects (-.01, -.02, -.10). The same pattern is also observed for 2 further variables; locus of control and awaking at mid night on the night before. This pattern might reflect a dependence of the degree of success of these variables as ESP predictors on the type of target used in the experiment.

The use of low significance α levels have been occasionally criticised for implying severe loss in the power of the analyses (e. g. Rosenthal, 1990). This perspective would leave room, if not for prioritising the power to the risk of committing type-I error, at least, for a more balanced adjustment, especially in the exam of effects of small magnitude such as the ESP effect. If we keep α at its usual .05, the power of our analysis increases to .65 and .35 for the whole sample and ganzfeld and sensory attenuation conditions respectively. The number of correlations that, like this, would be expected to reach statistical significance by mere chance, under independence of measures, would be 5.5. We observe 8 variables to correlate significantly with ESP on

the picture and other 8 with the objects, for the whole sample. Restricting our analysis to the ganzfeld condition, we find 8 significant correlations with ESP on the picture and 15 on the objects. In the sensory attenuation condition 19 indices were significant in relation to the picture and 8 in relation to the objects. Thus, we observed that when the risk-of-type-I-error/power-of-analysis relationship is more balanced the difference between number of expected and observed significant correlations increases showing greater evidence of internal psi effects taking place in the study.

It was a striking observation that the correlation indices varied largely across the groups resulting from combining target type and technique. An exploratory analysis shows that, from the variables that correlated significantly with the individuals' ESP call in the ganzfeld condition, only 2 were recurrent for both pictures and objects. Six variables of the remaining showed correlation indices that were statistically different for pictures and for objects using an α level of .05. For the sensory attenuation condition, only one of the variables that showed a p-value below .05 was recurrent for both picture and object, and 9 of the remaining ones showed significantly different correlations for pictures and for objects.

Equally, if we split the individuals' calls on the basis of target type, and examine the variation of the correlation coefficients across ganzfeld and sensory attenuation conditions, we observe a similar picture. Twenty-seven correlation indices showed a p of .05 or less for pictures overall, 8 in the ganzfeld condition and 19 in sensory attenuation. Only 2 of these correlations were recurrent across conditions, and 4 showed significantly different correlations for ganzfeld and sensory attenuation at a .05 α level. Similarly, 23 of these correlations were produced for objects, of which 15 were registered for the ganzfeld condition and 8 for the sensory attenuation condition. None of them overlapped, and 12 of these variables showed statistically different correlations for ganzfeld and sensory attenuation.

These results suggest that the variables that predict success as well as their magnitude might depend upon both type of stimulus and technique used in the experiment. Some studies in the literature also suggest different associations between ESP and individual differences on the basis of type of target (Carpenter, 1971; Dean

and Nash, 1967; Johnson; and Nordbeck, 1972; Price, 1973). This hypothesis challenges further research and poses the question whether, and to what extent, different characteristics in the experiment, participants, experimenters, etc. determine differently the variables that predict the study success.

Outcomes of ganzfeld/sensory attenuation manipulation were also explored in terms of the participants' cognitive, psychological and physical functioning during the reception period. A series of t-tests were performed comparing means in ganzfeld and sensory attenuation of the variables processing of imagery before reporting, post-session relaxation, response constrains, altered state of consciousness, concentration, experiencing "mind in blank", response productivity, effort to image, quality of imagery, auditory imagery, dynamic imagery, vividness of the images, voluntary control of mental imagery, experiencing novel images, experiencing memories, and post-session comfort. None of the tests was significant at an adjusted α= 0.01.

The way in which individuals responded to technique manipulation was further examined by comparing variances of the above variables. Equally, no significant differences were found. The ganzfeld-sensory attenuation manipulation did not, therefore, affect the variance of these variables at an α= 0.01 either. The largest F value was shown for variable voluntary control of mental imagery. This would have been significant operating at an α level of 0.05 ($F_{|30,30|}$ = 2.1, p = .04), suggesting that subjects responded with larger variability in the voluntary control exerted on their mental imagery under the sensory attenuation condition.

Therefore, the ganzfeld/sensory attenuation manipulation yielded neither parapsychological, in terms of ESP success, nor psychological differences, in a significant degree, in the individuals tested in this study.

4. CHAPTER SUMMARY

This study was intended to contribute to the exploration of those variables which count on a lesser degree of experimental work as well as other that have never

been studied in relation to the prediction of ESP scores. It was also intended to compare the effects of two experimental conditions: ganzfeld sensory monotonisation vs. sensory attenuation, and two types of targets: pictures vs. objects.

The overall hit rate did not differ significantly from chance expectation, rejecting, thus, our main hypothesis. Overall, subjects showed more success at the ESP task under ganzfeld stimulation than in sensory attenuation, although this difference did not reach statistical significance. Similarly, participants were more successful with objects as ESP targets than with pictures, which would support the hypothesis that multisensorial stimuli would facilitate the ESP success when used as targets. However, this difference did not reach significance. The highest hit rate, 43%, was achieved by subjects in the ganzfeld condition calling on the objects.

One hundred and twelve variables were tested as predictors of participants' ESP performance in this study. None of the correlation values showed statistical significance in more than one of the cells defined by target type and condition, except *locus of control* that appeared significantly associated to ESP for call on the pictures (overall) and call on the pictures by participants in the sensory attenuation condition. When the risk-of-type-I-error/power-of-analysis relationship is more balanced, by increasing alpha from .01 to .05, the difference between number of expected and observed significant correlations increases showing greater evidence of internal psi effects operating in the study. It was a striking observation that the correlation indices varied largely across the groups resulting from combining target type and technique. These results suggest that the variables that predict success as well as their magnitude might depend upon both type of stimulus and technique used in the experiment. This hypothesis challenges further research and poses the question whether, and to what extent, different characteristics in the experiment, participants, experimenters, etc. determine differently the variables that predict the study success.

Ganzfeld/sensory attenuation manipulation did not yield psychological differences in terms of the participants' cognitive, psychological and physical functioning during the reception period, in a significant degree, in the individuals tested in this study.

In the next chapter, I describe a survey study conducted on researchers with the intention to collect ideas on methods and procedures that could be used in order to increase ESP experimental research rates.

CHAPTER IV: A SURVEY ON PSI-CONDUCIVE PRACTICES (STUDY II)

INCREASING HIT RATES IN FREE-RESPONSE ESP RESEARCH

1. Introduction

The Achilles' heel of parapsychology, and frequent focus of criticisms has been experimental, controlled replication of the studied phenomena. Chapter 2 surveyed a series of variables that could play a role in the experimental success. A large number of individual differences, state, and other factors were explored in the first experimental study described in the previous chapter. Furthermore, many parapsychologists drive their efforts towards the development of a method to systematically replicate psi effects in the laboratory. The ganzfeld has been a product of such an effort and is, at the moment, the most used technique in experimental ESP inquiry. However, recent studies (Milton and Wiseman, 1999) suggest that the mere use of the technique might be insufficient unless the researchers pay further attention to psi-facilitating aspects relating to the experimental setting, protocol, participants, etc.

In this chapter we describe a survey conducted on researchers on psi-conducive practices. Psi-conducive practices in ESP research can be viewed as modes of operating in order to promote the appearance of, and enhance, psi under the controlled circumstances of a parapsychology laboratory experiment. Several studies in the literature have explored the accuracy of diverse means of improving experimental ESP success. Among them, participant selection based upon personality traits and other differences (e. g. artistic ability, extroversion, neuroticism, etc.) seems to be the most commonly used means. Chapter 2 described several other techniques collected from the literature, too, such as dealing with participants (a frequently regarded one too) in order to relax, motivate them, etc, or trying to "optimise", by diverse mechanisms, the

experimental setting and procedure. In search for a recipe for success in ESP research, psi-conducive practices play quite a central role.

As in any other science, observation and statement of hypothesis are the departing point for further research and new findings. Because parapsychologists frequently point out ideas and anecdotal impressions from their own work in informal communications, chats, meetings, etc., it was thought that a survey that explicitly invited to point out this ideas would help in drawing potential means of increasing hit rates in free-response ESP research. It was expected that valuable pieces of subjective, and even anecdotal, knowledge that might be unsuitable for formal publication would be made explicit in this survey (see Delanoy, 1997).

In 1996, a panel within the PA Annual Convention (Delanoy, 1997) dealt with psi-conducive practices pursuing the same objective: collecting and making explicit tacit knowledge of potential mechanisms to facilitate psi. Though an important body of issues was discussed, such as the experimenter effect, laboratory setting, testing environment, and experimenter-participant social interaction, this source could be exploited further. There were 3 factors that could have limited the amount of knowledge gained in this panel. These are: first, the exposition was contributed by a minority of professionals in the area (only 5 researchers); second, the fact that the panel was held in association with a formal parapsychology convention and that suggestions were to be made public (third) could have prevented the participants from putting forward more intuitive and anecdotal materials. In the survey described in this chapter, regarding these factors, I tried to contact a large number of researchers, explicitly encouraging them to put forward "any potential means" of increasing ESP results, and warranting anonymity of the communications. A detailed description of methods and results is provided next.

2. Method

This survey was completed in two phases. First, a list of about 60 researchers and academics in the area, extracted from recent publications and parapsychology organisations databases, were contacted through email and conventional mail and invited to point out their views on *"potential means to increase hit rates in free-response ESP research"*. A period of three months waiting was established. After this time no more replies were expected or received. The response rate for the survey was 43%. Then, the material received was explored. Most suggestions were viable in the current research trends and a total of 46 items were identified in the materials received. Then, these hints were listed in a new questionnaire and, approximately six months later, resent to the same guests one second time with the intention to explore two new things: a) the level of confidence that each suggestion produced in the parapsychology research community, and b) the extent to what the referred aspects had been attempted in previous research. Parapsychologists were asked to indicate if each suggestion, in particular, seemed to them certain, likely, unlikely, or self-defeating when trying to promote the study hit rate. Also, researchers who had conducted free-response ESP research were asked to indicate if they had always, frequently, seldom, or never attempted what each suggestion proclaims, in their previous work. The response rate was 36% in this case.

3. Results and Discussion

After thoroughly reading through the questionnaires received, it was decided that the ideas suggested could be classified into a series of categories which could reflect domains to be exploited in ESP experimental research in order to achieve successful hit rates. These categories were the following: a) psychological management and preparation of participants, b) experimental design, c) treatment of data, d) targets, e) ecological validity, f) instrumental measures, and g) others. Table IVa shows each suggested item with the mean of the confidence level reported by the group of parapsychologists contacted, and the degree to what it has been attempted in previous work. Level of confidence varies from 1 to 4 as follows: 1 = the idea is thought to be

self-defeating for free-response ESP studies, 2 = the idea is unlikely to help in increasing the study hit rate, 3 = the idea is likely to increase the study hit rate, and 4 = the idea is certain to increase the study hit rate. Similarly, parapsychologists pointed out the degree in which they had attempted what the idea proclaims in their previous work as follows: 1 = never, 2 = seldom, 3 = frequently, 4 = always.

Table IVa, Section 1: Instrumental Measures

Suggestions Concerning *Instrumental Measures*	***Average Level of Confidence: 3.07***	***Average Utilisation in Previous Research: 2.36***
Use successful experimenters as proved in previous studies.	3.27	2.7
Consider the experimental set up as a system with the experimenter and investigator (if different) as separate components of the system. Thus, look for well-integrated systems as evidenced in performance in previous studies.	3.07	2.33
Use target material with which high hit rates have been already obtained (e.g. select successful sets from previous studies).	3.05	2.29
Use intuitive judges that have provided high hit rates in previous studies.	3	2.12

Table IVa, Section 2: Psychological Management and Preparation of Participants

Suggestions Concerning *Psychological Management and Preparation of Participants*	***Average Level of Confidence: 2.98***	***Average Utilisation in Previous Research: 2.6***
Make participants feel comfortable. Try to make them be happy with the setting and the people in the experiment, the topic, the procedure, the study in general, what his data will be used for, etc.	3.5	3.58
Include a pre-experiment informal chat as part of the session.		

	3.2	3.37
Look for and try to decrease any concerns in relation to the study. Encourage participants to make questions about anything they might be worried about.	3.14	3.1
Take participants to see the laboratory and explain to them about the equipment, procedure, etc. before the scheduled session.	3	3
Remind participant of previous successes and paranormal experiences, "getting the participants in the mood for psi"	3	2.6
Perform rituals before the session, if participants and experimenter like.	2.75	1.66
Perform a guided meditation before the session.	2.66	2
Take participant to observe a real session, or even run a informal trial before the scheduled session.	2.6	1.77

Table IVa, Section 3: Ecological Validity

***Suggestions Concerning** Ecological Validity*	***Average Level of Confidence: 2.96***	***Average Utilisation in Previous Research: 1.9***
Use less artificial methods than those normally used in Parapsychology labs, and closer to real life situations and spontaneous case phenomenology.	3.2	2.4
Create emotionally arousing experiences for the sender.	3	2
Use pairs of parents and children as receiver and sender. Separate the child from his parent and put him/her in a mildly emotive situation, or get him/her to do things that his/her dad/mum would react emotionally to.	2.68	1.41

Table IVa, Section 4: Experimental Design

Suggestions Concerning *Experimental Design*	***Average Level of Confidence: 2.8***	***Average Utilisation in Previous Research: 2.33***
Use a personalised approach to the phenomenon. Some people require concentration, others relaxation, others an informal atmosphere, others a more professional-looking environment. It would be the task of the experimenter to recognise characteristics of participants and adapt the design and protocol to them.	3.47	2.27
Researchers should go themselves through their own protocol before starting the study, and get feedback from some other experimenters and subjects, in order to find out how participants will feel and what might discomfort them.	3.22	3.1
Experimenter should be happy about the design and other aspects in connection with the study.	3.09	3.4
Use experimenters with a cheerful, communicative and optimistic character.	3.05	3.13
Use relaxation exercises as part of the session.	2.9	2.55
Use techniques that participants are familiar and comfortable with rather than forcing them to fit within a specific research protocol.	2.88	2.2
Try to approximate the dream state in the lab.	2.87	2.3
Use techniques to induce ASC, e.g. drumming tapes.	2.86	2.33
Provide feedback of the on-going receiver's mentation to the sender when they are happy with the idea. Make sure that receiver won't feel embarrassed about being listened to by the sender.	2.86	2.28
Avoid super-sheep	2.46	1.46

If they are not totally happy allow them to suggest slight changes in the setting and procedure.	2.4	1.95
Use multiple experimenters for the study, especially when the study involves a large number of sessions. This will prevent the experimenter from getting bored or loosing motivation in the study.	2.4	1.85
Use males as receivers and females as senders.	2.21	1.5

Table IVa, Section 5: Data Treatment

***Suggestions Concerning** Data Treatment*	***Average Level of Confidence: 2.62***	***Average Utilisation in Previous Research: 2.15***
Use psychophysiological measures as additional psi-indicators.	3	1.88
Use majority vote techniques, obtaining several calls per individual on the same target, or using several participants per target.	2.8	1.7
Use sum of ranks or rating scales for the analysis of data.	2.73	3
Reviewing the individual's comments after the session for both reminding the participant of his experience before judging and collect post-session explanations and comments.	2.61	3.07
Use Consensus Judging, having a group of judges discussing the called material.	2.58	2.06
With the correspondent pre-specifications, ditch trials where people tic ranks, leaving only the ones where participants have a strict order of preference.	2	1.18

Table IVa, Section 6: Targets

Suggestions Concerning *Targets*	***Average Level of Confidence: 2.55***	***Average Utilisation in Previous Research: 1.84***
Use multi-sensorial targets, e.g. pictures of the Artic, fan on face, ice on hand, cold room, etc.	2.87	1.56
Use personal things as target. Allow participants to bring things with personal meaning (photographs, objects, etc.).	2.64	1.4
Use target materials that are interesting for the individual. Avoid boring and non-interesting pictures, etc.	2.35	2.88
Use actual human beings doing things in various situations as targets. For example, from a group of friends choose 1 as the target/sender whose identity must be guessed by the receiver.	2.35	1.6

Table IVa, Section 7: Other Sugesstions

Other Suggestions	***Average Level of Confidence: 2.98***	***Average Utilisation in Previous Research: 2.56***
Selection of participants. The following characteristics were mentioned: From a creative population, paranormal believers, paranormal experients, extroverts, artistic pursuit, Myers-Briggs FP type, imaginativeness, disociability, practice of mental discipline, belief they can be psychic in the laboratory and under the conditions of the experiment.	3.61	2.41
If the subject, for any reasons, don't feel up to do any experiment, don't run the session.	3.1	3.22
Create a informal, game-like, even joking situation. Make the session enjoyable.	3.1	2.64

Run sessions around 13.50 LST and avoid 18.50 LST.	3	1.76
Run the session when the GMF activity is low.	3	1.75
Encourage subjects to bring along a friend or relative if they feel happy with it. But use a member of the staff as sender if they prefer that instead.	3	3
Participants should be self-selected, volunteering freely for the experiment.	2.1	3.16

Table IVa: Strategies suggested in order to increase free-response ESP studies hit rates, with average subjective level of confidence and utilisation in previous research.

The overall confidence level for the set of ideas pointed out was a rating of 2.84, near "likely". This is, suggestions as a whole were believed nearly likely to increase the hit rate of a given free-response ESP study by the community of parapsychoogists surveyed. The highest confidence was shown in relation to items classified in categories *instrumental measures*, *psychological management and preparation of participants*, *others*, and *ecological validity*, with averages of 3.07, 2.98, 2.98, and 2.96 respectively. The lowest confidence level was reported for items in categories *target*, *data treatment*, and *experimental design*, with means of 2.55, 2.62, and 2.8 respectively.

Similarly, the parapsychologists surveyed reported an average previous use of the strategies here outlined of 2.32, near "seldom" used. The strategies most frequently used were those concerned with *psychological management and preparation of participants*, *others*, *instrumental measures*, and *experimental design*, with means of 2.6, 2.56, 2.36, and 2.33 respectively. The least used strategies were those in categories *data treatment*, *ecological validity*, and *targets*, with means 2.15, 1.9, and 1.84 respectively.

There was a significant .45 ($p<.01$, two tails) correlation between the level of confidence and the degree in which each suggestion had been used in previous research. Parapsychologists tend to use more frequently those practices and procedures which are most believed to contribute to the experimental success.

Moreover, in addition to the above, parapsychologists were invited, in this second phase of the survey too, to point out, once more, new ideas to improve the study outcome that were not listed. Some new suggestions were collected as listed below.

- Introduce sender and receiver, if they do not know each other, and allow some time for social interaction between them before the experiment.
- Avoid male/male pairs.
- Select emotionally close pairs as sender and receiver.
- Encourage post-trial rituals.
- Select biologically related pairs as sender and receiver.
- Explain participants that their contribution will be useful anyway, regardless of the outcome.
- Clear out distractions in the individual before the experiment

4. Conclusion

Many interesting ideas, that are also viable in the current research trends, arouse from this survey. One wonders whether the use of the directions and procedures here suggested can help psychical research to achieve its replication target. In principle, none of the suggestions here outlined would warrant success in improving the study outcome per se. The ideas here suggested could have come from experimental facts as well as from anecdotal observations, or even from rational deductions. Most of them count on little, or none, experimental evidence. Similarly, that an idea produced a high degree of confidence in the sample of parapsychologists

surveyed does not warranties that it is going to work or work more than a less trusted item. The estimations could have been based on empirical evidence but also could be rather subjective. It is, however, argued that such techniques are a rich source for further research and that their exploration could largely contribute to the development of a successful protocol for the experimental replication of the ESP phenomenon. (An analysis of the ideas here put forward in relation to previous experimental findings and my own experimental results from studies I and III. will be presented later.)

A striking, though somewhat expected, finding was that the suggestions here pointed out, overall, are little being used or, at least, not as much as they could be with a mean rating of 2.32, nearly *seldom* used. It is surprising as many of the items appeal to implicit knowledge largely shared in the parapsychological research community. This fact, however, can be accounted for by a dominant interest in process-oriented research. As previously explained, experiments nowadays are, primarily, designed to examine determined aspects of psychic functioning, instead of producing outstanding "proving" hit rates. Moreover, it is also known that some of the measures could yield detrimental effects for the research. For instance, recruiting participants on the basis of personality and individual differences in our experiments would, obviously, narrow the generalizability of the findings. Also, forcing the phenomenon, somehow, introduces artificiality in the study that would also question the validity of our findings when being applied to real-life, naturally occurring, situations. Many views would see preferable letting the phenomena arise itself and, rather than forcing it, then study it at any expense of the hit rate and proof-oriented views. These could be reasons why parapsychologists are not making use of the procedures that could provide greater evidence for the ESP phenomenon. This could also explain the small effect size found in some meta-analytic work (e. g. Milton and Wisemal, 1999). I think that there is a need in the field for the integration of measures like the ones revealed in this survey into our research protocols at the time as the appropriate levels of generizability and ecological validity are maintained.

5. Chapter Summary

Researchers have explored the accuracy of diverse means of improving experimental ESP success. This survey was carried out in addition to the literature review conducted in chapter 2. A series of researchers and academics in the area, extracted from recent publications and parapsychology organisations databases, were contacted and invited to point out their views on *"potential means to increase hit rates in free-response ESP research"*. The ideas suggested were classified in the following categories: a) psychological management and preparation of participants, b) experimental design, c) treatment of data, d) targets, e) ecological validity, f) instrumental measures, and g) others. Suggestions as a whole were believed nearly likely to increase the hit rate of a given free-response ESP study by the community of parapsychologists surveyed. The overall rating of use of the suggestions in previous research reported by the own researchers was nearly seldom. This fact, however, can be accounted for by a dominant interest in process-oriented research. I concluded that many interesting ideas, which are also viable in the current research trends, arouse from this survey and that the use of these procedures could largely contribute to ESP success.

This survey (Study II) took place chronologically between the two experimental studies, Study I, described in Chapter 3, and Study III, described in the next chapter. Although it was not the experimenter's intention to make use of the knowledge gained through the survey in the design and conductance of the second experiment, there is room for the possibility that some aspects of the design, protocol, and social interaction with the participants have been influenced by the insight gained in this survey on what other experimenters recommend, which could have played a role in the study outcome.

CHAPTER V: EXPERIMENTAL STUDY III

USING LOGISTIC REGRESSION ANALYSIS IN THE DEVELOPMENT OF A RECIPE FOR SUCCESS IN GANZFELD ESP RESEARCH

1. INTRODUCTION

Study I tested a series of individual differences and state factors extracted from the literature. These variables had been little explored but could be put forward as candidates for the prediction of ESP success on the basis on some theoretical approach or opportunistic finding in parapsychological research or mainstream science. The study, in addition, compared 2 experimental conditions (a ganzfeld stimulation vs. sensory attenuation) and 2 types of targets (pictures vs. objects).

In this chapter we describe the second experimental study, Study III, aimed mainly at testing those variables that showed predictive value of participants' ESP scoring in the pilot study, using a larger sample size. The most successful hit rate in Study I was observed in relation to objects as targets under the ganzfeld condition. Variables showing correlation indices with a p-value of .05 or less in this condition were entered in the present study. A total of 18 variables were selected under this criterion; internal awareness, perceiving the ESP task as a matter of mental abilities, need for cognitive closure, preference for order, preference for predictability, decisiveness, ambiguity discomfort, closed minded, cognitive disorganisation, dissociation, empathy, impulsivity, intuition, controllability of visual imagery, feeling vigorous during the last week, feeling vigorous on the day of the experiment, sensory adaptation, and confidence call. In addition, a series of 92 different predictors commonly appeared in the literature were also included (see next section). As a result, a total of 110 variables were included in this study. Only one experimental condition, the standard ganzfeld with objects as targets, was used in order to fulfil the minimum case-to-variable ratio required in logistic regression. The use of experimental

conditions like the ones in the previous experiment would have required unattainable sample sizes, given time and resources constrains.

This study was also intended to show the utility of logistic regression in formula development ganzfeld ESP research. A logistic regression equation was constructed to demonstrate the predictive value of the most successful variables.

Hypotheses

On the basis of previous research in the area, it was hypothesised that the overall hit rate of the study would be significantly above chance expectation at a .05 α level. Hypotheses in relation to the direction of the associations between the variables and ESP scores were mostly based on previous psychical research and mainstream psychology. For a minor number of variables, for which the literature was too thin, hypotheses were stated on a more intuitive basis. All hypotheses if not otherwise stated, refer to a significant level of .01 in this study.

All 18 variables filtered in from the previous experimental study were hypothesised to replicate their effect in magnitude and direction. Gender, where high scores would describe a male social role and behaviour, was hypothesised to correlate negatively with ESP scores, mainly on the basis of cultural beliefs on "female intuition". This belief, if generalised to the sample of participants, could influence the experimental outcome through expectancies. Variables: richness and controllability of visual imagery as well as degree of mental effort made by the individuals to obtain imagery, feeling scared, uncomfortable, irrelevant thinking or processing of the mental imagery before reporting were expected to distort the psi-signal, introduce noise, as defined in the Noise Reduction Model, or interfere with the ESP process during the ganzfeld task and, therefore, were hypothesised to correlate negatively with the experimental outcome. Amount of hours of sleep during the previous nights was expected to correlate positively with ESP scores due that the individual would feel more rested and would undertake the task more positively. Conversely, variables stress, tension and anxiety, intake of stimulant drinks, energetic and tense arousal were

expected to interfere the relaxation process and, therefore, introduce *physiological noise*. Relaxation and sensory adaptation during the ganzfeld, according to the Noise Reduction Model, would be expected to facilitate the ESP process by reducing the level of physiological noise and external stimulation. Similarly, indicators of these variables were hypothesised to correlate positively with the experimental outcome. Psychotism was expected to correlate negatively with the participants' scores on the basis of previous findings in the literature (e. g. Haraldson, 1995), the same as variables phase of menstrual cycle, being 0 = pre-menstrual and 1 = post-menstrual (Schmidt and Stanford, 1972), anger, frustration, and feeling annoyed at any point of the experiment (e. g. Schmeidler, 1950, 1954), defensiveness (Haraldson, 1985), neuroticism (Braud, 1977; Kanthamani and Rao, 1973). Similarly, other variables were, also based upon previous findings, were hypothesised to correlate positively with participants scores. This is the case for dissociation (Schmeidler, 1982; Pekala, et al., 1995), religiosity (Haraldson, 1985; Haraldson and Houtkooper, 1991), dream recall and interpretation (Sargent, 1981), prior psi-laboratory testing and practice of mental disciplines (Honorton, 1992), creativity or artistic pursuit (e. g. Dalton, 1997), extraversion (Kanthamani and Rao, 1972; Honorton and Ferrari, 1989), sensation seeking (Curtis and Wilson, 1997), FP dimensions of the Myers-Briggs Type Indicator (Honorton, 1992), paranormal belief (Lawrence, 1993), right brain dominance (Braud, 1975; Broughton, 1977a), transliminality (Thalbourne, 1996; Grainger, 2001), absorption (Stanford and Angelini, 1984; Irwin, 1994), a measure of sender-receiver closeness and intimate bonds (Bierman et al., 1993; Broughton et al. 1989), expectancies of success (Tadonnio, 1976), degree of ASC and indicators feeling confused during the ganzfeld stimulation, loss of time, space, or identity awareness, which could reflect an ASC (Stanford and Stein, 1994; Palmer et al., 1974). Higher scores were hypothesised in sessions run during 13.5±1h local sidereal time as shown by Spottiswoode (1993, 1997). Highest scoring was hypothesised for sessions in which males were senders while females were receiving, followed by sessions in which males were receivers and females senders, same sex female-female sessions, and lowest scores for male-male sessions (Dalton, 1994). The intuition process could involve a degree of ESP. Therefore, a positive correlation between a measure of intuition and participants' scores was also hypothesised.

2. METHOD

2.1. Participants

Ninety participants were recruited through advertisement of the study amongst the student population at Coventry University. £5 were paid to every individual for travelling, and other expenses derived from their co-operation in the study. There were 36 males and 54 females. The age of the participants ranged from 18 to 43, with a mean of 24.

2.2. Design

Only one condition, the standard ganzfeld procedure, and one target type, objects, were used in this study. Correlation analyses were run in order to test the hypothesised association between the variables and the participants' ESP scores.

Similarly to the previous experiment, the hit rate (dependent variable) for the study was defined employing a nominal scoring method, for being this method the most commonly reported in the parapsychological literature. The participant simply picked on a 'blind' basis the one of the four pairs of objects which corresponded most closely to his/her experience during the reception period. If the stimulus chosen was the target used for the session, one hit was counted. Otherwise, the trial was regarded as a miss.

2.3. Materials

2.3.1. Questionnaires and Variables[5]

A series of questionnaires, scales, and other psychometric tools were used in the assessment of the individual differences and state factors variables. As was done in the first experimental study, when a concrete psychometric instrument showed success in the previous literature in revealing an association between participants of ESP studies scoring and a determined variable, that questionnaire, scale, or psychometric tool would be used in the present study. In the cases where the previous literature did not point toward the usage a concrete measurement tool or did but the instrument was not appropriate for the study, due to time constrains, required training, or other reasons, an alternative measure would be used. Ii was intended, in all cases, to find an instrument for which satisfactory properties had been reported. In those cases where an appropriate instrument could not be found, or the variable could be easily assessed through direct, simple questions the experimenter constructed the items. The questionnaires, scales, and other instrument used in this study are listed below.

2.3.1.1. Trait questionnaires

Individual Differences Questionnaire: A number of scales and sub-scales were collected from the literature and integrated into one single questionnaire. The items had a four-choice liker scale format and were scored from 1 to 4 to reflect the degree in which the respondent agreed with the item statement. The questionnaire was structured in a way that high scores in the items, scales, or sub-scales would reflect high incidence of the dimension measured. Scale total scores were calculated by adding up the means of the participants scores in the sub-scales. With this questionnaire we assessed the individual differences described below:

[5] A copy of questionnaires I and II as well as post-session, and pre-session questionnaires can be found in appendix-II

Variables self-consciousness (see items 1-4), need for cognitive closure (see items 27-46), cognitive disorganisation (see items 54-59), dissociation (see items 82-94), religiosity (see items 151-154), perception of the ESP task as a mental abilities task (see item 15), dream recall (see item 116), and dream interpretation (see item 117) were selected from the previous experimental study. The same measurement tests and scales were used in this study (see chapter III, section 2).

Prior psi-lab testing (see items 300 and 301) and practice of mental disciplines (see items 302 and 303) were assessed by directly asking participants whether they had taken part in another ESP or parapsychology test in the past. They were also asked whether they practiced, or had ever done, a mental discipline such as yoga, transcendental meditation, biofeedback, etc. Positive associations with ESP were hypothesised for all these scores on the basis of previous research (see e. g. Bem and Honorton, 1994; Honorton and Schechter, 1987).

Eysenk's IVE (Impulsivity, Venturesomeness, Empathy Personality Inventory, Eysenck, H. J. and Eysenck, S. B. G., 1991): The IVE is a well-know reliable and valid measure (Eysenck and Eysenck, 1985) to assess the constructs of impulsivity, venturesomeness, and empathy. Because of time and resource constrains only the sub-scales of impulsivity and empathy were used in this study. Positive correlations were hypothesised between ESP scores and these two constructs on the basis of previous research (e. g. Schmeidler, 1985; Stanford, 1973). The hypothesised correlation between ESP and empathy was further based on the argument that an ESP mechanism could be implied in empathy, as the process of understanding other's feelings, views, and impressions.

Gordon's CVIQ (Controllability of Visual Imagery Questionnaire): In this questionnaire the participants were required to produce voluntarily determined mental images. The questionnaire assesses the degree in which the individual is able to control his/her mental imagery. Individuals are, therefore, classified as controllers, if they are able to exert a great degree of control over their mental imagery, or autonomous, if not. It was thought that controllers would tend to manipulate and distort psi-mediated imagery in

a greater degree than autonomous individuals. Therefore, a negative correlation was hypothesised for this variable.

Embedded Figures Test (EFT): Field dependence is an individual's ability to abstract relevant information from a larger set of stimuli or background. An EFT, in which participants were required to find a determined figure within a complex pattern of lines and shapes, was used to assess field dependence. Those individuals who are able to find a larger number of figures within the given time in this test are referred to as field independent. Those who experience more difficulties are referred to as field dependent. Because of the similarity of this perceptual ability with the ESP task where the individual must discern psi signals from background noise, a positive association was hypothesised between scores on this test and ESP.

A stroop task (Defensiveness): The concept of defensiveness has its origins in psychoanalytic theory in which the ego uses defence mechanisms to defence itself against anxiety. Most conceptualisations of defensiveness share the notion of the delayed or distorted perception of potentially threatening stimuli. Although there are several paper-and-pencil tests to measure defensiveness, a performance task was used in this study in order to avoid reliability and validity problems often pointed out in relation to the former techniques (e. g. Joy, 1963). Although the Defence Mechanisms Test has shown successful in the prediction of ESP scores, its use was not suitable in this study, for being extremely time consuming and require prior intensive training. Instead a Stroop task, based on the same reasoning as the DMT (i. e. a delayed or distorted perception of potentially threatening stimuli), was used in this study. Two sheets made of five columns of ten words each printed randomly on different colours were used. The first matrix was made of neutral words while the second was of emotionally threatening words. Participants were asked to name the colour of the ink of the words in the two matrices. Those participants who took longer with the threatening words were classified as defensive (coded as 1s), while those who took less were classified as vigilant (coded as 0s). Higher ESP performance was expected for the vigilant group on the basis of previous work (Haraldsson and Houtkooper, 1995).

An alternate uses creativity task: The individuals were given three objects, one after another, in this order: a piece of cotton, a 50 cm ruler, and a party cone-shaped hat. They were asked to say possible uses of each of the objects in one minute. The individual's creativity score was the total number of uses given for the objects divided by three. It was hypothesised on the basis of previous research on creativity and ESP (e. g. Braud and Loewenstern, 1982), that this score would show a positive association with the experimental success.

NEO-PI (Costa P. T., McCrae R.R., 1992): The NEO-PI was used in this study in order to assess the dimensions of agreeableness, extraversion, neuroticism, and sensation seeking. Positive correlations were hypothesised between ESP and extraversion (Kanthamani and Rao, 1972; Green, 1966), agreeableness (Van Kampen et al., 1995) and sensation seeking (Curtis and Wilson, 1997) on the basis of previous research. Similarly, a negative correlation was hypothesised for the variable neuroticism (Kanthamani and Ramakrisna, 1973).

Keirsey Temperament Sorter (KTS, Kersey, D., 1978)**:** The Keirsey Temperament Sorter is a questionnaire designed to identify different personality types. It is derived from Carl Jung's theory of psychological types as other devices such as the Myer-Briggs Type Indicator with which correlation have reported as high as .75 (Keirsey, 1978). D. Keirsey's description of temperament is based on the work of Jung, Myers, and others. The KTS classifies people into 16 types on the basis of their scores on four bi-dimensional constructs: extroversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving, which explore the individual's primary source of energy (the outer vs. inner world), preferences to take in information (analytically vs. holistically), making decisions (objectively vs. subjectively), or organise their life (structurally vs. flexibly). Because of time and resources constrains, only the two latter scales where used in this study. On the basis of previous research (e. g. Bem and Honorton, 1994) it was hypothesised that participants who tend to make decisions subjectively, on the basis of personal values, and that organise their life in a more flexible way would show higher ESP scores.

The 18-Items Australian Sheep-Goat Scale (ASGS, Thalbourne, M.; Delin, P., 1993)**:** The ASGS is a 18-item measure of paranormal belief. The ASGS focuses on paranormal belief in three areas: extrasensory perception, psychokinesis, and life after death. It does not explore beliefs in other anomalies with little relevance to psi, such as superstition or the existence of extraordinary forms of life. Thalbourne (1995) reports a high internal consistency index, Cronbach's alpha of .84. Also, females tended to score higher than males. High correlation with other paranormal belief measures has been found (e. g. Thalbourne and Delin, 1993).

Herrmann Brain Dominance Instrument (HBDI, Herrmann, N., 1999)**:** The HBDI is a 120-item diagnostic survey to uncover individuals' thinking style preferences. Close scrutiny of the brain reveals four structures rather than just two, consisting of the two cerebral hemispheres and the two parts of the limbic system. The four-quadrant approach adopted by the HBDI helps us to understand brain dominance with a new dimension, which would be described by a intellectual and cognitive thinking preference vs. a more emotional one, in addition to the classical right/left dominance. Graphically, the HBDI provides scores in four quadrants. Quadrant A would reflect a logical, analytic, mathematical, and problem solving thinking. Quadrant B would reflect an organisational, conservative, controlling, and planning thinking style. Quadrant C would reflect interpersonal, emotional, musical, spiritual and communication preferences. And, finally, quadrant D would describe an artistic, holistic, imaginative, synthesising style. The HBDI has proven to be a valid and reliable instrument (see Herrmann, 1981). Higher ESP scores where hypothesised for participant showing thinking preferences in the two latter described quadrants on the basis of previous finding, especially with artistically gifted populations and brain dominance (Dalton, 1997; Schlitz and Honorton, 1992; Broughton, 1976).

The Transliminality Scale –Form-B (Thalbourne, M. and Delin, P., 1994)**:** The transliminality scale was developed from factor-analytic work on paranormal belief by Thalbourne and Delin (1994). These authors define transliminality as a largely involuntary susceptibility to, and awareness of, large volumes of inwardly generated psychological phenomena of an ideational and affective kind. Transliminality measures are contributed by, and correlate highly with, items from the Australian Sheep-goat

Scale (Thalbourne and Delin, 1993), a creative personality scale developed by Thalbourne and Delin (1994), the Mystical Experiences Scale (Thalbourne, 1991), the Absorption Scale (Tellegen and Atkingson, 1974), the Inventory of Childhood Memories and Imagins (Myers, 1983), a hyperaesthesia scale compiled by Thalbourne (1996a), the Magical Ideation Scale (Eckblad and Chapman, 1983), the Manic-depressiveness Scale (Thalbourne and Bassett, 1998), and an item on the frequency of dream interpretation created by Haraldsson (1981).Transliminality. on the basis of previous research and reasoning in the literature (Grainger, 2001; Thalbourne, 1996) a positive association was hypothesised between ESP and transliminality scores.

Tellegen's Absorption Scale (Tellegen, A. and Atkinson, G., 1974)**:** Absorption can be understood as a predisposition to enter a transient state characterised by marking restructuring of the phenomenal self and world. Within this state the individual may experience dissociation or a 'sentient' external focus or an inner focus on reminiscences, images and imaginings. The absorption trait subsumes these diverse possibilities in a remarkably cohesive correlational structure. Factor-analytic research reveals six factors in this structure. These are: responsiveness to engaging stimuli, synesthesia, enhanced cognition, oblivious/dissociative involvement, vivid reminiscence, and enhanced awareness. Positive association were hypothesised between ESP and all these factors as well as the total absorption score (Irwin, 1985, 1989; Stanford and Angelini, 1984).

Moreover, other variables were assessed in the way specified below.

- **Richness and vividness of imagery** A combined questionnaire was made of the Memory Style and Vividness of Visual Imagery questionnaires. VES and Marks' VVIQ (Marks, 1973). The Memory Style Questionnaire comprises a series of tasks in which the individual is required to visualise an object for a determined short time. Afterwards, this questionnaire assesses the individual's richness of mental imagery by exploring the degree in which the requested image brought with it a rich, complementary picture of elements into the individual's consciousness. It was hypothesised that this characteristic if the participant's imagery would result in

psi-irrelevant associations and information that could mask the psi-signal. The VVIQ asks the individual to rate the vividness of their mental imagery in a given rating scale. It was thought that participants who experience more vivid images would realise of any psi-mediated imagery easier. A positive correlation between ESP and this variable was, therefore, hypothesised.

- **Intuition**: The participant was asked to identify a list of six key words made by the experimenter, consisting of three concrete plus three abstract ordinary words, one by one, in six trials. Seven clues were given, for each word, in temporal order as in the following example:

1st clue: word length e.g.	b-------
2nd clue: central letter	b--i----
3rdclue: last letter	b--i---s
4th clue: second letter	bu-i---s
5th clue: letter after the central one	bu-in--s
6th clue: last but one letter	bu-in-ss (business)

Each trial was scored from 1 to 7 according to the number of clues needed to identify the key words, being 1= no identification of the word and 7 = immediate identification after the 1st clue. Words were not revealed to participants in order to avoid later participants being aware of the keywords beforehand. Adding the participants' scores for each of the trials and dividing it by 6 computed the final score. There could be an ESP component in the intuition process through which the individual arrives to the correct solution of a problem on the basis of scanty data. A positive association between scores in this task and ESP was, therefore, hypothesised.

2.3.1.2. Pre-session state questionnaire

Pre-session questionnaire: This questionnaire was constructed by the experimenter in order to assess a series of variable, mainly state factors, prior to the ganzfeld stimulation. The same items as in Study I were used to assess expectancies of success (see item 27), feeling vigorous (see item 30), comfort (see item 31), eating and drinking (see items 34-35), feeling vigorous during the last week (see item 36), self-reported stress level (see item 46), hours of sleep in the night before (see item 40), and degree of relaxation (see item 101). Other variables were assessed through single, direct questions, such as interest in the study (see item 100). Participants were asked about the degree in which they would feel comfortable in doing activities or sharing experiences with the sender named sender-receiver closeness (see item 99). It was though that this could reflect comfort to perceived proximity and that this could expand to the ESP communication domain. It was hypothesised that high scores in this variable, reflecting participants comfort to share activities and experiences with their sender, would contribute to the ESP success. Mood state and motivation were, in turn, assessed prior to the session using the Mood Adjective Checklist and the Motivation sub-scales of the Dundee Stress State Questionnaire.

2.3.1.3. Session and post-session state factors and characteristics of the experience

Post-session questionnaire: The same items as in Study I were used to assess participants' degree of confidence call (see item 19), response constraints (see item 3), sensory adaptation to the ganzfeld stimulation (see items 4-6), voluntary effort paid during the session (see item 10), experiencing auditory imagery (see item 12), degree of concentration/distraction during the session (see item 306), degree of physical relaxation during the ganzfeld and post-session (see items 317-318), and menstrual cycle phase (see items 21-23).

Estimation of success was assessed by asking participants whether they thought that ESP took part in the session (see item 1). It was hypothesised that participants could have a certain degree of awareness of psi occurring in the experiments and, therefore, this variable would correlate positively with ESP.

A series of items were developed by the experimenter in order to gain an estimation of the individual's degree of altered state of consciousness experienced during the ganzfeld (313-316). It was hypothesised under the grounds of previous research (e. g. Palmer et al., 1979) that those experiencing the most extreme ASC would achieve higher scores.

Mood state, thinking content during the ganzfeld, and post-session motivation were assessed, in turn, using the Mood Adjective Checklist, Thinking Content, and Motivation sub-scales of the Dundee Stress State Questionnaire.

It was also of interest to find out whether participants felt annoyed throughout, or enjoyed, the experiment and whether these variables would influence the outcome (see items 320 and 321). It was hypothesised that frustrated participants could have developed a subtle means of aggression by psi-missing in the ESP task and that participants who enjoyed the session could, conversely, show their gratefulness by complying to the demands for ESP. The former variable was, therefore, expected to correlate negatively with success and the latter positively.

Other state factors during the period of sensory monotonisation were assessed (see items 300-312). Positive associations were hypothesised between ESP and comfort to report mental imagery, mental confusion, comfort under the ganzfeld stimulation, absorption and feeling asleep. Conversely negative correlations were hypothesised for variables feeling scared, worrying about the external world during the period of sensory monotonisation, distraction, and processing of mental imagery before reporting. These relationships were hypothesised upon previous work (see e. g. Palmer et al., 1979; Stanford, 1979; Stanford and Angelini, 1984; Tart, 1984).

Dundee Stress State Questionnaire (DSSQ, Matthews, G., Jones, D.M., & Chamberlain, A.G., 1990)**:** The DSSQ comprises a mixture of existing scales and items for important stress-related constructs. Factor analytic work (Matthews et al., 1990) reveals a four-dimension structure. This questionnaires, therefore, comprises four parts: The UWIST Mood Adjective Checklist, a mood and affect scale assessing

energetic arousal, tense arousal, hedonic tone, and anger/frustration; a Task Motivation Scale; a Thinking Style Scale, assessing self-focussed attention, self-esteem, concentration, control and confidence; and a Thinking Content Scale with two sub-scales: Task-related Interference and Task-irrelevant Interference. Discriminant and concurrent validity data have also being reported (Matthews et al., 1990).

2.3.1.3. Other questionnaires

Experimenter's Questionnaire: This was a questionnaire to be filled in by the main experimenter in every session. Through this questionnaire the following variables were assessed: local sidereal time during the time of testing, sex pairings, and artistic pursuit in sender or receiver. Local sidereal time at which sessions were conducted was computed from the solar time for all sessions. It was hypothesised, on the basis of previous research (Spottiswoode, 1997), that a larger number of hit would be registered in those sessions conducted at 13.5 ± 1 hour local sidereal time and that the lowest hit rate would be observed in sessions conducted at 18 ± 1 hour. Sender-receiver sex pairings were registered for every session. On the basis of previous research (e. g. Dalton, 1994) highest hit rates were hypothesised for sessions in which males acted as receiver and females as senders, followed by sessions in which females were receivers and males senders and female-female sessions. Lowest scores were hypothesised for male-male paring sessions. Similarly, whether participants were at the moment, or had been in the past, engaged in any artistic activity, profession, or training was also assessed in all sessions. It was hypothesised, from previous research (Dalton, 1997; Schlitz and Honorton, 1992), that participants who answered positively to these questions would achieve higher hit rates.

Intimate Bonds Scale (Wilhelm and Parker, 1988)**:** This is a 24-item scale that lists a series of attitudes and behaviours which people reveal in their relationships. The scale has two factors: control and care. Receivers were asked to judge their senders' attitudes and behaviours towards themselves by pointing out their degree of agreement to each statement in a four-point scale. A positive association was hypothesised between ESP and the individual's scores in both factors and the total scale score. It

was thought that either high care or high control relationships could result in a high need for communication which could generalise to the ESP domain.

2.3.2. Other Materials and Apparatus

Microphone and tape recorder: Recording was made of all participants mentation during the reception period. A clip-on microphone was used in all sessions plugged into a Sony TCM 939 tape recorder.

Personal audio compact disc player: A Sony D-EJ760 personal CD player was used to generate pink noise via headphones (model Technichs RP-F295).

Radio transmitter and headphones: Senders were provided with feedback of the on-going receiver's mentation through wireless headphones. A Philips HC 8349 radio-transmitter set up at the experimenter's room received the receiver mentation input through the tape recorder and transmitted it to the senders headset.

Random Number Generator. This was used to select the target objects and order for presentation of the judging sequence.

Target pool

There was a pool of 64 objects, similar to the one in Study I, selected by the experimenter so that they could seem interesting to the individuals and attention catching. There were toys, small figures and other daily utensils like key rings, a coffee cup, a sponge, a biro, a CD-Rom, a bulb, a chocolate, a piece of soap, a hat, a glasses, a small ball, etc., divided into 8 sets of four pairs of objects each. The items in each set were selected to be as different as possible in terms of colours, utility, and theme. There was a exact duplicate of the pool used for judging. There were, therefore, two

pools of identical objects. Each pair of objects was enclosed into a small plastic bag, and each set (of four bags) was kept into a small box. Bags were labelled with the set number and a letter from a, b, c, or d. Boxes were labelled with the set number they contained.

2.4. Procedure

The study was advertised as an ESP study, as in the previous study, by posters around the university campus. It was made explicit that £5 would be paid to each participant. Individuals would also be encouraged to come along with somebody else also interested in taking part in the study so that they could act as sender and receiver of each other in two independent sessions, normally run in two different days.

The procedures and experimental protocols were designed to be similar to the previous study. However, the fact that the survey on psi-conducive practices took place between the two studies could have affected the experimenter's testing style, behaviour, and interactions with participants.

When participants approached the experimenter with the intention to take part in the study, they were shortly given an explanation on aims and procedures and scheduled for 2 sessions each on 2 different days. The first session was a psychometric session that consisted of the administration of the questionnaires and assessment of the individual differences variables. The second session was a free-response ESP test following the standard ganzfeld procedure. Participants were tested in couples in both sessions. The psychometric evaluation took, on an average, 1 hour per participant and was carried out in the parapsychology laboratory on the fourth floor of B-block at Coventry University. This was intended, in addition, to familiarise the participants with the laboratory and experimental settings. Individuals were also explained in more detail about the procedure to be followed in the next ganzfeld session.

Two experimenters were involved in the study. The main experimenter, myself (experimenter A), tested participants in the psychometric session and run the ESP

sessions. Random selection of targets and condition was carried out using a true RNG in each session. At the time of the ganzfeld session, experimenters A and B, the same co-experimenter as in the first experimental study, I. H., met the participants at A's room that was also the sending room. The receiver was accompanied to the laboratory and asked to fill in the pre-session questionnaire. Meanwhile, experimenter A gave the instructions to the sender, at the sending room. Then, when experimenter A left the room, experimenter B generated the code for the target objects, and gave them to the sender. At this time experimenter A, in the lab, gave the instructions to the receiver, in a standard manner, and started the session. Experimenter A remained all the time outside the receiver's room, within the lab, listening to the individual's mentation through headphones and writing down his/her comments. In 30 minutes from the commencement of the session experimenter B, without knocking and trying not to produce any noise that could be regarded as a signal, passed a computer-typed note under the laboratory door (always double-bended, face down, and by the right frame of the door) containing the set number of the target and a randomised presentation order for the judging sequence. Experimenter A ignored this note until the time of the judging. After the 30 minutes of receiving period experimenter A released the subject to remind and review his mentation. Then, the participant was asked to fill in the post-session questionnaire. Next, the judging was carried out. Nobody at all was allowed to enter the laboratory until the participant's response had been registered. Finally, the experimenter accompanied the participant to the sending room to find out the identity of the target.

3. RESULTS AND DISCUSSION

3.1. Exploratory Analyses

Six variables with skewness values beyond ±2 were identified, 5.6 being the highest value. Similarly, 13 variables showed kurtosis beyond this limit. In general, kurtosis was not extreme for any of these variables except for only 2 of them with

values such as 36.1 and 44.3. No transformation was required in any cases given the robustness of the techniques to be used in the analysis of data. Eleven values with a z score beyond ±3.29 were found, 5.26 being the most extreme of these values. Only one had to be retyped for being the product of a mistake in data input. The rest of these cases were within the possible and expected range of values and, therefore, were conserved. 1.5% of values were missing, appearing randomly across questionnaire items. These values were replaced with the mean except for categorical and dichotomous variables, which were left as missing.

Target selection bias was tested for equiprobability of target, set number, and doublets intertrial independence. Operating at an α level of .01, the distribution of targets for the 90 sessions proved to be random for the target alternatives ($\chi 2 = 4.75$, n. s.) or set number ($\chi 2 = 4.59$, n. s.). Intertrial independence was also tested for the 16 combinations of doublets (i. e. AA, AB, AC, AD, BA, BB, etc.) as the target could appear in each 2 consecutive sessions, showing further the accuracy of the target distribution ($\chi 2 = 9.9$, n. s.)

3.2. Hit Rates

From the 90 participants who took part in the study, 30 ranked the correct pair of objects in the first position, producing a hit rate of 33.3%. The difference between this hit rate and the 25% expected by chance is statistically significant ($z = 1.86$, $p = 0.031$, one tail), thus, confirming our hypothesis that ESP would take place in the study. The distribution of ranks, displayed in table Va, reveals an interesting increasing pattern that would have supported further the ESP hypothesis in case we had used binary hits. Sixty-two per cent of the individuals ranked the correct target either first or second. This statistic is highly significant ($z = 2.52$, $p < .006$, one tail).

	RANKS			
	1st	2nd	3rd	4th

Expected	22.5	22.5	22.5	22.5
Observed	30	26	20	13

Table Va: Expected and observed frequencies for each target rank.

3.3. Variable Assessment

Contrary to our hypothesis, only 4 of the 110 predictors tested in this study showed significant correlation indices with the participants scores at an α=.01. These were *internal awareness, feeling vigorous last week, outside concern during the ganzfeld, and feeling upset at any point of the experiment.* The power of these correlation analyses, assuming, at least, medium effect sizes in the population and operating at a .01 α level, was .60.

Of the 110 predictors, 13 showed p-values below .05. They are displayed in Table Vb. *Anger and frustration in the ganzfeld, tense arousal, feeling upset at any point of the session, feeling uncomfortable during the ganzfeld stimulation, empathy, psychoticism, and outside concern during the ganzfeld* showed positive association to ESP scoring. On the other hand, *internal awareness, vulnerability, feeling vigorous, and level of sender-receiver relationship* showed a negative association. Only 5.5 variables were expected to reach statistical significance just by chance, had the measures been independent.

Anger and Frustration in the Ganzfeld	.18 p=.04
Tense Arousal During the Ganzfeld	.17 p=.049
Feeling Upset	.27 p=.007
Feeling Uncomfortable During the Ganzfeld	.21 p=.02
Sender-Receiver Relation	-.19 p=.032
Empathy	.21 p=.024
Psychoticism	.18 p=.042
ESP as a Mental Abilities Task	-.18 p=.04
Confidence Call	-.18 p=.048

Outside Concern	.26 p=.006
Internal Awareness	-.31 p=.002
Vulnerability	-.24 p=.01
Feeling Vigorous Last Week	-.26 p=.006

Table Vb: Correlation coefficients and p-values of ESP predictors significant at α=.05 for the total sample.

The positive correlations found for *tense arousal, anger and frustration, feeling upset,* and *feeling uncomfortable during the ganzfeld* contradict the hypothesised relationships. There is room for the possibility that these, or other correlation indices, had reached statistical significance by chance. These three variables were expected to have a detrimental effect on the ESP process through a variety of mechanisms. *Tense arousal* and *feeling uncomfortable during the ganzfeld stimulation*, were expected to reflect a level of nervousness and activation that would obstruct the mental and physical relaxation process theorised in mental states optimisation models (e. g. Braud, 1977; Honorton, 1977). The positive effect found for these variables could be understood appealing to a curvilinear relationship and an optimum level of arousal needed for the successful accomplishment of the ESP task, as suggested in some studies (Braud, 1977). Experiencing tense arousal and discomfort might have helped the individuals in this study to achieve this optimum level of activation needed to perform the ESP task. Similarly, *anger and frustration* as well as *feeling upset at any point of the session* were expected to show detrimental effects. In fact, there are studies that using either the Rosenzweig's Picture Frustration Test or the Cason's Test of Annoyance show negative association to ESP (Eilbert and Schmeidler, 1950; Nicol and Humphrey, 1953, 1955). In chapter 2, in relation to the sheep-goat effect, I put forward an account to explain how the individual's psi-missing could represent an unconsciously driven behaviour, component of a more complex attitude to the paranormal. Such a mechanism could also operate when the individual is frustrated or upset, according to frustration-aggression theories from mainstream psychology. Unconsciously pointing at the wrong pair of objects could be a subtle form of aggression by frustrated or upset participants. However, the results do not support this hypothesis.

Psychoticism was also expected, on the basis of previous findings (Haraldsson, 1995), to correlate with ESP scores. *Empathy and outside concern during the ganzfeld*, as hypothesised, showed a positive association to participants' scores. The concept of empathy as the understanding of others' emotions feelings and points of view leaves room, by definition, for the possibility of ESP mechanisms taking part in the process. In his paper "Dealing with displacement", Braud (1987) explains how encouraging the individual to focus on the location of the target, in terms of space and time, would minimise the chances for displacement to irrelevant stimuli (noise). Under this perspective *outside concern* was expected to correlate positively with participants scores.

The variable *vulnerability* was expected to appear negatively associated to participants' scoring on the basis of previous findings (e. g. Braud, 1977; Palmer, 1978, 1982; Weiner, 1986). This hypothesis was not confirmed at an α=.01, but appeared in the expected direction with a p-value below .05.

The negative association shown between ESP scores and variables *internal awareness*, *feeling vigorous*, and *sender-receiver relationship* contradict our expectations. Internal awareness was expected to contribute to the ESP process appealing to signal detection theories. It was reasoned that participants who were more aware of their own thoughts, feelings, etc. would count on a greater chance to detect any ESP signal. However, it could be further explained that the individual would also be more aware of cognitions irrelevant to the target materials (noise) and, therefore, the signal to noise ratio would not be increased, explaining, like this, equal or lower scores. Variable *feeling vigorous during the week before to the experiment* was interpreted as a health indicator and, therefore, expected to contribute to the ESP task. The expectations for higher scores by participants who were more closely related was also based on previous literature findings (e. g. Bierman et al., 1993; Broughton et al., 1989).

In Study-I we noticed that the variables that correlated with the individuals' ESP performance varied largely on the basis of both target type and technique. It was

hypothesised, at the time, that the predictors of ESP could also vary on the basis of other different factors such as characteristics of the experiment, experimenter, participants, etc. In order to explore if the predictive value of the variables would vary as well with characteristics of the participant tested, the sample of Study-III was split into believers/non-believers and into males/females.

Participants were split into believers and non-believers using their scores in the Australian Sheep-Goat Scale. The total sample was halved by percentile 50 in order to keep equal sample sizes of, therefore, 45 individuals. The hit rates for believers and non-believers were 28% and 37% respectively. This difference is not significant ($z = 0.92$, $p = .34$, two tails). Seven predictors were found with a p-value below .05 in the believers group. Twenty were found for non-believers. None of these variables showed a p-value below .05 for both groups simultaneously, and 8 were statistically different in each group at a .05 α level. If the measures were independent, only 1.4 of these 27 differences would be expected to show significance by chance. Similarly, in relation to gender, the hit rates for males and females were equally 33%. There were 36 males and 54 females. Fourteen predictors were found with a p-value below .05 in the males group and 12 for females. Only 2 of these variables (internal awareness and feeling vigorous last week) showed a p-value below .05 for both groups, and 8 were statistically different in each group. Only 1.2 of the 24 comparisons was expected to be significantly different by chance, under independence of measures. This finding suggests that different populations might show different patterns for the prediction of the study success.

Summary

Only 13 of the 110 variables tested showed p-values below .05. The positive correlations found for *psychoticism, tense arousal, anger and frustration, feeling upset,* and *feeling uncomfortable during the ganzfeld* contradict the hypothesised relationships. *Empathy and outside concern during the ganzfeld*, as hypothesised, showed a positive association to participants' scores. The variable *vulnerability* was expected to appear negatively associated to participants' scoring. This hypothesis was

not confirmed at an α=.01, but appeared in the expected direction with a p-value below .05. The negative association shown between ESP scores and variables *internal awareness, feeling vigorous,* and *sender-receiver relationship* contradict our expectations too. When participants are split into paranormal believers and disvelievers, we find a non-significant hit rate for disbelievers that contradicts previous findings in the literature. We also observed that none variable predicted success simultaneously in both groups and eight were statistically different at a .05 alpha level of significance between the groups. There were no differences, in terms of hit rate, between males and females. Only two variables predicted success, at a significant level, and eight showed significant different values between these two groups. This finding supports a previous observation from the first experimental study suggesting that different populations might show different patterns of variables predicting ESP success.

3.4. Principal Component Analyses

In order to simplify the original set of predictors, principle component analysis was carried out using orthogonal varimax rotation. Using eigenvalues greater than 1 as selection criterion, the analysis revealed 25 components. Component scores were computed for each individual. Only 1 of them correlated with ESP performance at a significance level of .01. This component showed a correlation index of -.39 and was interpreted dichotomously as upset non-conformity vs. pleased submissiveness, being loaded in one pole by the variables anger and frustration in the ganzfeld (-.80), feeling upset (-.74), pre-session anger (-.57), and in the opposite pole by hedonic tone in the ganzfeld (.67), fantasy (.56), interest in helping (.43), enjoining the session (.31), pre-session hedonic tone (.39), sensory adaptation (.33), and feeling uncomfortable in the ganzfeld (.36). A scree plot analysis produced a more parsimonious solution of 4 components (see figure Va).

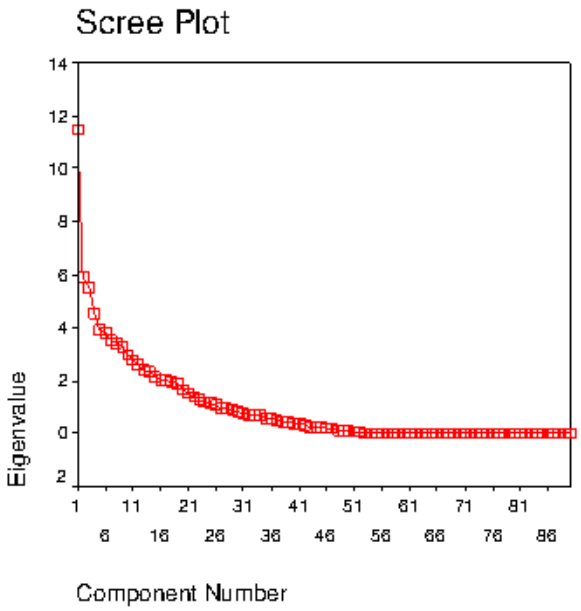

Figure Va: Scree plot of principle component analysis using orthogonal varimax rotation.

Component I, similar to the previous one, , accounting for 11.4% of the variance, was loaded in one pole by hedonic tone in the ganzfeld (.67), fantasy (.56), and interest in helping and collaborative attitude (.43); and in the other pole by anger and frustration in the ganzfeld (-.80), feeling upset during the session (-.74), and pre-session anger (-.57). Component II, accounting for 7% of the variance, was loaded by transliminality (.91), absorption (.71), paranormal belief (.66), creativity (.50), and dissociation (.40). This component could be interpreted as a transliminality component. As we saw, the transliminality scale appeared as a factor analytic product of several scales, among them paranormal belief, absorption, dissociation, and several creativity measures developed by Thalbourne and Delin. Component III, accounting for 6.1 % of the variance, loaded by variables post-session motivation (.82), pre-session motivation (.76), interest in helping and collaborative attitude (.59), enjoyment of the session (.53), awareness of psi (.43), and empathy (.40), could be understood as a optimistic motivation component. Component IV, accounting for 4.9% of the variance, was uninterpretable and loaded in one pole by scores on quadrant B of the HBDI (.85), need for cognitive closure (.52), values (.52), and viewing the ESP exercise as a mental

capacities task (.46); and in the other pole by scores in quadrant D of the HBDI (-.52), and psychoticism (-.45). Only the first of these components correlated significantly with ESP scores with a correlation index of .39 (see table Vc).

	Factor I	**Factor II**	**Factor III**	**Factor IV**
Hedonic Tone in Ganzfeld	.67			
Fantasy	.56			
Interest in Helping	.43		.59	
Anger and Frustration in the Ganzfeld	-.80			
Feeling Upset	-.74			
Pre-Session Anger	-.57			
Transliminality		.91		
Absorption		.71		
Paranormal Belief		.66		
Creativity		.50		
Dissociation		.40		
Post-Session Motivation			.82	
Pre-Session Motivation			.76	
Enjoyment of the Session			.53	
Awareness of Psi			.43	
Empathy			.40	
HBDI Quadrant B				.85
Need for Cognitive Closure				.52
Values				.52
Viewing the ESP Exercise as a Mental Capacity Task				.46
HBDI Quadrant D				-.52
Psychotism				-.45
Variance explained	11.4%	7%	6.1%	4.9%
Correlation with ESP	-.39.5**	-.024	-.005	-.077

Table Vc: Component loadings (with correlation indices larger than ±.40), variance explained, and correlation with ESP. (*) indicates significant correlation with ESP performance at .05 α level, 2 tails. (**) indicates significant correlation at .01 α level, 2 tails.

Furthermore, a second principle component analysis was conducted on the 13 variables that correlated with ESP with a p-value of .05 or less. A scree plot analysis gave rise to a 2 independent component solution (see figure Vb).

Figure Vb: Scree plot of principle component analysis on the 13 variables with a p value < .05 using orthogonal varimax rotation.

The table below (Table Vd) shows components and variable weightings as well as variance explained and correlations with ESP scores.

	Component 1	**Component 11**
Anger and Frustration in the Ganzfeld	.82	
Tense Arousal During the Ganzfeld	.74	
Feeling Upset	.68	.31

Feeling Uncomfortable During the Ganzfeld	.54	
Sender-Receiver Relation		-.76
Empathy		.64
Confidence Call	-.31	
Outside Concern	.40	
Vulnerability		-.41
Variance explained	19.8%	11.8%
Correlation with ESP	.32**	.26*

Table Vd: Component loadings (with correlation indices larger than ±.30), variance explained, and correlation with ESP. (*) indicates significant correlation with ESP performance at .05 α level, 2 tails. (**) indicates significant correlation at .01 α level, 2 tails.

Both components correlated positively and significantly with ESP. Component I, accounting for 19.8 of the variance, was loaded by variables anger and frustration, tense arousal and discomfort during the ganzfeld, and feeling upset at any moment of the session in one pole and confidence call and outside concern in the other pole. Component I was interpreted as an emotional state component correlating .32 significantly with ESP at a .01 α level (two tails). Component II, accounting for 11.8% of the variance, was loaded by vulnerability and sender-receiver relationship in the negative pole and empathy and feeling upset in the positive, was uninterpretable, correlating .26 ($p < .05$, two tails) with ESP.

Summary

Principle component analyses were conducted on the variables and the 13 significant predictors separately in order to simplify the set of predictors. The first principle component analysis, on the whole set of variables, gave rise to a four-component solution. Only one of these components, interpreted as upset non-conformity vs. pleased submisiveness, correlated significantly with ESP. A second

principal components analysis conducted on the 13 variables that correlated with ESP with a p-value of .05 or less gave rise to a two independent component solution. Both factors correlated positively and significantly with ESP. Factor I, was interpreted as an emotional state factor correlating .32 significantly with ESP at a .01 α level (two tails). Factor II, was uninterpretable, correlating .26 ($p < .05$, two tails) with ESP.

3.5. Logistic Regression

A stepwise forward logistic regression analysis was performed on the 13 predictors that showed coefficients with p-values of .05 or less. The analysis was performed with SPSS. Two cases with missing values were deleted. After 4 steps, a 4 variable solution was shown. The form of the equation would be as follows:

$$\text{PROB (hit)} = \frac{1}{1+e^{-(1.5-.54(IA)-1.02(EL)+1.73(OC)-.21(VU)+\varepsilon}}$$

In the equation, OC means outside concern (during the period of ganzfeld stimulation) and contributed to the session outcome with a positive coefficient in the equation of 1.73. EL, IA, and VU mean feeling energetic and vigorous during the week prior to testing, internal awareness, and vulnerability from the neuroticism sub-scale of the NEO-PI, contributing negatively to the session outcome with coefficients –1.02, -.54, and -.21 respectively. ε is the error term.

The equation classified correctly 79.55% of the cases, predicting accurately 91.5% of the misses and 55.17% of the hits. A test of the model against the constant-only model was statistically significant, χ^2 (6, 88) = 33.4 ($p < .0001$), showing that the set of predictors was reliable in predicting the outcome of the session. The model accounted for 30% of the variance as indicated by the Hosmer & Lemeshow's goodness of fit statistic, R_L^2 (.30), an analogue of R^2 in multiple regression. Table Ve shows log likelihoods, Wald's statistics, partial correlations, step statistics, and percent of cases correctly classified for each step and predictor.

Step/Variable Entered	-2LL	Wald's Statistic	R	Step Statistic	Percent Correct (Total)	Percent Correct (Hits)	Percent Correct (Misses)
0/constant	111.55	9.8 (p=.001)			67%	0%	100%
1/internal awareness	103.2	7.48 (p=.006)	-.22	8.35 (p=.003)	69.32%	34.48%	86.44%
2/outside concern	93.8	8.53 (p=.003)	.24	9.37 (p=.002)	70.45%	37.93%	86.44%
3/ feeling vigorous	83.23	8.85 (p=.003)	-.24	10.6 (p=.001)	75%	55.17%	84.75%
4/vulnerability	78.15	4.48 (p=.03)	-.14	5.08 (p=.02)	79.55%	55.17%	91.53%

Table Ve: Log likelihoods, Wald's statistics, partial correlation indices, step statistics, and percent of cases correctly classified for each step and predictor.

A χ^2 test run on the remaining variables shows that addition of new variables will not increase the predictive power of the model (χ^2 = 14.7, p = .19). The amount of unexplained information that remains in the model is indicated by a –2 log likelihood statistic (–2LL) of 78.15. The perfect solution, though, would be associated to a –2LL of 0. The contribution of each predictor can be estimated from the loss/gain in log likelihood since last step when the term is added/removed. The Wald's statistic, used to test the significance of the β coefficient for each predictor, reaches statistical significance for all variables included in the equation. The step value, that indicates the improvement on the predictive power of the equation since the last stage, is equal to –2LL at the current step minus –2LL at the previous step. This can be taken as an indicator of the contribution of the predictor entered in the step to the predictive power of the model.

The correlation between the observed values and the ones predicted by the equation, another indicator of the accuracy of the model, was also high and significant (r_{xy}=.71, p < .001, one tail).

In search for a recipe for success in ganzfeld ESP research, the utility of finding out new predictors or means to enhance hit rates relies on the grade in which researchers can make practical use of them. Under this perspective, I decided to group the predictors on the basis of two modes of operating to produce successful results in ganzfeld ESP research; 1) participant selection and 2) promoting a psi-conducive state in the individuals; plus one third way to estimate the result of the session relying on post-session and on-session indicators of the occurrence of psi. In this study there were 17 variables concerning the participants mental state prior and during the session. Similarly, there were 19 variables in this study, which could indicate the occurrence of psi in the study. The remaining 74 concerned individual differences that could be used for participant screening (see section 2.3.1.). A logistic regression analysis was made on the variables relating to each of these three facets in order to find out the most important factors for operating at these three different levels.

The logistic regression analysis on the variables regarding participant selection gave rise to a 8 predictor solution including *internal awareness* (β=-.57), *viewing ESP as a mental abilities task* (β=-.85), *empathy* (β=.33), *sender/receiver relationship* (β=-1.30), *intuition* (β=.15), *care for the sender* (β=.10), *interest in helping* in the study (β=-.85), and *positive emotions* (β=.18) in the final equation. The model proved to predict correctly 78.4% of the cases, 62% of the hits and 86.4% of the misses, and to be significantly different from the constant-only model (χ^2 = 34.11, p< .0001).

The analysis of the set of variables regarding psi-conducive states gave rise to a 5 predictor solution including the variables *pre-session energetic arousal* (β=.13), *pre-session hedonic tone* (β=-.12), *discomfort* during the ganzfeld (β=.64), *outside concern* (β=.91), and *distraction* of mind during reception (β=-.47). The model predicted correctly 73.3% of the cases, 40% of the hits and 90% of the misses. This model was significantly different from the constant-only model too (χ^2 = 15.99, p = .003).

In relation to on-session and post-session indicators of ganzfeld success, the analysis gave rise to a 2 predictor solution made of *confidence call* (β=-.37), and *feeling upset* during the experiment (β=1.10). The equation predicted correctly 72.2% of the

cases, 26.6% of the hits and 95% of the misses, and is also significantly different from the constant-only model ($\chi^2 = 7.78$, $p = .02$).

In order to obtain further insight on the practical utility of combining these three sets of variables to predict ESP performance, a sub-sample of individuals was created under the selection criterion "scoring above percentile 25", for the positively correlated variables, and "below percentile 75", for the negatively correlated ones, in all of these predictors. Thirteen individuals were, therefore, selected from the total sample. Out of these 13 participants 8 scored a hit, achieving a rate of 61.5% ($z = 4.02$, $p < .0001$, one tail). Operating simultaneously on these 3 domains (participant selection, pre and on-session state, and post-hoc indicators of the occurrence of psi) could help us to achieve higher hit rates in ESP experiments. But obviously, it must be stressed that this is only a post-hoc finding and needs further experimental exploration.

Summary

A stepwise forward logistic regression analysis performed on 13 predictors with p-values of .05 or less produced a 4-variable solution. The variables included were: outside concern during the period of ganzfeld stimulation, feeling energetic and vigorous during the week prior to testing, and, negatively associated to scoring, internal awareness and vulnerability from the neuroticism sub-scale of the NEO-PI. The equation showed to classify 79.55% of the cases correctly, accounting for 30% of the variance.

It was noticed that the predictors could be grouped on the basis of two modes of operating to produce successful results in ganzfeld ESP research; 1) participant selection and 2) promoting a psi-conducive state in the individuals; plus one third way to estimate the result of the session relying on post-session and on-session indicators of the occurrence of psi. In order to obtain further insight on the practical utility of combining these 3 sets of variables to predict ESP performance, a sub-sample of individuals was created on the basis of their scores in these predictors. It was noticed that the group achieved a hit rate of 61.5%. Thus, operating simultaneously on these

three domains (participant selection, pre and on-session state, and post-hoc indicators of the occurrence of psi) could contribute to ESP success.

4. CHAPTER SUMMARY

Study III was aimed mainly at testing those variables that showed predictive value of participants' ESP scoring in the pilot study, in addition to a series of other predictors commonly appeared in the literature. Ninety ganzfeld experiments were conducted. There was a psychometric session, consisting on the administration of the questionnaires and assessment of the individual differences variables, and a free-response ESP test following the standard ganzfeld procedure, in each experiment. From the 90 participants who took part in the study, 30 ranked the correct target stimulus in the first position, producing a statistically significant hit rate of 33.3%. This hit rate is consistent with previous research.

Only 13 predictors showed a significant correlation with ESP at an alpha level below .05. Variables: *psychoticism*, *tense arousal, anger and frustration, vulnerability, feeling upset, feeling uncomfortable during the ganzfeld*, *empathy,* and *outside concern during the ganzfeld* appeared positively associated to ESP scores. Negatively associated to participants' ESP scores we found variables *internal awareness*, *feeling vigorous*, and *sender-receiver relationship*.

A principle component analysis conducted on the set of variables yielded a four-component solution. Only one of these components correlated significantly with ESP scores. One second principal components analysis was conducted on the 13 variables that correlated significantly with ESP. A scree plot analysis gave rise to a two independent component solution, which correlated positively and significantly with ESP. Factor I was interpreted as an emotional state factor and factor II was uninterpretable.

A logistic regression analysis of 13 significant predictors produced, a four-variable equation that included variables: outside concern during the period of

ganzfeld stimulation, feeling energetic and vigorous during the week prior to testing, and, negatively associated to scoring, internal awareness and vulnerability from the neuroticism sub-scale of the NEO-PI. The equation showed able to predict correctly 79.55% of the cases.

A sub-sample of individuals was created on the basis of their scores in three sets of variables: 1) predictors concerned with participant selection, 2) predictors concerned with the participants' mental state, and 3) session and post-session indicators of the ocurrence of psi. This group achieved a hit rate of 61.5%. It was argued that operating simultaneously on these three domains (participant selection, pre and on-session state, and post-hoc indicators of the occurrence of psi) could help the researcher to increase the study rate of success.

CHAPTER VI: SUMMARY, CONCLUSIONS, AND FUTURE DIRECTIONS

1. Summary of Findings

The ESP phenomenon has been extensively studied within the area of parapsychology. Although individual studies as well as meta-analyses show a significant effect supporting the existence of an anomalous process of information transfer, a major criticism in the area is the lack of a "experimental recipe" that can yield replicable results across independent laboratories. The research work conducted in this PhD was aimed at exploring predictors of individuals' ESP scoring in free-response ESP experiments, in the development of a model of successful ESP performance. From a methodological perspective, it was also intended to show the utility of logistic regression models, for this type of research.

Chapter I started with a brief introduction on ESP research and a description of a major technique for the experimental evaluation of ESP, the ganzfeld. Historically, the use of this technique and the results obtained has been a focus of intense criticism. In a co-authored paper, published in 1986, R. Hyman, a critict of psychical research, and Honorton, a major contributor or the ganzfeld technique, agreed that there was an overall significant effect observed in a database of early ganzfeld studies but that the final verdict on the evidence of ESP awaits the outcome of future experiments that adopted more stringent standards. This controversy was also analysed in chapter I to conclude that the data obtained so far are encouraging and that the ganzfeld is a suitable technique for the study of ESP. It was argued that expecting significant ESP results in every experiment would be statistically unrealistic. Logistic regression was proposed, in this chapter, as a valuable technique in parapsychology research and in the development of a formula for success in the experimental study of ESP.

Chapter II outlined a series of variables and practices found in the literature in relation to the prediction and promotion of ESP success. The variables were grouped into 6 categories which would represent domains to be exploited in practical ESP research: 1) personality and individual differences; 2) state factors; 3) experimental design, protocol, and testing atmosphere; 4) environmental factors; 5) targets; and 6) on-session and post-session indicators of psi. It was argued that personality traits had been paid most attention in previous research and that other variables such as mood or session indicators of success had been considered in a much lesser degree. Variables such as openness, prior psi-testing experience (other than ganzfeld) and ganzfeld-testing experience, practice of mental disciplines, extraversion, artistic pursuit and creativity, neuroticism, paranormal experiences are among the ones which have most consistently predicted ESP success in previous research, whereas other findings are not conclusive. Particular characteristics of the experimental design and protocol draw differences among studies, which may influence the outcome. It is not clear, however, which features make an experiment successful. Similarly, the literature suggests that several sources external to the experimenter, participants, or experiment itself, such as the Earth's geomagnetic activity, the local sidereal time, and other environmental factors, could influence the study success too. Also target characteristics seem to play a role in the outcome of the experiment. However, there is evidence that suggests that the success of a stimulus as ESP target might interact with individual differences. It was also explained that even when the experimental session is started or have already been completed, certain occurrences or characteristics of the individual's experience, such as experiencing time contraction or characteristics of mental imagery might be used to prognosticate the experimental outcome. It was argued that the exploration of this kind of variables could be fruitful.

Similarly, a series of means of facilitating psi (psi-conducive practices) were also presented. A comfortable and reasuring environment that, at the time, conveys an image of professionalism is desired. Orientation towards participants, such as waiting for their arrival, not leaving them unattended, offering them refreshments, and other courtesies are often viewed as psi-conducive too. A good participant-experimenter interaction is also viewed as an important factor in psi success. Other measures, such as providing auditory monitoring of the receiver's response to the sender, or consensus

judging, have shown successful in increasing scores in previous ESP studies. It was explained that the development of psi-conducive practices would be both more accurate and feasible if a better understanding of the variables determining ESP success and their mechanisms were achieved. It was concluded on the prediction of ESP that a noticeable degree of inconsistency was present in the previous literature. Another problem noticed was the lack of systematic studies considering jointly large number of variables for the prediction of ESP.

Chapter III described the first experimental study. This study focussed on the exploration of several individual differences, state factors, and session and post-session indicators of success that have been studied in a minor degree but could be expected to be relevant for the prediction of ESP success. The overall hit rate in the study, 26.6%, did not differ significantly from chance expectation, contrary to our hypothesis. However, results showed a non-significant higher performance for individuals who were tested under a ganzfeld condition, compared to a sensory attenuation condition, and when objects were used as targets, instead of the more usually employed pictures. Subjects in the ganzfeld condition calling on the objects achieved the highest hit rate, 43%. These results support the hypothesis that multisensorial stimuli would facilitate higher hit rates in ESP research. However, definitive conclusions could not be drawn given the differences in content between both pools of targets. One hundred and twelve variables were tested as predictors of participants' ESP performance in this study. None of the correlation values showed statistical significance in more than one of the cells defined by target type and condition, except *locus of control* that appeared significantly associated to ESP for call on the pictures (overall) and call on the pictures by participants in the sensory attenuation condition. A striking observation was that the correlation indices varied largely across the groups resulting from combining target type and technique. Equally, we observe a similar picture when we split the individuals' calls on the basis of target type and examine the variation of the correlation coefficients across ganzfeld and sensory attenuation conditions. These results suggest that the variables we explore nowadays in association to ESP success are not robust and their reliability might depend upon characteristics of the experiment. Logistic regression was not used given the small number of participants per condition and the aims of the present study,

which was designed to select those best predictors to be included in the second, larger experimental study where this statistical technique would be employed.

Chapter IV described a survey carried out on researchers and academics who were invited to point out their views on potential means to increase hit rates in free-response ESP research. Many interesting ideas, that are also compatible with the current research trends, arise from this survey. The ideas suggested were classified in the following categories: a) psychological management and preparation of participants, b) experimental design, c) treatment of data, d) targets, e) ecological validity, f) instrumental measures, and g) others. Parapsychologists were also asked to indicate their degree of confidence toward each of the suggestions. Curiously, the suggestions as a whole were believed only "nearly likely", on an average, to increase the hit rate of a given free-response ESP study. Also, researchers who had conducted free-response ESP experiments were asked to indicate how often they had attempted what each suggestion proclaims, in their previous work. That the suggestions here pointed out, according to the researchers reports, have little been used was another relevant finding. The mean rate provided by the researchers was almost "seldom" use of the techniques. It was explained that this could have been due to a dominant interest in process-oriented research. It was concluded that although none of the suggestions here outlined would warrant success in improving the study outcome per se. The ideas here suggested could have come from experimental facts as well as from anecdotal observations, or even from rational deductions. Most of them count on little, or none, experimental evidence, but their exploration could largely contribute to the development of a successful protocol for the experimental replication of the ESP phenomenon.

It must be noticed that this survey was conducted chronologically between the two experimental studies. Therefore, the experimenter's behaviour towards participants and social interaction as well as other parameters of the experimental design and procedure could have been affected, at least unconsciously, by the ideas and views pointed out by other researchers.

Chapter V described Study III aimed mainly at testing those variables that showed predictive value of participants' ESP performance in the previous experimental study, in addition to a series of other predictors commonly appeared in the literature. Of the 110 predictors, 13 showed p-values below .05. The positive correlations found for *tense arousal, anger and frustration, feeling upset,* and *feeling uncomfortable during the ganzfeld* contradict the hypothesised relationships. *Empathy and outside concern during the ganzfeld*, as hypothesised, showed a positive association to participants' scores. The variable *vulnerability* was expected to appear negatively associated to participants' scoring. This hypothesis was not confirmed at an α=.01, but appeared in the expected direction with a p-value below .05. The negative association shown between ESP scores and variables *internal awareness, feeling vigorous,* and *sender-receiver relationship* contradict our expectations. A principal components analysis was conducted on the 13 variables that correlated with ESP with a p-value of .05 or less, giving rise to a two-independent component solution. Both factors correlated positively and significantly with ESP. Factor I, was interpreted as an emotional state factor correlating .32 significantly with ESP at a .01 α level (2 tails). Factor II, was uninterpretable, correlating .26 ($p < .05$, 2 tails) with ESP.The hit rate in this study was 33%, significantly higher than chance expectation. A stepwise forward logistic regression produced a four- variable solution capable of classifying correctly 79.55% of the cases. The equation was made up of two stable traits (internal awareness and vulnerability), a pre-session state variable (feeling vigorous), and an on-session mental state indicator (outside concern). Selecting a sub-sample of trials on the basis of participant characteristics, pre- and on-session state, and post-hoc indicators of the occurrence of psi, showed a highly significant hit rate.

It was noticed that the predictors could be grouped on the basis of 2 modes of operating to produce successful results in ganzfeld ESP research; 1) participant selection and 2) promoting a psi-conducive state in the individuals; plus one third way to estimate the result of the session relying on post-session and on-session indicators of the occurrence of psi. In order to obtain further insight on the practical utility of combining these 3 sets of variables to predict ESP performance, a sub-sample of individuals was created on the basis of their scores in these predictors. It was noticed that the group achieved a hit rate of 61.5%.

It was concluded that drawing a recipe to systematically produce significant results in experimental ESP studies would be a complicate objective due to a series of factors. Firstly, it is not clear what prototype of participant is desirable for ESP tests. Moreover, greater or smaller variations in the experimental conditions might require different cognitive and emotional characteristics in the participants.

In the present chapter, we integrate the knowledge and data gained throughout this research project to conclude on a series of topics on the prediction and optimisation of ESP experimental success.

2. Promoting ESP in the Parapsychological Laboratory

Replication of the parapsychological phenomenology that is observed in spontaneous case reports under the controlled circumstances of a laboratory is one of the major ambitions for the scientific development of this discipline. A weak understanding of the mechanisms that rest at the basis of the appearance of the phenomena hinders nowadays the production of consistent results. In this regards, diverse means of facilitating ESP have been put forward and explored. The ganzfeld, based on a noise reduction theory, was one of the first experimental procedures developed with the intention to promote psi in the laboratory. Additional to the large and diverse series of psi-conducive procedures found in the literature, many interesting ideas are also latent in the parapsychological community, as shown in my survey study.

In order to develop accurate psi-conducive strategies, it is necessary to achieve an understanding of the true variables which facilitate the appearance and magnitude of the phenomenon. My survey study revealed that the suggestions pointed out were little trusted as a means of increasing a determined study hit rate, with an overall rating of estimated utility below "likely". But, even more surprisingly, the items were little being used with an overall reported use of nearly "*seldom*". In general, much systematic research is needed on the large number of procedures that, at the moment,

remain intuitive in the development of a formula to success in laboratory ESP research.

Also, a different view is that the artificiality introduced by the efforts made to evoke the phenomenon in the laboratory would question whether our findings can validly be applied to real-life, naturally-occurring situations. Many experimenters would see preferable to adopt a more ecologically valid approach letting the phenomena arise itself and, rather than forcing it, then study it at any expense of hit rates and proof-oriented views. From my point of view, and of many other researchers in the area, it is important to state in advance if the purpose of the study is to achieve a significantly high hit rate.

3. The Robustness of ESP Predictors

Psychical researchers have evaluated a large diversity of potential predictors in an effort to find a set of variables reliably capable of prognosticate the experimental outcome. However, despite the great effort and the large body of research conducted, the situation remains frustrating in the sense that the inconclusive results render still uncertain what parameters sustain the phenomenon.

Experimental findings, not only in parapsychology but also in psychology and many other sciences, are associated to a greater or lesser degree of robustness, which could be understood as an independence of the results upon variations in the experimental and surrounding conditions. Although most experimenters in ESP follow a previously standardised protocol (e. g. the ganzfeld), particular features of the experimental design, procedures, setting, as well as experimenter-participant interaction frequently result in considerable variation among ESP experiments. Most robust findings will still appear across different situations and studies. However, the least robust ones might not replicate in the same degree. A presumed high lability in the variables that we currently study as predictors of ESP success could be responsible for the outstanding lack of replication observed in the literature and for the general failure of the attempts to develop a formula to systematically produce successful

results in ESP experiments. This hypothesis stands for detailed methodological and procedural descriptions in the study reports and acute attention to the experimental conditions as a means of contributing to improve replication in parapsychological research, as already noted by Delanoy (1987).

The experimental studies reported in chapters III and V show that the individual differences variables that predict the study outcome change significantly across testing protocol (ganzfeld vs. sensory attenuation), type of stimulus (pictures vs. objects), and characteristics of the population of participants (paranormal believers vs. non-believers and males vs. females). It was hypothesised at the time that other factors in relation to the study such as characteristics of the experimental setting and design, the experimenter's personality, style for testing, and social interaction with the participants, and even the cultural and social environment where the study is conducted, could show a similar effect. These results also suggest, in contrast to what parapsychologists have mostly assumed on the nature of ESP, that it might not be a stable recurring trait-like phenomenon, but a more whimsical and context dependent one. The diversity was found in relation to individuals' characteristics as predictors. The data do not discard the hypothesis that the phenomenon be more stably related to factors independent from the individual or that future research be able to achieve a consistent prediction of ESP outcome based on more robust variables.

4. Individual Differences and Participant Selection

In principle, screening for participants for a determined task on the basis of characteristics that have previously showed predictive power of the individual's performance would certainly be very much expected to increase the average scoring of the group. However, because results in parapsychological research are not conclusive, it is not clear what prototype of participant is desirable for ESP tests. An additional problem is that greater or smaller variations in the experimental conditions might require different cognitive and emotional characteristics in the participants, as suggested by the results of Study I. Furthermore, there is the possibility that personality and other stable individual differences do not have direct effects on the

participants' performance but are mediated through mental state conditions given at the moment of the evaluation, which would be the actual responsible of ESP success. Even so, there are studies in the literature that show successful results after pre-selecting participants on the basis of characteristics such as the ones pointed out in the PRL four factor model or others such as creativity or artistic criteria (see e.g. Alexander, 2000; Parker, 2000; Schlitz and Honorton, 1992). Results like these support the utility of participants screening upon the current state of knowledge in the area as a means for succeeding in ESP experimental research.

An additional drawback, worth keeping in mind, is related to the applicability of the study results to the overall population. It is well known that, as a general principle in psychological research, the generalizability of obtained results is related to the heterogeneity of the sample evaluated. That is, if we obtain a series of experimental findings using a sample of individuals that are particular in determined characteristics, it could be that such dynamics are not given in subjects that do not share the characteristics of the group tested.

According to the above, it could be argued that pre-selecting participants in ESP studies on the basis of individual differences could be contributory in proof-oriented research but not totally appropriate in process-oriented research. Ahead in this chapter I outline a series of individual differences that, bearing this in mind, could be used for participant screening.

5. Psi-conducive Mental Conditions

It was argued before that individual differences could operate through mediation of mental conditions at the time of testing. Thus, it could be these later factors are the ones that directly determine the appearance as well as the magnitude of psi. However, the literature in this area is very scarce. Though many forced-choice experiments have failed to show consistent effects of mental state variables, the positive results found in several studies warrants further enquiry using a free-response paradigm. Relaxation, anxiety, ASC, and mood factors are among the variables that have received most

attention by researchers. However, the overall picture is that free-response studies have generally failed to show simple associations between state variables and ESP performance. At best, a curvilinear relationship appealing to an optimal degree of arousal, which could also be determined by individual differences and other external factors, has been hypothesised. Studies related to ASC, for instance, hypnosis, meditation, etc. are not conclusive either.

Further research aimed at uncovering which characteristics of the individual's mental state during the ESP session facilitate the appearance of the phenomenon could be rewarding. The participant's mental state during the period of ganzfeld stimulation might be determined by diverse parameters such as mood, environmental factors, personality and individual differences, and even the interpersonal dynamics given with the experimenter prior to the commencement of the session, including any explicit or implicit instruction pointed out by the latter. Occurrences during the ESP session and post-session reports could be used as indicators of the individual mental state. Some of these indicators have been used in previous research to prognosticate ESP success (see chapter II). In the design of my experimental studies, I included a series of variables related to mood, state factors, and other indicators of the participant mental state during the evaluation. However, no conclusive results were found. The definition of the psi-conducive mental state remains, at the current moment, uncertain and challenges further research.

6. The Utility of Logistic Regression Techniques in Psychical Research

Logistic regression is a robust non-parametrical statistical technique quite suitable to formula-development work in parapsychology. As explained before, essentially, this technique allows us to predict a discrete outcome, which could be for instance a hit/miss, from a set of predictors, which could be continuous or discrete. Logistic regression works out outcome probabilities on the basis of the independent variable values. Because there are not assumptions about the distribution of the variables, discrete predictors, non-normally distributed, or linearly related ones, frequently found in psychical research, can still be incorporated into the equation. This

is the most outstanding advantage of logistic regression in parapsychology, against other parametric methods such as multiple regression.

Study III illustrated the use of logistic regression in the development of an equation to predict hit/miss probabilities on the basis of a series of variables. An equation was obtained to predict the probability of a hit on the basis of 2 stable traits (internal awareness and vulnerability), a pre-session state variable (feeling vigorous), and an on-session mental state indicator (outside concern) from the participants. As illustrated, the suitability of the obtained model can be evaluated through a $\chi 2$ test and through the Hosmer and Lemeshow's goodness of fit test indicator. It was also shown how the method permits to know the percentage of correctly classified cases. The amount of information that remains unexplained by the model, as well as the single contribution of the predictors in the model, can also be estimated from the log likelihood statistic and the step value in the first case.

7. A Recipe For Success

If qualitative as well as quantitative aspects of the variables that determine the appearance and magnitude of ESP are dependant upon surrounding circumstances and characteristics of the given experiment, there could be as many recipes for success as experiments. Different experimental protocols, designs, and experimenters, under different circumstances could require, for instance, different types of participant (and viceversa) for success. Therefore, drawing a step-by-step recipe to systematically produce significant results in experimental ESP studies would remain a highly complicate objective. Even so, at the current state of research, a series of guidelines could be given.

As a general rule, I would recommend to screen for participants that show those characteristics that have predicted ESP success more recurrently in previous research. This is because they would be more expected to appear, in turn, associated to the individuals' scoring in any given new study than traits and individual differences that have failed to do so in previous studies or have done in a lesser degree. In the next

section, I shortly discuss a series of individual differences that could be used on the basis of this rationale. Furthermore, I would also recommend the use of psi-conducive practices, such as the ones I show ahead in this chapter. One third recommendation, if suitable for the purpose of the study, could contribute to cope with the hypothesised dependence of the predictors upon the characteristics of the study and the situation. This would be conducting a pilot series of trials prior to the main experiment, which could through some light on the utility of different predictors under the circumstances and characteristics of the study. In the following sections I concretise further details on each of these 3 suggestions.

7.1. Recommended variables for participant screening

The personality traits and individual differences that I found more consistent in predicting ESP scores are listed below. The measurement tools employed are also mentioned.

Openness

As described in chapter 2, some studies show association between scores on this sub-scale of the NEO-PI and ESP. Moreover the relation of some of the sub-scales facets with other variables that have also predicted ESP, such as the facet FP from the MBTI or artistic pursuit, supports also this finding.

Prior Psi-testing Experience (Other Than Ganzfeld) and Ganzfeld-testing Experience

The literature shows higher scoring for participants who have previously taken part in parapsychological and/or ganzfeld experiments. There are explanations that hypothesise the effect of this type of experience to be given through learning or state factors in the participant at the test situation (e. g. lower anxiety).

Practice of Mental Disciplines

Although research on the relationship between mental disciplines and ESP is too scarce given the complexity of this topic, practitioners of yoga, meditation, biofeedback, or other similar mental discipline, scoring higher in ESP studies have been reported in several occasions. In addition, the fact that there are also theoretical accounts for the effect of this variable suggests it as a desirable characteristic of ESP experiment participants.

Extraversion

Extraversion is another trait highly desired in samples of ESP experiments. There is quite a large body of research, using diverse measures of extraversion (e. g. Eysenck's EPQ-R, Catell's questionnaires, MMPI, NEO-PI, etc.), in support of this expectancy as well as theoretical accounts.

Artistic Pursuit and Creativity

Selecting participants from "creative" populations such as musicians, artists, actors, etc. seems to be more effective in achieving outstanding ESP scores than using creativity psychometric tests. Both the repeatability of these experimental findings and the high effect sizes appeared in some studies suggest that artistic pursuit is a most prioritary characteristic to take into account in participants selection.

Neuroticism

Both empirical work and theoretical approaches suggest this variable be a useful tool for participant screening. It is suggested that neuroticism could be a

predisposition variable that would have a detrimental effect on the ESP task through a state of anxiety in the participant. Using the NEO-PI as a psychometric tool has shown success in predicting ESP scores.

Paranormal Experiences

Though the literature on paranormal experiences and psi is not broad, studies available show higher ESP scoring by subjects who report having experienced paranormal occurrences. In my Study I paranormal experiences, in general, correlated negatively with ESP, and was a better predictor than ESP experiences, in particular. There are several scales to assess this variable, from single items (e. g. items 133-149 from questionnaire I in Study I, see appendices) to more complex scales (e.g. Thalbourne, 1995b).

Some factors that might still appear relevant have been left out for parsimony. My main priority is to provide a feasible recipe for success easy to apply in real world research. Some variables have been discarded for showing greater degree of inconsistency in their association with ESP, others for suggesting only a small effect size (e.g. paranormal belief), or for requiring tedious measurements or previous intensive training (e.g. perceptual defensiveness).

7.2. Recommended psi-conducive procedures

Below, I analyse a series of procedures that I found in the literature and others that I gathered through my survey work. Among the ones suggested in my survey, there are some that I could relate to empirical facts found in previous work as well as to findings in my experimental studies.

A) Procedures Concerning Psychological Management and Preparation of Participants

"Make participants feel comfortable. Try to make them be happy with the setting and the people in the experiment, the topic, the procedure, the study in general, what his data will be used for, etc."

There are studies in the literature that suggest that a friendly and warm experimental atmosphere where the individual can feel comfortable is psi-conducive (e. g. Crandall, 1985; Honorton, Ramsey, and Cabibbo, 1975). However, in my Study I self-informed "comfort at the test situation" correlated negatively with ganzfeld success. In Study III "discomfort during the ganzfeld" and "anger" correlated positively and significantly with success. This suggests that the above recommendation could also be self-defeating in some cases.

"Look for and try to decrease any concerns in relation to the study. Encourage participants to make questions about anything they might be worried about."

"Include a pre-experiment informal chat as part of the session"

"Take participants to see the laboratory and explain to them about the equipment, procedure, etc. before the scheduled session."

All the above is done mainly in order to decrease the participant's anxiety, a generally undesirable state not only in parapsychology but also in mainstream psychology and other disciplines' experiments. The parapsychological literature suggests a detrimental effect of state anxiety in participants of ESP studies. However, it also suggests the existence of an "optimum" level of activation for successful performance (see e. g. Braud and Braud, 1977), which could be helped through mild levels of anxiety and modulated by individual differences.

Neither pre-session relaxation nor anxiety showed any significant effect in either of my studies. Furthermore "tense arousal during the ganzfeld" correlated positively and significantly with participants' scores in Study III. However, I noticed that 61

participants (67.7% of the sample) reported having fallen asleep or "nearly" during the ganzfeld session. This variable correlated negatively with success. This suggests that the sample overall could have experienced a level of activation below that "optimum". This could be why variables such as discomfort and tense energetic arousal appeared to help the ESP process, probably, by activating the individuals.

"Take participant to observe a real session, or even run a informal trial before the scheduled session."

As the previous suggestions, observing or taking part in a test in advance would, in principle, tend to decrease anxiety at the actual experiment. Running an informal trial could also provide the individual with the prior experience that has been related to ESP success. A higher performance of participants who have previously experienced the ganzfeld appears repeatedly in the literature. A potential drawback could be that, as many individuals come with high expectancies to the ESP test, especially novices, this/these trial/s could discourage them if they miss or do not see evidence of psi. We do not know to what extent this could end up being self-defeating. At any rate, if the experimenter does not want to run this risk he/she could proceed by not carrying out the judging or, at least, not giving feedback of the result of this/these trial/s session/s to the individual.

"Remind participant of previous successes and paranormal experiences, 'getting the participants in the mood for psi'"

This could enhance self-confidence, expectancies of success and motivation in the task. However, the literature is confusing with regards to showing if these variables help or not the individuals' performance (see chapter 2).

"Perform a guided meditation before the session."

Accordingly, some studies report evidence of a higher ESP performance by participants after yoga, breathing, and transcendental meditation sessions (see Rao, Dukham, and Rao, 1978; Schmeidler, 1970)

"Perform rituals before the session, if participants and experimenter like."

In a ganzfeld study by Wezelman et al. (1997), participants who performed a pre-session ritual scored higher than other participants, though not to a significant degree probably given to the small sample size. However, these results could have arisen from higher expectancies in the experimenters for participants in the ritual condition. Talamonti (1970) provides a theoretical discussion of rituals and the mechanisms by which they could trigger the psi-process. The literature is very scarce to draw definitive conclusions.

B) Procedures Concerning the Experimental Design

"Researchers should go themselves through their own protocol before starting the study, and get feedback from some other experimenters and subjects, in order to find out how participants will feel and what might discomfort them"

As we previously mentioned, "discomfort during the ganzfeld" was a significant predictor of success in study III. This discomfort reported by psi-hitters could come from aspects of the protocol but could also reflect other things, for instance, a greater ASC or even external causes. Although it is not clear if too high levels of comfort, satisfaction, relaxation, etc. are desirable in participants, at the least, this procedure is always expected to be helpful in order to implement the experimental design in technical terms.

"Try to approximate the dream state in the lab"

There are dream ESP studies that show interesting results indicative of a highly psi-conducive state (see e. g. Dalton, Steinkamp, and Sherwood, 1999; Krippner, 1993), though null results have also been reported. In my Study III, falling asleep during the ganzfeld stimulation correlated negatively with ESP, though not to a significant level. Subjects who fell asleep reported explicitly great difficulties to recall cognition and other impressions that they experienced during the ganzfeld, which could be detrimental for the ESP task outcome.

"Use relaxation exercises as part of the session"

Despite pre-session and on-session physical and mental relaxation are widely desirable in ESP research participants, the literature still leaves room for discussion (see chapter 2). In my Study III, as previously mentioned, self-reported level of relaxation during the ganzfeld stimulation correlated negatively with ESP, though not to a significant degree. Moreover energetic arousal and tense arousal showed a positive association to performance, with the latter being significant. It is argued that, although mild levels of physical and mental relaxation are desirable, too high level of relaxation and, therefore, attempts to achieve those states, could also be detrimental for the individual's performance.

"Use a personalised approach to the phenomenon. Some people require concentration, others relaxation, others an informal atmosphere, others a more professional-looking environment. It would be the task of the experimenter to recognise characteristics of participants and adapt the design and protocol to them."

In Study I we saw how variations on the experimental conditions (ganzfeld vs. sensory attenuation, pictures vs. objects) demanded different prototypes of participant. There are studies in the literature that suggest that different participants do differently under different conditions too (e.g. Kanthamani, 1985). If these results reflect a real effect, a determined participant would be expected to perform best under a particular experimental design and protocol. It could be helpful to use a personalised approach to

ESP testing if we knew which experimental characteristics would match best particular participants' characteristics. Finding out so would indeed be an ambitious challenge. It must be noticed that although this procedure would be suitable in proof-oriented research, process-oriented studies should maintain standard testing conditions for each participant.

"Use techniques that participants are familiar and comfortable with rather than forcing them to fit within a specific research protocol."

"If they are not totally happy allow them to suggest slight changes in the setting and procedure."

These 2 points would be related to the above explanation. If we permit the participant to personalise certain aspects of the experiment, he/she might approach that situation where he/she performs best. An obvious problem here is that it is not sure if the participant will get it right and, what is more important, caution should be paid before modifying any aspects that could be detrimental for a safe ESP experiment, in terms of sensory shielding, or for the aims of the study. Attention should also be paid to avoid deception (e. g. when testing psychic claimants) maintaining the appropriate safeguards. So, this procedure would be viable, but only within certain parameters.

"*Use multiple experimenters, especially when the study involves a large number of sessions. This will prevent the experimenter from getting bored or losing motivation in the study.*"

In theory, and in tune with mainstream psychology literature, this could counteract decline effects if they come from states of boredom, loss of motivation, etc. Caution should be paid, however, in order for the different experimenters to keep the experimental conditions and treatment of participants constant.

"Explore techniques to induce ASC, e.g. drumming tapes."

Some studies have suggested ASC like hypnosis, dreaming, or those achieved during meditation be psi-conducive (see e. g. Bautista, Zangrani, and Cia, 1998; de Carvalho, 1998; Dalton, Steinkamp, and Sherwood, 1999; Krippner, 1975; Krippner, 1993, Stanford and Stein, 1994). In the ganzfeld, positive association between the degree of ASC experienced by the participant and ESP success have also been reported (e.g. Palmer, Kamashta, and Israelson, 1979). However, there are also researchers that have pointed out that variables such as individual differences, expectancies, or volunteer-subject bias might be a source of error in this type of study (e.g. Rogo, 1976). In my study I, a self reported measure of the degree in which the individual experienced an ASC during the ganzfeld correlated negatively, but not significantly, with ESP success. Although the literature appears to support the idea of ASCs as psi-conducive states, the amount of research carried out to date is too scarce, given the complexity of the topic, to draw definitive conclusions. Like in the cases of relaxation, anxiety, and arousal, it is hypothesised that there could be an optimum degree of altered state of consciousness beyond which the individual would experience a state of mind detrimental for the ESP task.

"Use experimenters with a cheerful, communicative and optimistic character."

Though the experimental literature supports the existence of an experimenter and psi-experimenter effects, it is not known what characteristics in the experimenter favour ESP success. As we mentioned previously, there are studies that suggest that a friendly and warm experimental atmosphere is psi-conducive. Experimenters with similar personality traits would be expected to create this kind of atmosphere on a more natural basis.

"Use males as receivers and females as senders".

The available literature is not as clear as frequently assumed (see chapter 2). I did not find any effect of this variable in my Study III either. Looking into social sexual roles, instead of genetic gender, is suggested for future work.

"Provide feedback of the on-going receiver's mentation to the sender when they are happy with the idea. Make sure that receiver won't feel embarrassed about being listened to by the sender."

In theory, feedback would help the sender to optimise his "sending strategy". Some theoretical models in parapsychology (e. g. Schmidt's Teleological Model, 1975; Walker's Quantum Mechanical Theory, 1975, 1984; or Steven's Electromagnetic Theory, 1997) also advocate for the importance of feedback in psi task. The studies conducted by A. Parker at Gothenburg provided data in support of this suggestion though not to a conclusive degree. I used this feedback in my 2 experimental studies, without a control condition though. It must be warned that this practice could discourage the sender when the receiver does not talk or his on-going mentation does not match the target materials as much as the sender expected. The experimenter could deal with these issues beforehand by explaining to the sender that these facts might happen but are not indicative of failure.

C) Procedures Concerning Data Treatment

"Use Consensus Judging, having a group of judges discussing the called material."

In principle, several judges could realise of more psi-information contained in the individual mentation than if only one person scans this materials. There is experimental evidence that supports that this procedure is useful to detect ESP information that could otherwise remain unnoticed (see Dalton, Steinkamp, and Sherwood, 1999). Though this practice seems promising upon the above rationale and experimental evidence, further research is needed.

"Use majority vote techniques, obtaining several calls per individual on the same target, or using several participants per target."

In theory, it could be expected, on the one hand, that if we have several individuals calling on one single target, or one individual calls several times on the same one, we would collect more psi-information, which may be useful in the judging process. However, we would also have, on the other hand, more noise, psi-irrelevant information, which could confuse the judge.

Carpenter (1993) showed results in support of the efficiency of majority-vote practices in a series of forced-choice ESP studies. However, I did not find any free-response studies where this technique was applied. Further exploration of this technique, using free-response paradigms, is both promising and needed.

"With the correspondent pre-specifications, ditch trials where people tic ranks, leaving only the ones where participants have a strict order of preference."

Some studies on confidence calls, where the participant reports a degree of confidence associated to his/her call, suggest a slight awareness of the occurrence of psi in the experiment (see e. g. Parker, 2000; Sargent, 1980b). Other studies with gifted individuals report significant results too (e. g. Don, McDonough, and Warren, 1992; Kanthamani and Kelly, 1974). Some others, however, have reported null results (see e. g. Milton, 1994). In my Study I confidence calls, assessed by item "how sure are you that you ranked the right picture/set of objects in the first position?", showed a negative correlation with both pictures and objects ESP scores. This correlation was significant for objects in Study I as well as in Study III. In addition, in Study III the correlation between a measure of awareness of psi having taken place and ESP was low and negative too. Whether the individual's estimation of his own call indicates any awareness of psi is still uncertain.

" Use psychophysiological measures as additional psi-indicators."

Some studies have shown association between ESP calls and psychophysiological and neurological measures such as event related brain potentials (Warren, McDonough, and Don, 1992; Don, McDonough, and Warren, 1998) or EEG indicators (McDonough, Warren, and Don, 1989). Braud and Jackson (1982) also recommend the used of ideomotor reactions, like those appeared in association to pendulum guessing practices, as psi indicators. Further research on this approach is needed and also promising.

" Use sum of ranks or rating scales for the analysis of data."

In theory, these 2 methods for data analysis are expected to be more sensitive than the more commonly used method of direct hits. There is also meta-analytical evidence in support of sum of ranks as a more sensitive technique (Milton, 1997).

D) Procedures Concerning Targets

" Use target materials that are interesting for the individual. Avoid boring and non-interesting pictures, etc."

" Use personal things as target. Allow participants to bring things with personal meaning (photographs, objects, etc.)."

" Use multi-sensorial targets, e.g. pictures of the Arctic, fan on face, ice on hand, cold room, etc."

" Use actual human beings doing things in various situations as targets. For example, from a group of friends choose 1 as the target/sender whose identity must be guessed by the receiver."

Certain recommendations arise from the experimental literature, as well as spontaneous case reports, for the use of targets that are interesting, attention catching, emotionally arousing, and meaningful for the individual, as well as using dynamic rather than static targets. It has also been advised trying to use target material that conveys information in contrast with any internal or external stimuli at the testing period. In my experimental study, I found a significant difference between calls on the picture and calls on the objects, which did better. The objects could have seemed more interesting, attention catching, or meaningful to the participants. It could also be argued that using targets that imply several sensory modalities could contribute to the psi-process by providing more channels for psi-communication. Humans or human behaviours have also shown successfully used as targets in ESP research (e. g. Braud, 1989). However, the evidence is not conclusive enough to establish which type of stimuli makes the best ESP target. Furthermore, the fact that individual differences might play a role and interact with target type in success, as some studies suggest (see chapter 2), could complicate even more the task of standardising a successful ESP target type.

E) Procedures Concerning Ecological Validity

"Create emotionally arousing experiences for the sender."

"Use less artificial methods than those normally used in Parapsychology labs, and closer to real life situations and spontaneous case phenomenology."

"Use pairs of parents and children as receiver and sender. Separate the child from his parent and put him/her in a mildly emotive situation, or get him/her to do things that his/her dad/mum would react emotionally to."

On several occasions, it has been noted that the magnitude and quality of reported spontaneous occurrences seems greater than what is standardly achieved in

parapsychology laboratories. Approaching the experimental features to those observed in real life events could promote the appearance of the phenomenon. Creative experimental designs are welcome in the area for testing the above hypotheses. Ethical issues draw certain limitations here too.

F) Instrumental Measures

"Use successful experimenters as proved in previous studies."

As previously noted, ESP studies results and findings in the literature seem, at the naked eye, more consistent within experimenters than between them. Though this has never been statistically confirmed, the previously discussed experimenter as well as the psi-experimenter effects could be at the basis of this. From this perspective, using experimenters that have obtained high hit rates in previous studies could be psi-conducive.

"Use intuitive judges that have provided high hit rates in previous studies."

Some judges, because they are more intuitive or have more experience in the area, might provide higher hit rates when analysing the target materials and individuals' calls from ESP studies. Furthermore, an effect similar to the psi-experimenter effect has been also described for judges of ESP materials. If trends within judges are consistent, using people that have produced high hit rates in previous studies could also be psi-conducive.

"Consider the experimental set up as a system with the experimenter and investigator (if different) as separate components of the system. Thus, look for well-integrated systems as evidenced in performance in previous studies."

A system approach to parapsychological phenomenon could be feasible. According to the general systems theory (Bertalanffy, 1973) a system is defined as a set of components in interaction, which would show emergent properties based on such interactions. This theory attempts to formulate principles valid for systems in general. This could be applied to the optimisation of ESP testing as the item suggests and, indeed, challenges further research.

"Use target materials with which high hit rates have been already obtained (e.g. select successful sets from previous studies)."

As a general recommendation, concerning these and others potential instrumental measures, we could conclude that if, for any known or unknown reason, certain features of the session prove to contribute in evoking psi, incorporating them in later research could be successful too.

G) Other Suggestions

"Participants should be self-selected, volunteering freely for the experiment."

An item in the questionnaires used in my Study I asked participants how willing they were to take part in that study as well as in future ones. Scores on this item correlated negatively with ESP, which would not support the above suggestion. However, more research is needed in order to determine the validity of this practice as psi-conducive.

"Create an informal, game-like, even joking situation. Make the session enjoyable."

As previously noted, there are studies in the literature that suggest that creating a related friendly and warm experimental atmosphere is psi-conducive. This could also be helpful to relax anxiety in participants. Other authors, however, recommend sticking to formalities and stressing the importance of appearance and

professionalism. In Study III scores on an item where individuals were asked to point out the degree to which they enjoyed the session showed a near zero correlation with ESP scores, which would not support the above item.

"Run sessions around 13.50 LST and avoid 18.50 LST."

"Run the session when the GMF activity is low."

The findings concerning GMA fluctuations and ESP appear recurrently in the literature. The effect of LST revealed in Spottiswoode's meta-analyses seems strong too. The accumulated evidence suggests that ESP is enhanced during periods of quiescence in the geomagnetic field activity. Most of the studies have successfully used the ap or the aa indices as measure of the terrestrial GMF activity. The ap index reflects the maximum fluctuation within a 3-hours period. The aa is a daily index of the mean change in the global GMF. As GMF forecasts are provided and available from appropriate institutions (like weather forecasts) ESP sessions could be booked in advance to be run under periods of quiescence in the geomagnetic field activity.

There are many ways to calculate the LST. The formula below is simple and will be right to within a fraction of a percent.

LST=t+0.0657*D-L/15-17.4 [6]

where t is time in UTC (universal time), which is calculated by taking the local time, removing day light savings, if any, and using the time zone to convert back to UTC; D is number of days from last December the 31st, and L= longitude, being west of Greenwich positive and East negative.

Therefore, the recommendation here would be to carry out ESP sessions at 13.50±1LST (avoiding 18.50±1) during periods of quiescence in the terrestrial GMF

[6] Thanks to James Spottiswoode for facilitating this information.

activity. My Study III showed, however, a non-significant reversal of the expected LST effect.

"Encourage subjects to bring along a friend or relative if they feel happy about it. But use a member of the staff as sender if they prefer that instead."

Though Study III showed a non-significant reversal of the expected trend, the literature suggests that when sender and receiver are either close friends or relatives the probability of success is higher than when they don't know each other. Thus recruiting pairs of friends or relatives, instead of single participant, could be psi-conducive.

H) Additional Psi-Conducive Practices

Decline Effects

If the participants' performance decline throughout a series of experiments observed in some studies reflects a real effect and is not an artefact of selective reporting, as previously discussed, we should consider what we could do in order to counteract this phenomenon. If decline effects come from boredom, tiredness, lack of motivation, etc. in participants and/or experimenters, as hypothesised in several occasions, a possible procedure could be splitting the series of experiments into several sets that would finally compound the total study. It would also be feasible to assign different experimenters for each of the different sets. A potential drawback would be the risk of some aspects of the experiment and situation changing across sets. Also the inclusion of multiple experimenters could be a confounding variable and yield different results for the different sets within one same study. Any additional psychological

management of the variables assumed to trigger this effect (i. e. boredom, motivation, tiredness, etc.) would, in principle, be expected to be helpful too.

Pre-specified Discarded Trials Based upon Session and Post-session Indicators of Psi.

Once the individuals have been recruited and the ESP testing is running, we could still observe and register some indicators predictive of the outcome. It is the individual reporting having experienced the ganzfeld session shorter than it really was, that is the indicator that more consistently appears in the literature. In Study III several variables such as feeling uncomfortable during the ganzfeld, being concerned with outside stimulation, tense arousal, feeling anger and frustration, having felt upset during the testing, and a low confidence call, show a significant association to ESP performance.

Although these variables need further exploration, it is curious, however, that such "negative" aspects of the individual's state, which, in principle, would have been thought of being detrimental to ESP success, all correlated positively with the participants' performance. This could have been due to the fact that most of these variables could have an activating effect on the generally under-aroused population of participants, as previously discussed.

If what we aim at is a high hit rate, these indicators could be used to discard trials where a miss is predicted. Caution should be paid when doing this, however, and do it with the correspondent and very clear pre-specifications and always before judging or result checking. This practice is not recommended in process-oriented research, where we can learn from every trial and individual.

Instructions for Participants

Participants of ESP experiments are asked to perform a quite complex, unusual task. They can enter the laboratory with lots of doubts and expect to be explained on

how to "send/receive" psi-information, especially novices. Most of my participants demanded instructions explicitly. However, currently there are not standard instructions for participants in ESP research. In theory, as a rule of thumb, any recommendation given should lead the participant to experience a psi-conducive state and make the best profit of any ESP information during the session. However, the main obstacle is that, as we previously mentioned, the literature seems confusing when describing the characteristics of the mental state that would give rise to psi, if any. For my experimental studies, I compiled a series of items, from the literature and other researchers, that intuitively seemed to me helpful in promoting a psi-conducive state. I asked senders to try to communicate to the receiver information about the pictures and objects. I asked senders to visualise the objects and elements in the pictures and "play" with them in their hands and their mind. I thought that this mental imagery in the sender could help communication. I also asked the senders to relax every ten minutes, taking the headphones off and forgetting about the study for five minutes. With this I tried to avoid tiredness. Receivers were instructed to spontaneous images, memories, and impressions that they felt during the reception period. They were instructed to relax and try not to make any effort or produce any imagery voluntarily but wait for this to appear spontaneously. Thus, I intended to reduce irrelevant cognitive materials. I asked them not to give much detail when reporting so that this did not interfere with the relaxation process and because their mentation was to be revised after the session when participants would be given the chance to make comments on it and expand it. They were also instructed not to avoid to feel sleepy but to aim and maintain for this mental state. They were also asked to report their mental imagery and impressions as they looked like without thinking much about it so that any psi-signal were minimally processed (see full instructions in appendix D).

7.3. Preliminary exploration of ESP predictors

A series of pilot trials prior to the main experiment could provide valuable insight in relation to which state factors, on-session and post-session indicators of psi, individual differences, and practices predict best the individuals' ESP performance

under the particular characteristics of the study. At this point, I would recommend to explore the variables that have shown more robustness in previous research, as pointed out before, and also include diverse state factors and on-session and post-session indicators of success. Logistic regression could be used at this stage as previously shown. Psi-conducive practices could also be explored in the pilot study through correlational analysis or manipulating experimental conditions. Below, I discuss a series of state factors and indicators of success that have appeared in the literature.

As mentioned, the literature on state factors is not as extensive as in the case of individual differences. Even so, some insight could be gathered from previous studies. For instance, *mood, level of relaxation, anxiety,* and *arousal* are among the most attended variables. The results overall seem to indicate that relaxation and low level of anxiety during the session facilitates the process. However, there is also evidence for an optimum level of physical and mental activation below/above which relaxation and anxiety would show detrimental effects. *Expectancies of success*, especially in regard to Schmeidler's and attitudinal criteria (see chapter 2), seem also relevant in the prediction of the study outcome. *Motivation* and diverse mood indicators could also be helpful to the researcher. In my second experimental study I used the UWIST Mood Adjective Checklist and the Dundee Stress State Questionnaire.

Similarly, diverse measures of on-session and post-session indicators of success could also throw some light in the prediction of the experimental outcome. Although the literature is not wide, there is some research that supports the utility of indicators such as *experiencing time contraction* during the ganzfeld stimulation (simply asking the participant how long the ganzfeld seemed to be), *loss of body awareness*, success of the technique in altering the individual's *state of consciousness*, level of *relaxation* achieved during the session, *confidence of the call*, etc. Other variables also considered are characteristics of the *mental imagery* experienced such as *controllability, vividness, spontaneity, richness, modalities* experienced; post-hoc *expectancies of success*; *length, frequency, tendencies or number of utterances*; etc. These variables have mainly been measured through post-session questions (e. g. see appendix II)

In Study I as well as in Study III, individuals who disagreed with the single item that regarded the *success in the ESP task as a function of mental capacities* (item 15 of the individual differences questionnaire) scored significantly higher in the ganzfeld ESP task. This could refer to an attribution factor. An hypothesis to account for these results could be that individuals who disagreed with the item statement could be manifesting an external locus of control which would trigger a positive "let-it-happen" attitude when undertaking the ESP task. A similar attitude has been related to better ESP performance based on spontaneous case reports and empirical work. However, locus of control for the ESP task showed a near-zero correlation with ESP in Study I and, therefore, was not tested in Study III.

Similarly, high *empathy* subjects, measured as by Eysenck's IVE; those who reported feeling *less vigorous during the week previous* to testing (item 36 of the pre-session questionnaire); and those who showed less *confidence in their call* (item 19 of the post-session questionnaire) also scored higher in both studies.

In Study III the logistic regression equation carried out on the set of variables regarding participant selection gave rise to an 8-predictor solution (see chapter V). Positively associated to ESP scores we found variables *empathy*, *intuition*, *care for the sender*, and *positive emotions*. Similarly negatively associated to ESP we found *internal awareness*, *viewing ESP as a mental capacities task*, *sender-receiver pairing*, and *interest in helping*. The same technique applied on the variables related to the individual's mental state showed *pre-session energetic arousal, distraction, discomfort* during the ganzfeld, and *outside concern* associated positively to ESP success as well as a negative association for variable *pre-session hedonic tone*. Similarly, the analysis on post-session and on-session indicators of success pointed out a positive association between ESP scores and variable *feeling upset* at any point of the experiment and a negative association for *confidence call*. Obviously, the lack of literature on most of these variables warns us from recommending them as participant selection criteria straight away. However, they warrant further research.

To sum up, on the basis of the pilot results, the experimenter could design and conduct the main series of experiments. He/She could proceed by operating on 3

domains: 1) screening for participants on the basis of the characteristics that predicted ESP scores in the pilot series; 2) use psi-conducive procedures, especially those that are expected to promote state factors that appeared associated to the participant scoring in the pilot experiments; 3), with the proper pre-specifications, sessions could be weighted, cancelled, or discarded, prior to judging and any result checks, according to indicators of failure also obtained in the pilot series.

The following analyses I carried out on the data of my 2 experimental studies provide partial support for the utility of running this pilot series.

From the 15 variables that showed significance, operating at an α level of .05, in my study I, 4 (24%) replicated their effect in study III, whereas only .75 would have been expected to do so by mere chance, assuming independence of the measures. This supports, at least, for a certain degree of within-experimenter replication of the predictive effects despite some minor differences that existed between the study designs. I could have selected, for instance, the 10 variables that showed the highest correlation with ESP in Study I and use percentiles 10 (for the positively correlated variables) and 90 (for the negatively correlated ones) as filtering criteria in Study III[7]. More strict criteria could be used and would be expected to provide higher hit rates. However, it would also complicate more the recruitment of participants and the completion of the study. If I had screened for participants in Study III on the basis of the 9 variables of the above 10 that referred to individual differences, I would have not carried out the ganzfeld testing for 32 of the volunteers. These 32 sessions provided 8 hits, a chance 25% hit rate. If, in addition, I had used the only one variable from the above 10 that referred to post-session indicators of psi (confidence call), under the same percentile criteria, I would have not proceeded with the judging and checking in 4 cases. These 4 individuals produced 0 hits. The overall hit rate for the remaining 54 participants would have been 40.7% (22 hits), highly significant ($p<.01$). This procedure challenges further research and awaits future replications.

[7] Instead of selecting the 10 higher correlation indices, logistic regression, ideally, could have been performed on the significant variables from Study I in order to obtain the entry criteria for Study III. However, in principle, the use of

8. Summary, Limitations, and Future Research

This research project was targeted at the exploration of predictors of experimental ESP success and the development of a recipe for success that would be presented within the framework of a logistic regression equation. A literature review showed that the search for the prediction of ESP scores has been based on a large and diverse number of variables. Researchers have also explored diverse procedures to evoke psi in the laboratory. However, findings on which variables or characteristics of the experiment determine the appearance, or magnitude, of this phenomenon are not conclusive. In addition to the literature review on psi-conducive practices described in Chapter 2, a survey was conducted on researchers to outline a series of procedures potentially useful for the successful experimental replication of ESP. This piece of work yielded a wide number of recommendations which could largely contribute to experimental success. One first experimental study was conducted to explore a large set of variables. The most successful predictors in this study were selected for entry into a second experiment which also tested other variables commonly appeared in th parapsychological literature. This study showed a significant 33% hit rate and would conclude with a four-variable logistic regression equation that predicted correctly 79% of the cases. It was argued that the reliability of a "standard recipe for success" remained critical under the low robustness shown by the predictors studied.

Although replication of the parapsychological phenomenology that is observed in spontaneous case reports under the controlled circumstances of a laboratory is one of the major ambitions for the scientific development of this discipline, we must also keep in mind that the artificiality introduced by these efforts would question whether our findings can validly be applied to real-life, naturally-occurring situations.

The inconsistency of findings frequently found in the parapsychological literature, as well as a post-hoc analysis of data in Study I, would be in tune with the idea that we are dealing with labile predictors. If this hypothesis is further evidenced,

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logistic regression was not planed for this study and, therefore, the ratio of case to variable was too small for the use of this technique.

efforts to achieve the experimentally controlled replication of ESP should be based on more flexible guidelines that take into account this variability. It was also noted, however, that the data do not discard the possibility that the phenomenon be more stably related to factors independent from the individual. Should this be the case, there could still remain room for a robust prediction of ESP based on this latter, or a different, type of variable.

Participant selection on the basis of determined personality traits and other characteristics seems to be a most regarded strategy for success in nowadays ESP experimental research. However, it is not clear what prototype of participant is desirable. An additional problem is that greater or smaller variations in the experimental conditions might require different cognitive and emotional characteristics in the participants. Even so, the individual differences which appear associated to ESP more repeatedly in the literature are: openness, prior psi-testing experience (other than ganzfeld) and ganzfeld-testing experience, practice of mental disciplines, extraversion, artistic pursuit and creativity, neuroticism, paranormal experiences. As previously pointed out, the generalisability of the study results to the overall population would decrease with the inclussion of sample selection criteria. It was, therefore, argued that pre-selecting participants in ESP studies on the basis of individual differences could be contributory in proof-oriented research but not totally appropriate in process-oriented research.

It was explained that individual differences could operate through mediation of mental conditions at the time of testing. Relaxation, anxiety, ASC, and mood factors are among the variables that have received most attention by researchers. Occurences during the ESP session and post-session reports have been used in previous research to prognosticate ESP success. However, research has generally failed to show simple associations between state variables and ESP performance. It was argued that further research aimed at uncovering which characteristics of the individual's mental state during the ESP session facilitate the appearance of the phenomenon could be rewarding and that the definition of the psi-conducive mental state remains, at the current moment, uncertain. It was explained that if the variables that determine the appearance and magnitude of ESP are dependant upon surrounding circumstances

and characteristics of the given experiment, drawing a step-by-step recipe to systematically produce significant results in experimental ESP studies would remain a highly complicate objective.

Under this perspective, I attempted to outline a series of indications that would help the experimenter to succeed in the specific series of experiments to be conducted. As a general rule, I would recommend to screen for participants that share the characteristics that have replicated the most in previous research. Also, I would recommend the use of psi-conducive practices like the ones described in chapter IV. A pilot series of trials, prior to the main series of experiments, could be helpful in exploring which predictors suit best the particular circumstances and characteristics of the study. In the main series, the experimenter could operate, on the basis of the results obtained in the pilot series, on the three domains previously mentioned. That is, 1) selecting participants upon stable personality traits and other individual differences; 2) using psi-conducive practices and promoting a psi-conducive mental state; and 3) cancelling or weighting the experiments, in advance, when the pre-session variables clearly predict a miss, or discarding trials, prior to target checks, on the basis of on-session and post-session indicators of failure.

A brief post-hoc analysis I carried out on the data from my experimental studies supported the accuracy of this procedure. I observed that if I had screened for participants and weighted or cancelled sessions in advance, in my second study, on the basis of the results obtained in my first study, the overall hit rate for this second study would have been 40.7% (22 hits), highly significant ($p<.01$).

Another hypothesis mentioned in this thesis was the probability that stable characteristics of participants affect the session outcome through mediation of more transient state factors at the moment of testing. Causal relationships concerning the dynamics among the variables that take part in the experimental ESP evaluation can be tested through Structural Equation Modelling (SEM) techniques. This collection of statistical procedures permits analysis of a set of relationships between one or more independent variables and one or more dependent variables, either continuous or discrete.

Another problem I had to face throughout this research is related to the, probably too ambitious, number of variables evaluated. This made the psychometric testing, and data analysis tedious and complicated. I would recommend using (much) smaller sets of variables in future work.

The search for a replicable experiment that proves the reality of the ESP phenomenon has been target of interest since the very beginning of scientific psychical research. Some historical landmarks could be cited, such as J. B. Rhine's forced-choice experiments, at the University of Duke in the 30s, or more recent Honorton's et al.'s PRL autoganzfeld series. The results of my survey show, however, that researchers nowadays are, from my point of view, too relaxed in the efforts to replicate significant psi effects in the laboratory. Recent meta-analyses show frustrating results in terms of hit rates too. It might be thought that studies like the above ones legitimaly conclude on the existence of a communication anomaly, that the criticisms are, therefore, unfair, and that there is no longer need to invest effort and time to provide significant ESP. However, achieving a recipe to systematically success in laboratory ESP experimental research could have transcendental implications for the field, such as an increase of interest and acceptance by professionals and organisation in mainstream science, interdisciplinary co-operation, as well as funding sources and support for research. I believe that researchers are very close to achieve experimental replication of the ESP phenomenon aided by recent findings and methodological developments. I do believe that the achievement of a replicable ESP experiment will be the gate into full scientific acceptance for an area of research that is, at the moment, as much controversial as fascinating.

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APPENDICES

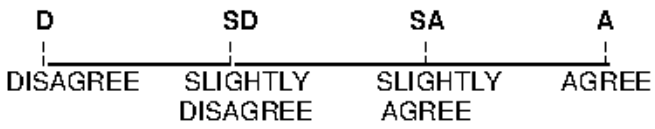
APPENDIX A

Study-I Questionnaires

- **Questionnaire I and II: Individual Differences**
- **Pre-session Questionnaire**
- **Post-session Questionnaire**

INDIVIDUAL DIFFERENCES QUESTIONNAIRE - I

Please rate each of the following statements on the basis of the grade in which they describe your usual behaviour or personality, attitudes, etc. There are no 'right' or 'wrong' answers to the questions. People are different and we are interested in what these differences are. Please answer circling the most accurate answer according to the following scale:



1. Generally, I'm not very aware of myself. D-----SD---SA-----A

2. I'm generally attentive to my inner feelings. D-----SD---SA-----A

3. I'm alert to changes in my mood. D-----SD---SA-----A

4. I'm aware of the way my mind works when I work through a problem. D-----SD---SA-----A

5. I'm always trying to figure myself out. D-----SD---SA-----A

6. I reflect about myself a lot. D-----SD---SA-----A

7. I'm constantly examining my motives. D-----SD---SA-----A

8. I sometimes have the feeling that I'm off somewhere watching myself. D-----SD---SA-----A

9. I like art and aesthetics very much (e.g. enjoy pictures, being in a museum, etc.). D-----SD---SA-----A

10. If I had learned to play a musical instrument I think I would do it pretty well now. D-----SD---SA-----A

11. I posses good mental capabilities (e.g. memory, intelligence, creative thinking, etc.). D-----SD---SA-----A

12. (deleted)

13. I believe I'm a lucky person. D-----SD---SA-----A

14. I think that succeeding or not in this Ganzfeld ESP task is a matter of luck. D-----SD---SA-----A

15. I think that succeeding or not in this Ganzfeld ESP task is a matter of cognitive abilities. D-----SD---SA-----A

16. Normally, I feel very energetic (vs. tired and exhausted). D-----SD---SA-----A

17. I would like going hunting. D-----SD---SA-----A

18. I enjoy car magazines. D-----SD---SA-----A

19.. I am scared of snakes and similar reptiles. D-----SD---SA-----A

20.. I would like being a poet. D-----SD---SA-----A

21. I think I would enjoy a job in the army. D-----SD---SA-----A

22.. I like romantic stories. D-----SD---SA-----A

23.. I'm very fussy when buying clothes and dressing. D-----SD---SA-----A

24.. I would never practise any high risk sport just for the thrill of it. D-----SD---SA-----A

25.. I really enjoy cooking. D-----SD---SA-----A

26. I like hard-action movies a lot. D-----SD---SA-----A

27. I find that a well-ordered life with regular hours suits my temperament. D-----SD---SA-----A

28. I hate to change my plans at the last minute. D-----SD---SA-----A

29. I find that establishing a consistent routine enables me to enjoy life more. D-----SD---SA-----A

30. I enjoy having a clear and structured mode of life. D-----SD---SA-----A

31. I don't like going into a situation without knowing what I can expect from it. D-----SD---SA-----A

32.. I think it is fun to change my plans at the last minute. D-----SD---SA-----A

33.. I enjoy the uncertainty of going into a situation without knowing what might happen. D-----SD---SA-----A

34. I dislike unpredictable situations. D-----SD---SA-----A

35.. When I go shopping, I have difficulty to know exactly what it is what I want. D-----SD---SA-----A

36.. I would describe myself as indecisive. D-----SD---SA-----A

37.. I tend to struggle with most decisions. D-----SD---SA-----A

38.. When trying to solve a problem I often see so many possible options that it is confusing. D-----SD---SA-----A

39. I don't like situations that are uncertain. D-----SD---SA-----A

40. I feel uncomfortable when I don't understand why an event occurred in my life. D-----SD---SA-----A

41. When I'm confused about an important issue, I feel very upset. D-----SD---SA-----A

42. I dislike when a person's statement could mean very different things. D-----SD---SA-----A

43. I dislike questions that could be answered by many different ways. D-----SD---SA-----A

44. I feel irritated when one person disagrees with what everyone else in a group believes. D-----SD---SA-----A

45.. When thinking about a problem, I consider as many different opinions on the issue as possible. D-----SD---SA-----A

46.. I prefer interacting with people whose opinions are very different from my own. D-----SD---SA-----A

47. I have always been very good at Mathematics. D-----SD---SA-----A

48. My thoughts are sometimes so strong I can almost hear them. D-----SD---SA-----A

49. I have felt (at times) that I have special, almost magical powers. D-----SD---SA-----A

50. My hearing is sometimes so sensitive that ordinary sounds become uncomfortable. D-----SD---SA-----A

51. I'm so good at controlling others that it sometimes scares me. D-----SD---SA-----A

52. Sometimes, I have had the feeling of gaining or losing energy when certain people look at me or touch me. D-----SD---SA-----A

53. I often happens to me that nearly every thought immediately and automatically suggests an enormous number of ideas. D-----SD---SA-----A

54. Sometimes I'm so nervous that I'm blocked. D-----SD---SA-----A

55. At times I have felt that my speech is difficult to understand because the words are all mixed up and don't make any sense. D-----SD---SA-----A

56. No matter how hard I try to concentrate, unrelated thoughts always creep into my mind. D-----SD---SA-----A

57. I frequently have difficulty in starting to do things. D-----SD---SA-----A

58. I often feel 'fed up'. D-----SD---SA-----A

59. I'm easily hurt when people find fault with me or the work I do. D-----SD---SA-----A

60. I feel very close to my friends. D-----SD---SA-----A

61. I'm too independent to really get involved with people. D-----SD---SA-----A

62. Trying new foods is something I always enjoy. D-----SD---SA-----A

63. People are usually better off if they stay aloof from emotional involvement with people. D-----SD---SA-----A

64.. I enjoy many different kinds of play and recreation. D-----SD---SA-----A

65.. I usually let myself go and enjoy myself at a lively party. D-----SD---SA-----A

66. I overindulge in alcohol or food. D-----SD---SA-----A

67. Sometimes I have had the urge to smash or break things. D-----SD---SA-----A

68. I often feel like doing the opposite of what people suggest, even though I know they are right. D-----SD---SA-----A

69. I'm usually in an average kind of mood, not too high and not too low. D-----SD---SA-----A

70. I would take drugs that might have dangerous or strange effects. D-----SD---SA-----A

71. At times I have taken advantage of someone. D-----SD---SA-----A

72. Sometimes a passing thought seems so real that it really frightens me. D-----SD---SA-----A

73. Sometimes my thoughts seem as real as actual events in my life. D-----SD---SA-----A

74. (Deleted)

75. In the past, I have had the experience of hearing somebody's voice and then found that there was no-one there. D-----SD---SA-----A

76. I often hear a voice speaking my thoughts aloud. D-----SD---SA-----A

77.. I have never been troubled by hearing voices in my head. D-----SD---SA-----A

78. The sounds I hear in my daydreams are generally clear and distinct. D-----SD---SA-----A

79. The people in my daydreams seem so true to life that I sometimes think they are. D-----SD---SA-----A

80. In my daydream I can hear the sound of a tune almost as clearly as if I were actually listening to it. D-----SD---SA-----A

INDIVIDUAL DIFFERENCES QUESTIONNAIRE - II

81. On occasions, I have seen a person's face in front of me when no-one was in fact there. D-----SD---SA-----A

82. I often feel as if things were not real. D-----SD---SA-----A

83. Occasionally, I feel like someone else. D-----SD---SA-----A

84. Sometimes my mind blocks, goes totally empty. D-----SD---SA-----A

85. I often wonder who I really am. D-----SD---SA-----A

86. At one or more times I have found myself staring intently at myself in the mirror as though looking at a stranger. D-----SD---SA-----A

87.I often feel that I'm removed from my thoughts and actions. D-----SD---SA-----A

88.. I rarely feel confused, like in a daze. D-----SD---SA-----A

89. I have had periods were I could not remember where I had been the day before. D-----SD---SA-----A

90. When I try to speak words, they don't come out right. D-----SD---SA-----A

91.. I have never woken up without knowing who I was or how I got there. D-----SD---SA-----A

92. As I was growing up, people often said that I seemed to be off in a world of my own. D-----SD---SA-----A

93. Sometimes I feel like my body is undergoing a transformation. D-----SD---SA-----A

94. Sometimes I feel as if there is something inside of me directing my actions. D-----SD---SA-----A

95. In uncertain times, I usually expect the best. D-----SD---SA-----A

96.. If something can go wrong for me it will. D-----SD---SA-----A

97. I always look on the bright side of things. D-----SD---SA-----A

98. I'm always optimistic about my future. D-----SD---SA-----A

99.. I hardly ever expect things to go my way. D-----SD---SA-----A

100.. Things never work out the way I want them to. D-----SD---SA-----A

101. I'm a believer in the idea that every cloud has got a silver lining. D-----SD---SA-----A

102.. I rarely count on good things happening to me. D-----SD---SA-----A

With the next 8 items we intend to find out how you would react to certain situations, in terms of how willing you will be to reveal information about yourself to other people. Please, use the numbered scale below to indicate the degree of self-disclosure at which you would feel comfortable in the situation:

LOW DISCLOSURE:
I would be willing to discuss only certain topics, and on a superficial level only, if at all, in this situation.

HIGH DISCLOSURE:
I would be willing to express, in complete detail, personal information about myself, my feelings, and views regarding any topic

Situations:

103. You are sitting next to a stranger on an aeroplane. (LD) 1---2---3---4 (HD)

104. You are eating lunch alone and a stranger asks if she/he might join you. (LD) 1---2---3---4 (HD)

105. You are sightseeing with a tour group in Europe. (LD) 1---2---3---4 (HD)

106. You are being introduced to a group of strangers. (LD) 1---2---3---4 (HD)

107. You are at a restaurant with a friend. (LD) 1---2---3---4 (HD)

108. You and a friend are driving to London. (LD) 1---2---3---4 (HD)

109. You are having dinner at home with some relatives. (LD) 1---2---3---4 (HD)

110. You are in a coffee-shop with some friends. (LD) 1---2---3---4 (HD)

111. Just before falling asleep, as well as just as waking up in the morning, I can see some flashing, dream-like images passing quickly through my mind.

€ always
€ often
€ sometimes
€ seldom
€ never

112. When I close my eyes, after a little while, I can see images going through my mind.

€ always
€ often

€ sometimes
€ seldom
€ never

113. I can notice some spontaneous mental imagery going through my mind when I'm awake doing some activity.

€ always
€ often
€ sometimes
€ seldom
€ never

114. Have you ever had a dream in which you realise you are dreaming and are able to control the flow of events in your dream?

€ never
€ rarely
€ sometimes
€ frequently
€ nearly every night

115. Do you often recall your dreams?

€ never
€ less than once per week
€ once per week
€ more than once per week
€ almost every day

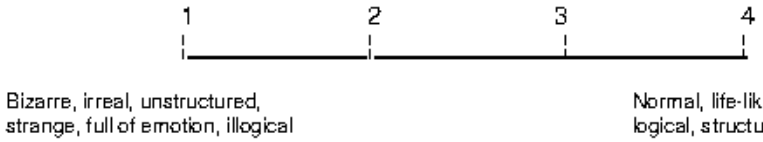
116. Do you remember what you dreamt last night?

€ remember nothing
€ remember unclear bits of a dream
€ remember parts of a dream
€ remember the full dream

117. How often do you try to interpret your dreams?

€ always
€ often
€ sometimes
€ seldom
€ never

118. How would you describe your dreams? (Point out in the following scale):



119. How long do you normally take to fall asleep at night? (In absence of loud environmental noise)

€ a few minutes
€ 15 minutes
€ 30 minutes
€ 1 hour
€ 2 hours
€ more than 2 hours

120. Do you normally fall asleep or feel sleepy when travelling?

€ always
€ often
€ sometimes
€ seldom
€ never

121. Do you fall asleep or feel sleepy when watching TV at night?

€ always
€ often
€ sometimes
€ seldom
€ never

The statements below show some aspects of the way in which people think or of what seems to go through their minds when studying or problem solving. Read each statement and decide to what extent it reflects your own thinking style.

122..I enjoy doing work that requires the use of words. D-----SD---SA-----A

123. My daydream are sometimes so vivid I feel as though I actually experience the scene. D-----SD---SA-----A

124.. I enjoy learning new words. D-----SD---SA-----A

125. My powers of visual imagination are higher than average. D-----SD---SA-----A

126.. I seldom dream. D-----SD---SA-----A

127.. I don't believe that anyone can think in terms of mental pictures. D-----SD---SA-----A

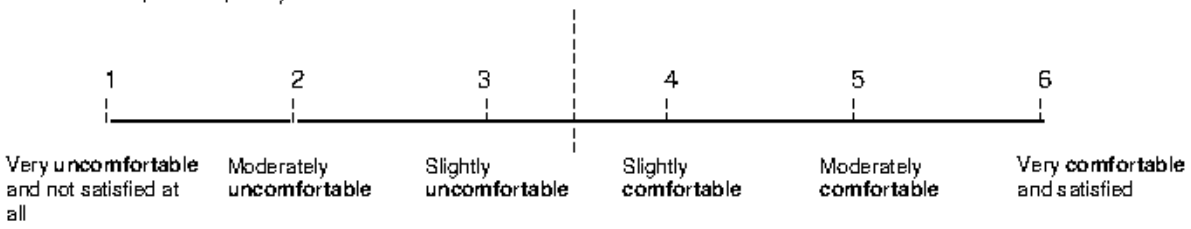
128.. I prefer to read instructions about how to do things rather than have someone show me. D-----SD---SA-----A

129. My dreams are extremely vivid. D-----SD---SA-----A

130.. I have better than average fluency in using words. D-----SD---SA-----A

131. I think I am a visual learner (vs. Verbal). D-----SD---SA-----A

132. Do you feel comfortable and satisfied with your life (take into account all areas: academic, economical, social, etc.)?



133. If telepathy existed, I could say I have had an experience that could be best explained as such (i.e. knowing what someone else is thinking or experiencing).

€ Yes
€ no
€ uncertain

134. If clairvoyance existed, I could say I have had an experience that could be best explained as such (i.e. knowing about something that is happening elsewhere).

€ Yes
€ no
€ uncertain

135. If precognition existed, I could say I have had an experience that could be best explained as such (i.e. knowing about the future).

€ Yes
€ no
€ uncertain

136. If psychokinesis existed, I could say I have had an experience that could be best explained as such (i.e. influence of mind over matter).

€ Yes
€ no
€ uncertain

137. If ghosts existed, I could say I have had an experience that could be best explained as an apparition.

€ Yes
€ no
€ uncertain

138. If communication with the dead were possible, I could say I have had an experience that could be best explained as such.

€ Yes
€ no
€ uncertain

139. If reincarnation existed, I could say I have had an experience that could be best explained as memories of a past life.

€ Yes
€ no
€ uncertain

140. If Astral Journeys or going Out-of-the-Body were possible, I could say I have had an experience that could be best explained as such.

€ Yes
€ no
€ uncertain

141. If paranormal occurrences existed, I could say I have had an experience that could be best explained as paranormal, different from the above. Say what.

€ Yes
€ no
€ uncertain

Now, please indicate how often, **within the last year**, you have experienced each of the above phenomena.

142. telepathy-like

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

143. clairvoyance-like

€ never
€ once

€ 2-4 times
€ 5-10 times
€ more than 10 times

144. precognition-like

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

145. psychokinesis-like

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

146. past life memories-like

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

147. communication with the dead-like

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

148. apparitions-like

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

149. out-of-the-body experiences-like

€ never
€ once

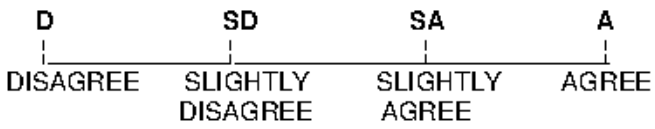
€ 2-4 times
€ 5-10 times
€ more than 10 times

150. Others

€ never
€ once
€ 2-4 times
€ 5-10 times
€ more than 10 times

PRE-SESSION QUESTIONNAIRE

Please score each of the following statements on the basis of the grade in which they describe how you **feel at this moment**, in particular. There are no 'right' or 'wrong' answers to the questions. Please answer rounding the most accurate answer according to the following scale:



1. I feel confident about my abilities. D-----SD---SA-----A

2. I feel as smart as others. D-----SD---SA-----A

3. I feel confident that I understand things. D-----SD---SA-----A

4.. I feel that I have less scholastic ability right now than others. D-----SD---SA-----A

5.. I feel frustrated or rattled about my performance. D-----SD---SA-----A

6.. I feel like I'm not doing well. D-----SD---SA-----A

7.. I think that I'm having trouble understanding things that I read. D-----SD---SA-----A

8.. I'm worried about whether I'm regarded as a success or failure. D-----SD---SA-----A

9.. I feel self-conscious. D-----SD---SA-----A

10.. I'm worried about what other people think of me. D-----SD---SA-----A

11.. I feel concerned about the impression I'm making. D-----SD---SA-----A

12.. I'm worried about looking foolish. D-----SD---SA-----A

13.. I feel inferior to others at this moment. D-----SD---SA-----A

14.. I feel displeased with myself. D-----SD---SA-----A

15. I feel satisfied about the way my body looks right now D-----SD---SA-----A

16.. I'm dissatisfied with my weight. D-----SD---SA-----A

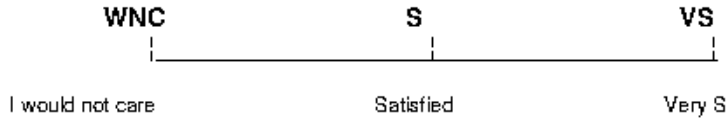
17. I feel good about myself. D-----SD---SA-----A

18. I'm pleased with my appearance right now. D-----SD---SA-----A

19. I feel that others respect and admire me. D-----SD---SA-----A

20.. I feel unattractive. D-----SD---SA-----A

Please, in the next 6 items, point out the degree of satisfaction you would feel if this ESP task ended up in the following outcomes:



21. I'm the only one who guesses the right picture. WNC-----S-----VS

22.. I discover something new about human nature. WNC-----S-----VS

23.. I explore and practice a new capability. WNC-----S-----VS

24. I get better results than other people. WNC-----S-----VS

25. What I do is useful for research. WNC-----S-----VS

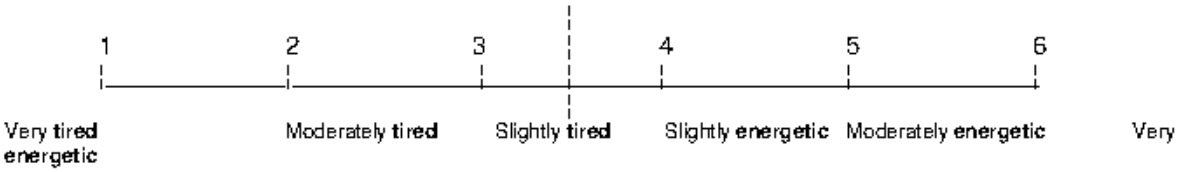
26. Others get things wrong and I don't. WNC-----S-----VS

27. I think that ESP (extrasensory perception) will turn up in this session. D-----SD---SA-----A

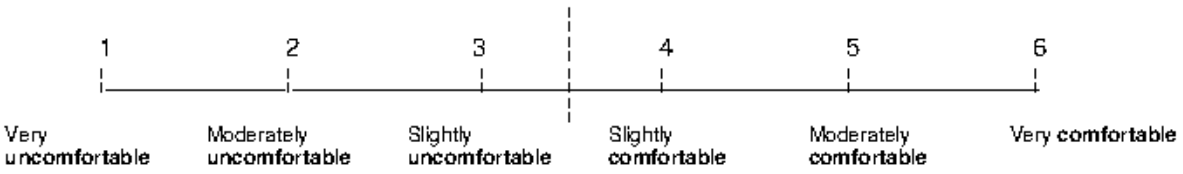
28. I would be willing to collaborate in another experiment like this, even if it implied harder work for me and I wasn't to be paid anything at all (please, it is important for you to answer honestly according to how you feel). D-----SD---SA-----A

29. Please point out how happy/sad you feel right now.

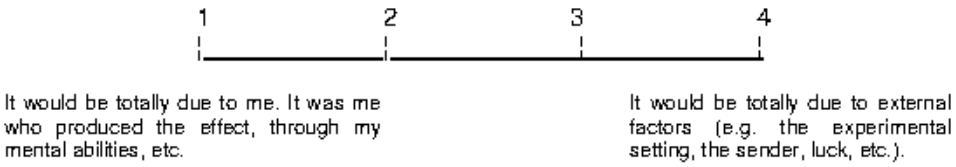
30. Point out how energetic/tired you feel today.



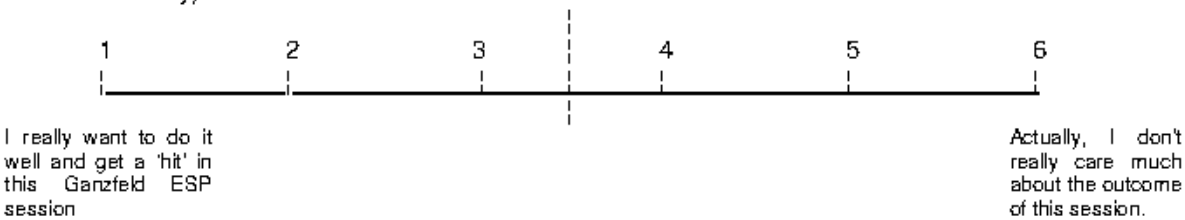
31. Please indicate the degree to which you feel comfortable at this test situation. Take into account every factors (e.g. people and social atmosphere, the research topic, your own mood, state of health, temperature, etc.)



32. Whatever the result of this session, successful or unsuccessful, what do you think its cause could have been, internal or external?. That is, did '**you make it happen**' or '**it just happened**'?.



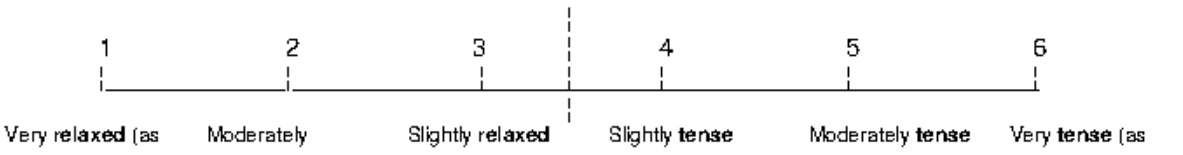
33. How motivated do you feel in relation to this Ganzfeld ESP task (please, it is important for you to answer honestly).



34. Did you eat anything within the last 2 hours?. Say what.

35. Did you drink anything within the last 2 hours?. Say what.

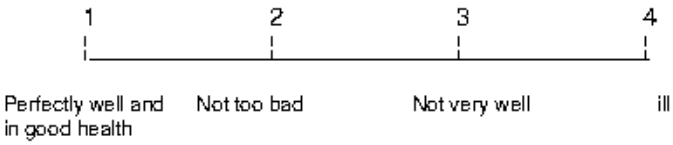
36. Please rate the degree of physical relaxation that your body feels right now.



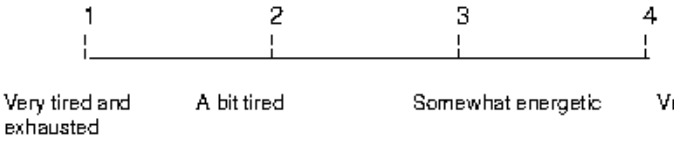
in bed) **relaxed** before an exam)

During the last week (**excluding today**) I have been feeling (tick the more accurate answer):

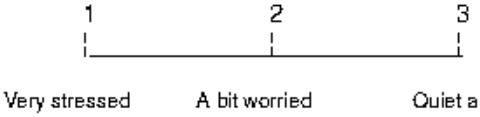
37. a) physical health:



38. b) level of energy:



39. c) stress:



During the last week (**excluding today**):

40. How many hours, on an average, have you slept?

-4 4 5 6 7 8 9 10 +10

41. Have you been waking up early in the morning being unable to fall asleep again?.

€ more than 4 nights
€ between 2 and 4 nights
€ only once
€ not at all

42. Falling asleep, once in bed, has taken me on an average:

€ more than 2 hours per night
€ 2 hours per night
€ 1 hour per night
€ 30 minutes
€ 15 minutes

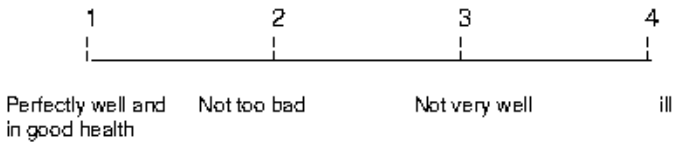
€ a few minutes

43. I have been waking up suddenly in the middle of the night

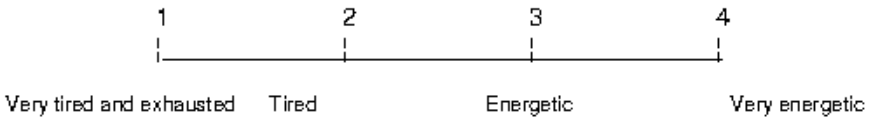
€ more than 4 nights
€ between 2 and 4 nights
€ only once
€ not at all

Today I feel:

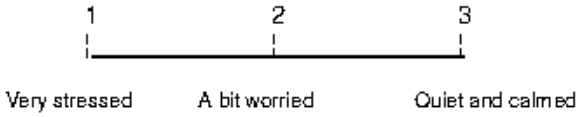
44. a) physical health:



45. b) level of energy:



46. c) stress:



47. How many hours did you sleep last night?

-4 4 5 6 7 8 9 10 +10

48. Did you wake up early this morning being unable to fall asleep again?

€ yes
€ no

49. Falling asleep, once in bed last night, took me:

€ more than 2 hours
€ 2 hours

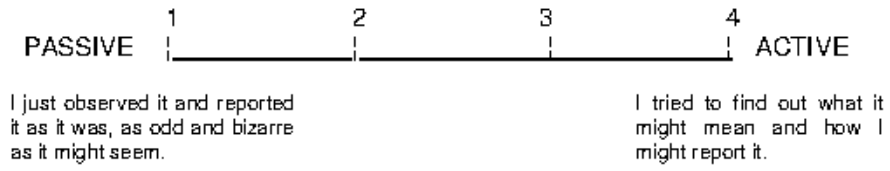
€ 1 hour
€ 30 minutes
€ 15 minutes
€ a few minutes

50. Did you wake up suddenly in the middle of the night last night?

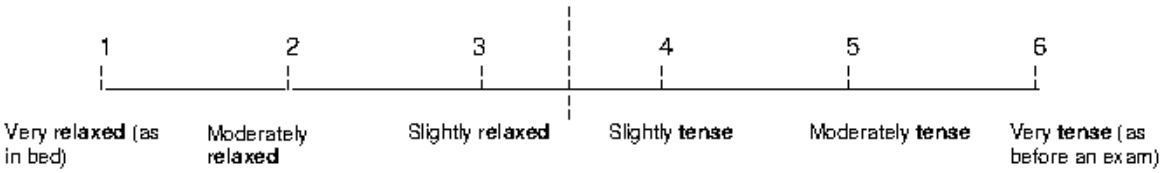
€ yes
€ no

POST-SESSION QUESTIONNAIRE

1. When an image or impression came to my mind (tick the most accurate answer according to the scale below):



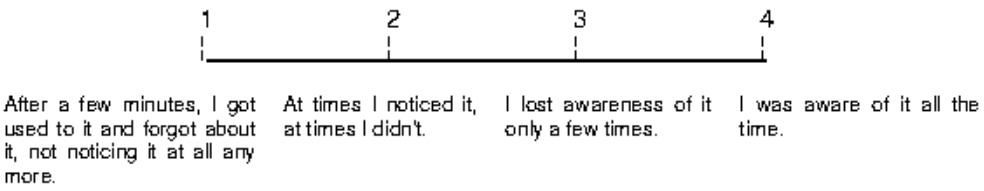
2. Please state the degree of physical relaxation that your body feels right now.



3. Did you manage to report all images, impressions, feelings, etc. that you got, when in the Ganzfeld?

€ I managed to report them all,100%
€ I reported about 75 % of my experiences during the session
€ I reported about 50%
€ I reported about 25 %
€ I reported nothing

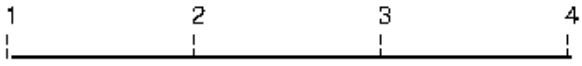
4. Were you aware of the pink noise throughout the whole session? (Tick the most accurate answer).



5. Were you aware of the tactual stimulation throughout the whole session (i.e. the chair in contact with your body, the cotton on your face, the headphones on your ears, etc.)?

1	2	3	4
After a few minutes, I got used to it and forgot about it, not noticing it at all any more.	At times I noticed it, at times I didn't.	I lost awareness of it only a few times.	I was aware of it all the time.

6. Were you aware of the red light throughout the whole session?



1	2	3	4
After a few minutes, I got used to it and forgot about it, not noticing it at all any more.	At times I noticed it, at times I didn't.	I lost awareness of it only a few times.	I was aware of it all the time.

7. How successful was the Ganzfeld stimulation in altering your state of consciousness?.

€ very successful
€ successful
€ unsuccessful
€ very unsuccessful

8. During the Ganzfeld session, did your mind wander and begin to fantasise?.

€ all the time
€ often
€ at times
€ seldom
€ not at all

9. Did your mind go 'blank' at any point?

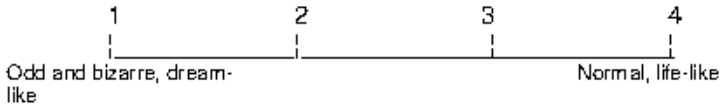
€ all the time
€ often
€ at times
€ seldom
€ not at all

10. How much effort did you exert trying to get imagery in the Ganzfeld?

€ very much effort
€ some effort
€ a little bit of effort

€ no effort at all

11. How would you characterise your mental imagery when in the Ganzfeld?

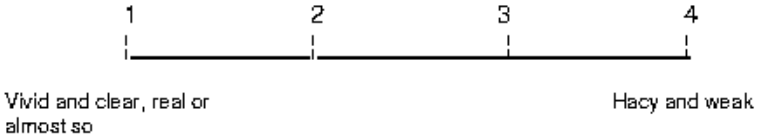


12.How much auditory imagery did you experience in the Ganzfeld?

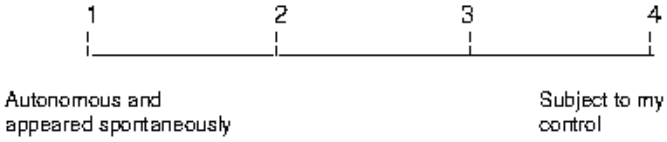
€ a great deal
€ something
€ a little
€ nothing at all

13. How would you characterise your mental imagery when in the Ganzfeld?

14. How vivid was your mental imagery?



15. My mental imagery was:



What did your mental imagery consist of (tick the most appropriate answer for both items)?

16- My mental imagery consisted of novel images that I don't remember having seen before in my waking life. How much?

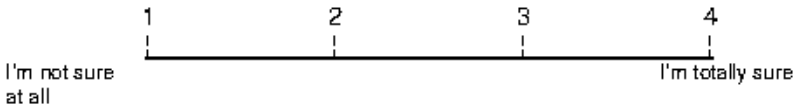
€ 0%

€ 25%
€ 50%
€ 75%
€ 100%

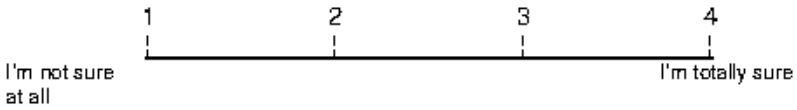
17- My mental imagery consisted of memories and past experiences. How much?

€ 0%
€ 25%
€ 50%
€ 75%
€ 100%

18. How sure are you that you ranked the target picture in the first position?



19. How sure are you that you ranked the target set of objects in the first position?



20. Please indicate the degree to which you felt comfortable during the Ganzfeld stimulation.

The following 3 items are to be responded only by females.

21. Are you currently taking oral contraceptives?

€ Yes
€ No

22. Is your menstrual cycle irregular?

€ Yes
€ No

23. In which phase of your menstrual cycle do you think you are today?

€ Postovulatory (i.e. less than 14 days before expected onset of menstruation)
€ Preovulatory (i.e. more than 14 days before expected onset of menstruation)

APPENDIX B

Study-III Questionnaires

- Questionnaire I: Individual Differences
- Pre-session Questionnaire
- Post-session Questionnaire

IMPORTANT: These questionnaires explore personality and individual differences in participants. **There are not right or wrong answers** to the questions. People are different and we want to know what these differences are. So please try to choose the best answer in your case in particular. Do not just answer what you think is what it should be or what most people would answer.

The results will remain **anonymous** even for the person who marks the questions. Participants names will be reduced to a number.

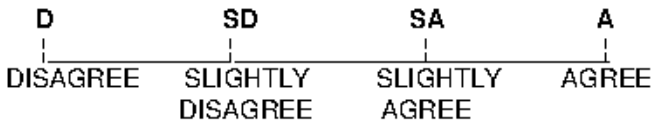
Try to answer every question even if someone seems hard.

In general, the best advise is **not to think too much** about the item. The first answer you think of is usually the best.

INDIVIDUAL DIFFERENCES QUESTIONNAIRE - I

Please rate each of the following statements on the basis of the grade in which they describe your usual behaviour or personality, attitudes, etc.

Please answer circling the most accurate answer according to the following scale:



1. Generally, I'm not very aware of myself. D-----SD---SA-----A

2. I'm generally attentive to my inner feelings. D-----SD---SA-----A

3. I'm alert to changes in my mood. D-----SD---SA-----A

4. I'm aware of the way my mind works when I work through a problem. D-----SD---SA-----A

15. I think that succeeding or not in this Ganzfeld ESP task is a matter of cognitive abilities. D-----SD---SA-----A

27. I find that a well-ordered life with regular hours suits my temperament. D-----SD---SA-----A

28. I hate to change my plans at the last minute. D-----SD---SA-----A

29. I find that establishing a consistent routine enables me to enjoy life more. D-----SD---SA-----A

30. I enjoy having a clear and structured mode of life. D-----SD---SA-----A

31. I don't like going into a situation without knowing what I can expect from it. D-----SD---SA-----A

32.. I think it is fun to change my plans at the last minute. D-----SD---SA-----A

33.. I enjoy the uncertainty of going into a situation without knowing what might happen. D-----SD---SA-----A

34. I dislike unpredictable situations. D-----SD---SA-----A

35.. When I go shopping, I have difficulty to know exactly what it is what I want. D-----SD---SA-----A

36.. I would describe myself as indecisive. D-----SD---SA-----A

37.. I tend to struggle with most decisions. D-----SD---SA-----A

38.. When trying to solve a problem I often see so many possible options that it is confusing. D-----SD---SA-----A

39. I don't like situations that are uncertain. D-----SD---SA-----A

40. I feel uncomfortable when I don't understand why an event occurred in my life. D-----SD---SA-----A

41. When I'm confused about an important issue, I feel very upset. D-----SD---SA-----A

42. I dislike when a person's statement could mean very different things. D-----SD---SA-----A

43. I dislike questions that could be answered by many different ways. D-----SD---SA-----A

44. I feel irritated when one person disagrees with what everyone else in a group believes. D-----SD---SA-----A

45.. When thinking about a problem, I consider as many different opinions on the issue as possible. D-----SD---SA-----A

46.. I prefer interacting with people whose opinions are very different from my own. D-----SD---SA-----A

54. Sometimes I'm so nervous that I'm blocked. D-----SD---SA-----A

55. At times I have felt that my speech is difficult to understand because the words are all mixed up and don't make any sense. D-----SD---SA-----A

56. No matter how hard I try to concentrate, unrelated thoughts always creep into my mind. D-----SD---SA-----A

57. I frequently have difficulty in starting to do things. D-----SD---SA-----A

58. I often feel 'fed up'. D-----SD---SA-----A

59. I'm easily hurt when people find fault with me or the work I do. D-----SD---SA-----A

82. I often feel as if things were not real. D-----SD---SA-----A

83. Occasionally, I feel like someone else. D-----SD---SA-----A

84. Sometimes my mind blocks, goes totally empty. D-----SD---SA-----A

85. I often wonder who I really am. D-----SD---SA-----A

86. At one or more times I have found myself staring intently at myself in the mirror as though looking at a stranger. D-----SD---SA-----A

87.I often feel that I'm removed from my thoughts and actions. D-----SD---SA-----A

88.. I rarely feel confused, like in a daze. D-----SD---SA-----A

89. I have had periods were I could not remember where I had been the day before. D-----SD---SA-----A

90. When I try to speak words, they don't come out right. D-----SD---SA-----A

91.. I have never woken up without knowing who I was or how I got there. D-----SD---SA-----A

92. As I was growing up, people often said that I seemed to be off in a world of my own. D-----SD---SA-----A

93. Sometimes I feel like my body is undergoing a transformation. D-----SD---SA-----A

94. Sometimes I feel as if there is something inside of me directing my actions. D-----SD---SA-----A

115. Do you often recall your dreams?

€ never
€ less than once per week
€ once per week
€ more than once per week
€ almost every day

117. How often do you try to interpret your dreams?

€ always
€ often
€ sometimes
€ seldom
€ never

300. Have you ever taken part in any other psychology lab experiment? Y / N

301. Have you ever taken part in any other experiment on extrasensory perception? Y / N

302. Do you practice any mental discipline such as yoga, TM, relaxation, biofeedback, etc., at the moment? Y / N

304. Have you ever practice one? Y / N

151. How religious do you consider yourself to be?
- ☐ Very much
- ☐ Somewhat
- ☐ A little
- ☐ Nothing

152. Do you read articles and books on religion?
- ☐ Often
- ☐ Seldom
- ☐ On and off
- ☐ Never

153. Do you pray?
- ☐ Often

- ☐ Seldom
- ☐ On and off
- ☐ Never

154. Do you attend religious meetings?

- ☐ Often
- ☐ Seldom
- ☐ On and off
- ☐ Never

PSYCHOMETRIC SESSION

Participant no:

Name: Surname:

Date of birth:

Telephone: E-mail:

Address during academic term:

Intuition:

1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7

Informed Consent Form

I give my consent to participate in this study of individual differences and ESP. I consent to publication of results so long as information provided is anonymous.

Experimenter

Participant

Date:

IMPORTANT: These questionnaires explore state factors and individual differences in participants. **There are not right or wrong answers** to the questions. People are different and we want to know what these differences are. So please try to choose the best answer in your case in particular. Do not just answer what you think is what it should be or what most people would answer.

The results will remain **anonymous** even for the person who marks the questions. Participants names will be reduced to a number.

Try to answer every question even if someone seems hard.

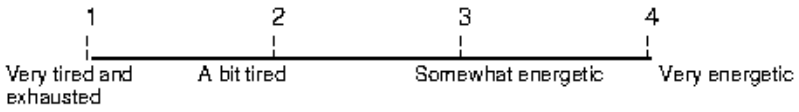
In general, the best advise is **not to think too much** about the item. The first answer you think of is usually the best.

PRE-SESSION QUESTIONNAIRE

27. I think that ESP (extrasensory perception) will turn up in this session.

- ☐ Yes
- ☐ Uncertain
- ☐ No

30. Point out how energetic/tired you feel today.

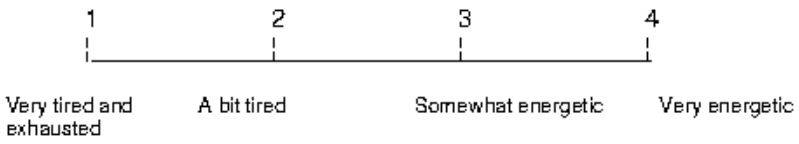


31. Please indicate the degree to which you feel comfortable at this moment.

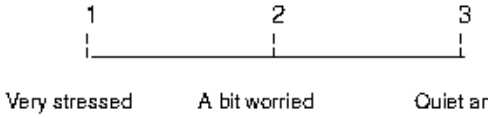
34. Did you eat anything within the last 2 hours?. Say what.

35. Did you drink anything within the last 2 hours?. Say what.

38. How energetic/tired you felt during the last week?



46. Do you feel stressed today?



40. How many hours did you sleep last night?

-4 4 5 6 7 8 9 10 +10

99. Please indicate the degree to which you would feel comfortable, or uncomfortable, to do the following things with the person who is acting as your sender.

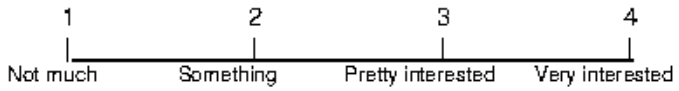
Sit down besides him/her at a lecture.
- ☐ Comfortable
- ☐ A bit uncomfortable
- ☐ Very uncomfortable

Go for lunch together:
- ☐ Comfortable
- ☐ A bit uncomfortable
- ☐ Very uncomfortable

Share a room at a B&B:
- ☐ Comfortable
- ☐ A bit uncomfortable
- ☐ Very uncomfortable

Go on a holidays:
- ☐ Comfortable
- ☐ A bit uncomfortable
- ☐ Very uncomfortable

100. How much interest do you feel to help in this study? (Please try to answer honestly what you feel).



MOOD STATE

First, there is a list of words which describe people's moods or feelings. Please indicate how well each word describes how you felt **AT THE MOMENT**. For each word, circle the answer from 1 to 4 which best describes your mood.

	Definitely Not	Slightly Not	Slightly	Definitely
1. Happy	1	2	3	4
2. Dissatisfied	1	2	3	4
3. Energetic	1	2	3	4
4. Relaxed	1	2	3	4
5. Alert	1	2	3	4
6. Nervous	1	2	3	4
7. Passive	1	2	3	4
8. Cheerful	1	2	3	4
9. Tense	1	2	3	4
10. Jittery	1	2	3	4
11. Sluggish	1	2	3	4
12. Sorry	1	2	3	4
13. Composed	1	2	3	4
14. Depressed	1	2	3	4
16. Vigorous	1	2	3	4
17. Anxious	1	2	3	4
18. Satisfied	1	2	3	4
19. Unenterprising	1	2	3	4

20. Sad	1	2	3	4
21. Calm	1	2	3	4
22. Active	1	2	3	4
23. Contented	1	2	3	4
24. Tired	1	2	3	4
25. Impatient	1	2	3	4
26. Annoyed	1	2	3	4
27. Angry	1	2	3	4
28. Irritated	1	2	3	4
29. Grouchy	1	2	3	4

1. How motivated are you to do the task?

Not at all — Very much

0 1 2 3 4 5 6 7 8 9

2. Do you think the content of the task is:

Very dull — Very interesting

0 1 2 3 4 5 6 7 8 9

3. How eager are you to do well at the task?

Very eager — Not at all eager

0 1 2 3 4 5 6 7 8 9

4. How do you expect to feel after doing the task?

More co-operative — More annoyed

0 1 2 3 4 5 6 7 8 9

5. How much mental effort will you exert?

Very little — A great deal

0 1 2 3 4 5 6 7 8 9

6. I want to succeed on this task:

Very much — Very little

0 1 2 3 4 5 6 7 8 9

7. How will you feel if you perform badly on this task?

Very unconcerned — Very upset

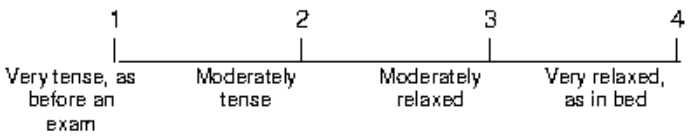
0 1 2 3 4 5 6 7 8 9

8. I think that doing this task will be:

Very worthwhile — A waste of time

0 1 2 3 4 5 6 7 8 9

101. Please state the degree of physical relaxation you feel right now:



POST-SESSION QUESTIONNAIRE

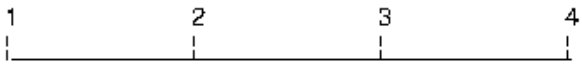
1. I think ESP took place in this session.

- ☐ Yes
- ☐ Uncertain
- ☐ No

3. Did you manage to report all images, impressions, feelings, etc. that you got, when in the Ganzfeld?

- € I managed to report them all,100%
- € I reported about 75 % of my experiences during the session
- € I reported about 50%
- € I reported about 25 %
- € I reported nothing

4. Were you aware of the pink noise throughout the whole session? (Tick the most accurate answer).

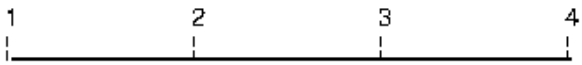


1	2	3	4
After a few minutes, I got used to it and forgot about it, not noticing it at all any more.	At times I noticed it, at times I didn't.	I lost awareness of it only a few times.	I was aware of it all the time.

5. Were you aware of the tactual stimulation throughout the whole session (i.e. the chair in contact with your body, the cotton on your face, the headphones on your ears, etc.)?

1	2	3	4
After a few minutes, I got used to it and forgot about it, not noticing it at all any more.	At times I noticed it, at times I didn't.	I lost awareness of it only a few times.	I was aware of it all the time.

6. Were you aware of the red light throughout the whole session?



1	2	3	4
After a few minutes, I got used to it and forgot about it, not noticing it at all any more.	At times I noticed it, at times I didn't.	I lost awareness of it only a few times.	I was aware of it all the time.

10. How much effort did you exert trying to get imagery in the Ganzfeld?

- € very much effort
- € some effort
- € a little bit of effort
- € no effort at all

12.Did you experience any auditory imagery in the Ganzfeld (e.g. noises, sounds, people's voices, etc.)?

- € more
- € 3-5 times
- € once or twice
- € nothing at all

During the period of sensory isolation I felt:

300. Uncomfortable to report my mental imagery:	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all
301. Confused:	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all
302. Scared:	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all
303. Uncomfortable:	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all
305. Worried about what could be going on out there:	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all
306. My mind was distracted, thinking of irrelevant things:	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all
308. My attention was absorbed by the things that were going on in my mind, forgetting about the external world.	☐ Almost all the time ☐ Large part of the time ☐ Sometimes ☐ Not at all

309. My attention was still taken by the external world:

- ☐ Almost all the time
- ☐ Large part of the time
- ☐ Sometimes
- ☐ Not at all

310. I fell asleep:

- ☐ Yes
- ☐ Nearly
- ☐ No

311. When an impression or image came to my mind I just reported it as it was, not worrying much about what it could be or mean.

- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Never

312. When an impression or image came to my mind, I thought about it before reporting it.

- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Never

Did the sensory isolation have any of the following effects on you?

313. I felt confused about where I was.

- ☐ Often
- ☐ Sometimes
- ☐ At one point
- ☐ Not at all

314. I lost awareness of what I was doing.

- ☐ Often
- ☐ Sometimes
- ☐ At one point
- ☐ Not at all

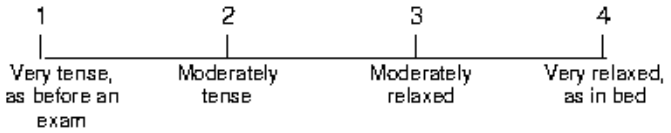
315. I lost awareness of time.

- ☐ Often
- ☐ Sometimes
- ☐ At one point
- ☐ Not at all

316. I felt confused about who I was.

- ☐ Often
- ☐ Sometimes
- ☐ At one point
- ☐ Not at all

317. Please state the degree of physical relaxation you felt during the sensory isolation.



318. And now:

MOOD STATE

Here is a list of words which describes people's moods or feelings. Please indicate how well each word describes how you felt **DURING THE SENSORY ISOLATION**.

	Definitely Not	Slightly Not	Slightly	Definitely
1. Happy	1	2	3	4
2. Dissatisfied	1	2	3	4
3. Energetic	1	2	3	4
4. Relaxed	1	2	3	4
5. Alert	1	2	3	4
6. Nervous	1	2	3	4
7. Passive	1	2	3	4
8. Cheerful	1	2	3	4
9. Tense	1	2	3	4
10. Jittery	1	2	3	4
11. Sluggish	1	2	3	4
12. Sorry	1	2	3	4
13. Composed	1	2	3	4
14. Depressed	1	2	3	4
16. Vigorous	1	2	3	4
17. Anxious	1	2	3	4
18. Satisfied	1	2	3	4
19. Unenterprising	1	2	3	4
20. Sad	1	2	3	4
21. Calm	1	2	3	4

22. Active	1	2	3	4
23. Contented	1	2	3	4
24. Tired	1	2	3	4
25. Impatient	1	2	3	4
26. Annoyed	1	2	3	4
27. Angry	1	2	3	4
28. Irritated	1	2	3	4
29. Grouchy	1	2	3	4

THINKING CONTENT

This set of questions concerns the kinds of thoughts that go through people's heads at particular times, for example while they are doing some task or activity. Please indicate roughly how often you had each thought in the list below **DURING THE SENSORY ISOLATION.**

N= Never O= Once FT= A few times Of= Often VO= Very often

1. I thought about how I should work more carefully. N O FT Of VO
2. I thought about how much time I had left. N O FT Of VO
3. I thought about how others have done on this task. N O FT Of VO
4. I thought about the difficulty of the task. N O FT Of VO
5. I thought about my level of ability. N O FT Of VO
6. I thought about the purpose of the experiment. N O FT Of VO
7. I thought about how I would feel if I were told how I performed. N O FT Of VO
8. I thought about how often I get confused. N O FT Of VO
9. I thought about members of my family. N O FT Of VO
10. I thought about something that made me feel guilty. N O FT Of VO
11. I thought about personal worries. N O FT Of VO
12. I thought about something that made me feel angry. N O FT Of VO
13. I thought about something that happened earlier today. N O FT Of VO
14. I thought about something that happened in the recent past (last few days, but not today). N O FT Of VO
15. I thought about something that happened in the distant past N O FT Of VO

16. I thought about something that might happen in the future. N O FT Of VO

How do you feel **AT THIS MOMENT** in relation to this ESP task?

1. How motivated are you to do the task?

Not at all									Very much
0	1	2	3	4	5	6	7	8	9

2. Do you think the content of the task is:

Very dull									Very interesting
0	1	2	3	4	5	6	7	8	9

3. How eager are you to do well at the task?

Very eager									Not at all eager
0	1	2	3	4	5	6	7	8	9

4. How do you expect to feel after doing the task?

More cooperative									More annoyed
0	1	2	3	4	5	6	7	8	9

5. How much mental effort will you exert?

Very little									A great deal
0	1	2	3	4	5	6	7	8	9

6. I want to succeed on this task:

Very much									Very little
0	1	2	3	4	5	6	7	8	9

7. How will you feel if you perform badly on this task?

Very unconcerned									Very upset
0	1	2	3	4	5	6	7	8	9

8. I think that doing this task will be:

Very worthwhile									A waste of time
0	1	2	3	4	5	6	7	8	9

The following 3 items are to be answered only by females.

21. Are you currently taking oral contraceptives?

∈ Yes
∈ No

22. Is your menstrual cycle irregular?

∈ Yes
∈ No

23. In which phase of your menstrual cycle do you think you are today?

∈ Postovulatory (i.e. less than 14 days before expected onset of menstruation)
∈ Preovulatory (i.e. more than 14 days before expected onset of menstruation)

320. Please point out the degree to which you enjoyed the session.

- ❑ Very much
- ❑ Somewhat
- ❑ Not at all

321. Did you feel annoyed, for any reason, at any point of this session.

- ❑ Yes, and I still feel upset
- ❑ I did at one point
- ❑ I didn't at all

19. How sure are you that you chose the right set of objects?

1 2 3 4

I'm not sure at all — I'm totally sure

APPENDIX C

Study II Survey

Jose M Perez-Navarro
Parapsychology Studies Group
Department of Psychology
Coventry University
Priory Street
Coventry CV1 5FB
United Kingdom

Dear colleague:

I am currently doing postgraduate research at Coventry University under the supervision of Dr. Tony Lawrence. My research involves an extensive investigation of factors thought to be conducive to laboratory based psi success.

I am conducting a survey on researchers within the field of parapsychology regarding their views on psi-conducive practices. I would be very grateful if you could outline your views on ***potential ways to maximise the hit rate*** in free response ESP experiments. Please, do not feel constrained by the current research standards. Any suggestions whatsoever are more than welcome.

Below, I have listed a number of suggestions already made to me as examples, but these in no way represent the boundaries of what is expected.

I very much appreciate your co-operation in this survey and look forward to hearing from you.

Best wishes,

Jose M Perez-Navarro

Issues already put forward:

1) Paying more attention on participant selection on the basis of individual differences that have indicated relation to ESP performance (e.g. extroversion, low anxiety, artistic ability/interest, paranormal experiences, etc).

2) Sender-receiver pairing: Trying to recruit pairs of friends, etc. instead of individual participants, and use males as receivers and females as senders, if possible, as in Willin (1996) or Zingrone (1994).

3) Providing feedback of the receiver's on-going mentation *to the sender* has shown psi-conduciveness (e.g. Parker et. Al., 1997). However, it is not always used.

4) Using a measure of variability around the MCE, instead of above it, would avoid the problem of psi-hitting being cancelled out by psi-missing.

5) Getting the individual to clear up and 'expand'somehow his/her mentation after the session.
6) Consensus judging has shown a gain in hit rate compared to individual judging or external judging in several occasions.

APPENDIX D

Participant Instructions

SENDER INSTRUCTIONS

The receiver is placed in a sensory isolation situation for 30 minutes. He is instructed to relax and report aloud any image or impression that comes spontaneously to his/her mind. During this period of time try to, silently, communicate to the receiver information about the objects in front of you.

How to communicate the stimuli: As you listen to the receiver, touch and handle the objects. Pay attention to their physical features, and play with them in your hands. Also make a mental image of them and move them in your mind.

The headphones: Through the headphones, you will be able to listen to the receiver. Turn up/down the volume so that it feels comfortable. You will notice that most of the time the receiver will say many things that don't bear any resemblance to the target materials you have on the table, or he might be quiet, not talking for a while or even in the whole session. This is not a problem at all. Also what usually happens is that suddenly he/she starts talking about something in connection to some of the objects and might describe them in a few seconds.

Take a break: Concentrate on the objects for 10 minutes, then have a 5 min break, then go again with the objects for another 10 min and then you will be finished. When you have a break take your headphones off, relax, and forget completely about the session.

RECEIVER INSTRUCTIONS

During the 30 minutes of sensory isolation try to relax both body and mind. Try to keep your eyes open looking at the light during the whole session.

At the same time, pay attention to **images, memories**, and **impressions** that come spontaneously to your mind. It doesn't matter if you don't see anything for a long time. Sooner or later you will see some image, some memory will suddenly spring to mind, or you will feel some impression.

Try not to produce any of these things voluntarily, just wait for them to happen. When you experience something, report it verbally. You don't need to describe it, just mention what it was. It is not necessary for you to talk too loud either, even if you whisper it is okay.

Don't avoid feeling sleepy. The best state to do this exercise is the kind you experience just before falling asleep. However, try to maintain this sleepy state without falling asleep.

The period of sensory monotonisation will last for 30 min. At the same time the person who is acting as your sender will be concentrating on a series of stimuli and trying to, silently, communicate to you information about them.

These stimuli might be anything at all. Therefore, it is important that you report everything that comes to your mind in an indiscriminate manner during this period of time.

After 30 min the CD will finish, indicating the end of the session. You will then be able to take off your mask and get up from the chair.

To sum up, all you have to do is relax and look at the light, and wait for some image, memory or impression to come to you. When this happens, mention it straight away on the microphone.