

Mental Health Aspects of Paranormal and Psi Related Experiences

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ABSTRACT

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This thesis aimed to investigate if paranormal beliefs and experiences represent signs of psychological ill-health or if they are neutral regarding psychological health. A further aim was to validate subjective paranormal experiences.

The first part of the thesis compares two models for the construct schizotypy, a quasi-dimensional model and a fully dimensional model in the context of psychological health. The former views paranormal beliefs and experiences as pathological whereas the fully dimensional model is unbiased regarding health. Individuals were grouped according to their scores on a multi-dimensional schizotypy measure, the Oxford-Liverpool Inventory of Feelings and Experiences Scale (Mason, Claridge & Jackson, 1995). The schizotypy groups were compared regarding two mental health-related measures, the Sense of Coherence Scale (Antonovsky, 1991) and the Eysenck Personality Inventory (Bederoff-Petersson, Jägtoft & Åström, 1971) Neuroticism sub-scale, and a measure of paranormal beliefs and experiences, the Australian Sheep-Goat Scale (Thalbourne & Delin, 1993). The results support the fully dimensional schizotypy model. Noteworthy, a group of people with a high level of paranormal beliefs and experiences also reported a high level of sense of coherence in conjunction with low neuroticism, which signifies psychological health rather than ill-health.

The second part of the thesis was designed to validate subjective paranormal experiences in the laboratory, where a Ganzfeld paradigm was used to induce psi. The psi Ganzfeld result was non-significant. Individual differences between successful and unsuccessful participants were investigated to explore the association between psi success and psychological health.

The results of this thesis show that the relationships between the subjective reports of health-related sense of coherence, neuroticism, and subjective reports of strong paranormal beliefs and experiences are complex. It seems more likely that strong paranormal beliefs and experiences together with an inability to experience pleasure or cognitive disorganisation are related to perceived ill-health rather than strong paranormal beliefs and experiences on their own. The results support the notion of healthy schizotypy and the conclusion that paranormal beliefs and experiences should be viewed as neutral regarding mental health.

PREFACE

This thesis is based on the following studies, referred to in the text by their Roman numerals:

- I Goulding, A. (2004). Schizotypy models in relation to subjective health and paranormal beliefs and experiences. *Personality and Individual Differences*, 37, 157-167.
- II Goulding, A. (2004). Healthy schizotypy in a population of paranormal believers and experiencers. *Personality and Individual Differences*. Manuscript in press.
- III Goulding, A., Westerlund, J., Parker, A., & Wackermann, J. (2004). The first digital autoganzfeld study using a real-time judging procedure. *European Journal of Parapsychology*. Manuscript accepted for publication.
- IV Goulding, A. (2004). Participant variables associated with psi Ganzfeld results. Manuscript submitted for publication.

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ABBREVIATIONS

ASGS	Australian Sheep-Goat Scale
CD	Cognitive Disorganisation
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, 4th Edition
EPI	Eysenck Personality Inventory
ESP	Extrasensory Perception
IA	Introvertive Anhedonia
N	Neuroticism
OBE	Out of the Body Experience
O-LIFE	Oxford-Liverpool Inventory of Feelings and Experiences
PK	Psychokinesis
SOC	Sense of Coherence
UE	Unusual Experiences

INTRODUCTION

Paranormal beliefs and experiences like anomalous communication between two minds (telepathy), anomalous knowledge of distant events (clairvoyance), and anomalous knowledge of future events (precognition) are perceived in fundamentally different ways. Some people consider these beliefs and experiences as valuable in terms of spiritual growth and personal development whereas others as abnormal health liabilities.

Paranormal beliefs and experiences are seen as signs of vulnerability to psychological ill-health, or in patient groups, as part of the mental disorders the patients suffer from. The *Diagnostic and Statistical Manual of Mental Disorders*, (DSM-IV, American Psychiatric Association, 1994) provides criteria for a number of mental disorders accompanied by paranormal beliefs and experiences. The DSM-IV (American Psychiatric Association, 1994) lists psychoses, personality disorders, and the new diagnostic category labelled Religious or Spiritual Problem. This does not mean that everybody who believes in or experiences paranormal phenomena will be diagnosed as mentally ill. Rather, the general idea is that believers and experiencers are at risk for developing a mental disorder like psychosis (Meehl, 1990).

The view of paranormal beliefs and experiences as signs of psychological ill-health has been challenged. Paranormal beliefs and experiences might actually be adaptive rather than related to psychological ill-health (McCreery & Claridge, 2002). Some believers and experiencers are affected in positive ways. They report an increased sense of well-being, sense of connections to others, happiness, confidence, optimism about the future, and meaning in life (Kennedy & Kanthamani, 1995). In other words, there are two contradictory views of paranormal beliefs and experiences. On the one hand, they are seen as signs of psychopathology, and on the other, as related to psychological health.

The issue of these two contradictory views of paranormal beliefs and experiences is complicated by the possibility that some paranormal phenomena really exist. Reports of subjective paranormal experiences have made some researchers investigate the evidence for paranormal phenomena in the laboratory setting. The term psi is typically used for paranormal phenomena investigated in the laboratory. Psi is defined as: “anomalous processes of information or energy transfer, processes such as telepathy or other forms of extrasensory perception that are currently unexplained in terms of known physical or biological mechanisms” (Bem & Honorton, 1994, p. 4). This line of research is different from those viewing paranormal beliefs and experiences as indicators of psychological health or ill-health since psi studies usually do not address the health aspects. The fundamental idea is that some paranormal phenomena might exist, and if they do, it would be natural for people to believe in them and experience them. It is still possible that some of these people are less psychologically healthy than others.

Investigations into paranormal beliefs and experiences are needed in order to shed light on their ambiguous nature. The connection between paranormal beliefs and experiences and psychological health and ill-health is especially important to investigate since it may provide valuable insights into the mental disorders like psychoses and personality disorders that have these beliefs and experiences as partial diagnostic markers (American Psychiatric Association, 1994; McCreery & Claridge, 2002). Increased knowledge might enable a more accurate screening of individuals at risk for these disorders and ultimately might provide the means for intervention and prevention of psychotic breakdown (McCreery & Claridge, 1996; 2002). Furthermore, insights can be gained into ways of coping with paranormal experiences. A survey of the effects of paranormal experiences on people’s lives (Milton, 1992), found that there is a need among experiencers to receive guidance and reliable information concerning paranormal experiences. Regrettably, this need seems rarely adequately met (Milton, 1992).

It is also necessary to investigate the suggestion that subjective paranormal experiences can be validated in the laboratory. If paranormal phenomena do exist then some people might experience them simply because they are there to be experienced. The view of them as caused only by misinterpretations or psychopathology might then have to be modified. If on the other hand they do not exist, there might be people who experience paranormal phenomena without being less healthy compared to non-experiencers. Studies into why these people stay healthy might give insights into intervention strategies for people with psychoses or personality disorders.

The general aim of this thesis is to investigate if paranormal beliefs and experiences represent signs of psychological ill-health or if they are neutral regarding psychological health. A further aim is to validate subjective paranormal experiences.

The thesis consists of an introductory part where it is shown that studies into paranormal beliefs and experiences have reached contradictory conclusions about them being indicative of psychological health, ill-health, and psi. These contradictions need to be examined in order to disentangle the confusion about paranormal beliefs and experiences and also to gain knowledge about the associated psychological health and ill-health. The last part of the introduction describes the four studies the thesis is built on. The method section also provides information about investigated individuals and the methods employed. Conclusions in each study and the overall findings are reported in the results and discussion sections.

PARANORMAL BELIEFS AND EXPERIENCES

There are a wide variety of phenomena that could conceivably be classified as paranormal. For example, some widely used measures of paranormal beliefs and experiences include those of traditional religions, witchcraft, superstition,

spiritualism, extraordinary life forms, and psi (Thalbourne & Delin, 1993; Tobacyk, 1988; Tobacyk & Milford, 1983). Psi (anomalous processes of information or energy transfer) is a label used for both extrasensory (ESP) and psychokinesis (PK) phenomena. ESP is concerned with: “the acquisition of information about an external event, object, or influence (mental or physical; past, present, or future) in some way other than through any of the known sensory channels” (Glossary, 2001, p. 430). There are three kinds of ESP phenomena: telepathy (anomalous communication between two minds), clairvoyance (anomalous knowledge of distant events), and precognition (anomalous knowledge of a future event). PK is defined as: “Paranormal action; the influence of mind on a physical system that cannot be entirely accounted for by the mediation of any known physical energy” (Glossary, 2001, p. 431). This thesis will be limited to psi phenomena since it might be possible to validate these phenomena in experimental studies.

There is evidence that paranormal beliefs and experiences can be organised in two associated domains, labelled New Age Philosophy and Traditional Paranormal Beliefs (Lange, Irwin & Houran, 2000). The New Age Philosophy domain contains items concerning psi, witchcraft, spiritualism, and astrology whereas the Traditional Paranormal Beliefs domain contains items concerning traditional religious beliefs, witchcraft, and psi. Moreover, it has been suggested that these two domains of beliefs and experiences may serve different needs in the believers and experiencers and that they also are related to various aspects of subjective health. The New Age Philosophy beliefs and experiences serve a need of sense of control over external events on an individual level and the Traditional Paranormal beliefs and experiences serve a need of sense of control over external events on a social level (Houran, Irwin & Lange, 2001). The New Age Philosophy beliefs are thought to be reinforced by personal experiences (Houran et al., 2001) and the Traditional Paranormal beliefs are reinforced by the individual's culture (Goode, 2000). According to the classification suggested above, the paranormal beliefs and experiences studied in this thesis belong to

the New Age as well as the Traditional Paranormal Beliefs domain since psi phenomena are included in both domains.

Surveys of the general population show that large proportions of people believe in and experience ESP and PK phenomena. Table 1 is based on a literature review (Goulding & Parker, 2001) and shows that more people report beliefs than experiences, and that ESP beliefs and experiences are more common than PK beliefs and experiences. The prevalence figures are based on studies from North America and Western Europe. The ESP belief figure for Sweden seems high. This might be due to the idiomatic format of the question. It was a plain language question. However, for example, Blackmore (1984) also used a plain language question for general belief in ESP. It is unknown how much the question format impacts on the answers.

Surveys from other parts of the world show somewhat different figures. For example, in an Israeli student sample, 55% reported experiences of telepathy and 36% reported precognitive experiences (Glicksohn, 1990). A survey of Asian students show that 35% of the Japanese students report ESP experiences and 62% report ESP beliefs whereas 71% of the Chinese students report ESP experiences and 76% report ESP beliefs (McClenon, 1993; 1994). Although these figures are higher compared to those in Table 1, this might be due to the population under study since younger people generally report higher degrees of paranormal beliefs (Irwin, 1993). Although there are different degrees of paranormal beliefs and experiences in different countries and cultures, it seems fair to conclude that paranormal beliefs and experiences are common.

Table 1

Prevalence of beliefs and experiences of ESP and PK phenomena in general populations

Type of belief	Prevalence	Country	Study
ESP	36%	UK	Blackmore, 1984
ESP	49%; 50%	USA	Gallup & Newport, 1991; Newport & Strausberg, 2001
ESP	84% ₁	Sweden	Sjödin, 1998
ESP	86% ₂	Iceland	Haraldsson, 1985
Telepathy	36%	USA	Newport & Strausberg, 2001
Clairvoyance	26%; 32%	USA	Gallup & Newport, 1991; Newport & Strausberg, 2001
PK	17%	USA	Gallup & Newport, 1991
Type of experience			
Waking ESP	38%	USA	Palmer, 1979
Waking ESP	27%	Iceland	Haraldsson, 1985
ESP dreams	36%	USA	Palmer, 1979
ESP dreams	36%	Iceland	Haraldsson, 1985
Telepathy	25%	UK	Blackmore, 1984
Telepathy	25%	USA	Gallup & Newport, 1991
Telepathy	16%	Canada	Ross & Joshi, 1992
Telepathy	18%	Sweden	Morhed, 2000
Clairvoyance	10%	Sweden	Morhed, 2000
Precognition	6%	Canada	Ross & Joshi, 1992
PK	1%	Canada	Ross & Joshi, 1992

₁ 45% responded yes maybe, 39% yes absolutely; here they have been added together.

₂ 45% responded possible, 24% likely, 17% certain; here they have been added together.

The student samples show higher degrees of paranormal beliefs and experiences because younger people tend to hold stronger paranormal beliefs although this might depend on which kind of paranormal belief is studied (see Irwin, 1993 for a review). Gender differences regarding paranormal beliefs and experiences are also reported. Women tend to hold stronger paranormal beliefs than men, but again this trend is reversed for some beliefs, such as belief in extraordinary life forms (Irwin, 1993). Recently, it was suggested that age and gender differences regarding paranormal beliefs and experiences might be an artefact due to possible semantic distortions in the measures used (Lange et al., 2000; Lange &

Thalbourne, 2002). It is possible that items of paranormal beliefs and experiences measures are understood differently in various groups. When a method was used to yield unambiguous semantics for the two most widely used paranormal beliefs and experiences measures, only weak age and gender differences were found (Lange et al., 2000; Lange & Thalbourne, 2002). Consequently, the differences regarding age and gender found in earlier studies might be misleading.

THE HEALTH AND ILL-HEALTH CONTINUUM

Paranormal beliefs and experiences are claimed to be associated with both health and ill-health. According to the World Health Organization (WHO; 1946), health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (p. 100). The health end of the health - ill-health continuum therefore means being healthy in an objective way, i.e. not having a disease as well as being healthy in a subjective way, i.e. feeling healthy. Subjective perceptions of health are valid indicators of future objective health (Idler & Kasl, 1991; Kaplan & Camacho, 1983; Mossey & Shapiro, 1982; Singer, Garfinkel, Cohen & Srole, 1976). Various terms for subjective perceptions of health have been used. One example is subjective well-being that is defined in terms of happiness and life satisfaction (Diener, 1984). In this thesis, health is used broadly, in line with the WHO (1946) definition. Since paranormal beliefs and experiences are associated mainly with mental or psychological health, psychological health will be at focus.

Health and ill-health can be described as end-points on a continuum that differ across persons, situations, and time (Antonovsky, 1991). Antonovsky (1993) proposed a theoretical model designed to advance the understanding of the relations between stressors, coping, and health. The model inspired the development of the Sense of Coherence Scale, which consists of the three components comprehensibility, manageability, and meaningfulness. It has been

shown that persons with a strong sense of coherence manage stress better and remain healthy, while persons with a weak sense of coherence are more vulnerable to ill-health (Antonovsky, 1991; 1993; Ebert, Tucker & Roth, 2002; Larsson & Kallenberg, 1996; 1999; Pallant & Lae, 2002). A review (Antonovsky, 1993) shows that sense of coherence is positively associated with subjective and objective measures of health whereas negatively correlated with subjective and objective measures of ill-health. However, it is pointed out that the majority of the studies have used subjective measures.

The review (Antonovsky, 1993) also shows that other variables are related to a strong sense of coherence. Some of these are internal locus of control, self-esteem, hardiness, and extraversion. Anxiety, neuroticism, and psychoticism on the other hand are related to a weak sense of coherence. Several studies have shown that neuroticism is negatively related to physical and psychological health (Cheng & Furnham, 2001; Duggan, Milton, Egan, McCarthy, Palmer & Lee, 2003; Ebert et al., 2002; Goodwin & Engstrom, 2002; Greenspoon & Saklofske, 2001; Neeleman, Ormel & Bijl, 2001; Neeleman, Sytema & Wadsworth, 2002). Friedman (2000) discusses two distinct types of health-related outcomes associated with neuroticism, one unhealthy and one healthy. Consequently, caution is needed when neuroticism scores are interpreted. High neuroticism scores do not automatically indicate worse health.

Paranormal beliefs, experiences, and psychological ill-health

Psychosis

Paranormal beliefs and experiences are found in people with severe mental disorders, such as psychoses. The lifetime prevalence of schizophrenia is estimated to be 0.5-1 % (American Psychiatric Association, 1994). Symptoms of psychosis are conceptualised to fall into two broad categories, positive and negative. Positive symptoms, which reflect an excess or distortion of normal functions, include hallucinations, delusions, and disorganised speech and

behaviour (American Psychiatric Association, 1994). Hallucinations may occur in any sensory modality but auditory hallucinations, usually experienced as voices, are most common (American Psychiatric Association, 1994). Delusions are erroneous beliefs that usually involve misinterpretations of perceptions and experiences. Negative symptoms reflect a diminution or loss of normal functions (American Psychiatric Association, 1994) and include restrictions in the range and intensity of emotional expression, in the fluency and productivity of thought and speech, and in the initiation of goal-directed behaviour. Psychoses like schizophrenia and schizophreniform disorder differ in certain characteristics but they contain some or all of the above positive and negative symptoms. Anhedonia manifested as a loss of interest or pleasure is an associated descriptive feature of schizophrenia.

The positive symptoms, hallucinations and delusions, overlap with paranormal experiences and beliefs. For example, the perception of telepathy could be viewed as a hallucination. Hallucinations are perceptions that seem to be as real as true perceptions, but that occur without external stimulation of the relevant sensory organs (American Psychiatric Association, 1994). To describe telepathy as hallucinations means making an assumption that telepathy does not really exist. If somebody experiences telepathy and also believes that telepathy exists in reality, then this person shows symptoms of both hallucinations and delusions.

Schizotypal Personality Disorder

Schizophrenia shares features, for example magical thinking, with schizotypal, schizoid, and paranoid personality disorder and may be preceded by them (American Psychiatric Association, 1994). The positive and negative symptoms of schizophrenia and other psychoses are mirrored in the positive and negative symptoms of schizotypal personality disorder (Venables, 1995). The diagnostic features of schizotypal personality disorder include for example: “ideas of reference”, “odd beliefs or magical thinking that influences behavior and is

inconsistent with subcultural norms (e.g., superstitiousness, belief in clairvoyance, telepathy, or ‘sixth sense’), “unusual perceptual experiences, including bodily illusions”, and “odd thinking and speech” (American Psychiatric Association, 1994, p. 645). For example, the positive symptom, unusual perceptual experiences, is a milder form of hallucination. The positive symptom, magical thinking, is a milder form of delusion. The negative symptom, constricted affect, is also found in schizophrenia. Schizotypal personality disorder occurs in approximately 3% of the general population (American Psychiatric Association, 1994). A small proportion of individuals with this diagnosis develop schizophrenia or another psychotic disorder (American Psychiatric Association, 1994). Schizotypal personality disorder is prevalent among first-degree biological relatives of individuals with schizophrenia and is genetically related to schizophrenia (Ingraham, 1995). There is a clear overlap between symptoms of schizotypal personality disorder and paranormal beliefs and experiences.

Schizotypy

The concept schizotypy emerged in the 1950:s to signify the hereditary disposition to schizophrenia (Claridge, 1997). Schizophrenia can be seen as a neurological disorder (e.g. Meehl, 1990). Meehl (1990) talks about a neural defect, which he labels schizotaxia. Schizotaxia is inherited by some family members of individuals with schizophrenia and various forms of schizophrenic illnesses can result from the interaction between the environment and this deficit (Meehl, 1990). So, the neural defect, schizotaxia, leads to schizotypy. Depending on environmental factors an individual with schizotypy can go on to develop schizotypal personality disorder, or even worse, schizophrenia. If, however, there are enough protective factors, a schizotypal individual might not develop a disorder, but will always be more vulnerable to psychosis.

Temporal lobe dysfunction

If schizophrenia is a neurological disorder and is preceded by schizotypy, then people with schizotypy should also show signs of a neural defect. There have been many studies on the neuropsychology and psychophysiology of schizotypy (see Raine, Lencz & Mednick, 1995 for a review). There have not been as many studies on paranormal beliefs and experiences except for one area of research where temporal lobe dysfunctions have been explored in paranormal believers and experiencers. The electric activity in the temporal lobe has been described to function on a continuum (Persinger & Makarec, 1993). Mild dysfunction of this electric activity can then occur in the general population and be regarded as benign, whereas the dysfunction is obviously worse in people with epilepsy. Both schizotypy (Buchsbaum, et al., 2002; Cannon, van Erp & Glahn, 2002; Siever, et al., 2002) and paranormal beliefs and experiences (Morneau, MacDonald, Holland & Holland, 1996; Neppe, 1983; 1993; Palmer, Neppe, Nebel & Magill, 2001; Persinger, 1984; Persinger & Valliant, 1985) are associated with temporal lobe dysfunction. This shows that there are similarities between schizotypy and paranormal beliefs and experiences not only regarding symptoms but also on the level of brain function.

A quasi-dimensional model for schizotypy

Meehl's (1962; 1990) theory of schizotypy has been labelled a disease-model or quasi-dimensional model (Claridge, 1997). The quasi-dimensional model views schizotypy as a disease continuum with schizophrenia as one end-point and individuals showing signs of schizotypy due to some kind of genetic flaw at the other end-point. In between these end-points, schizotypal personality disorder is found. The quasi-dimensional model for schizotypy focuses on variations within the illness domain. Dimensionality consists in the form of degrees of expression of a disease process (Claridge & Beech, 1995; Zuckerman, 1999). Consequently, the quasi-dimensional model views schizotypy as something negative, belonging in the ill-health end of the health – ill-health continuum.

Since paranormal beliefs and experiences are signs of schizotypy then they are also viewed as negative.

Schizotypy factors

There seems to be a consensus about the multi-factorial nature of schizotypy. In different studies three, and sometimes four factors have consistently emerged (Claridge & Beech, 1995; Claridge et al., 1996; Mason, Claridge & Williams, 1997; Venables & Bailes, 1994; Vollema & van den Bosch, 1995). The first factor concerns aberrant perceptions and beliefs. This schizotypy factor taps sub-clinical forms of such positive symptoms of psychosis as hallucinations and delusions (Mason et al., 1995). The second schizotypy factor concerns sub-clinical forms of cognitive failures, like thought-blocking and attention difficulties together with increased social anxiety (Mason et al., 1995). The third factor taps sub-clinical forms of the negative symptomatology found in psychosis such as social withdrawal and inability to experience pleasure. The fourth schizotypy factor of asocial behaviour has been found mainly in studies by Claridge and colleagues (McCreery & Claridge, 2002). However, it has been debated whether or not this factor is a true schizotypy factor. It does not seem to be relevant to schizophrenia *per se* (Loughland & Williams, 1997). This fourth factor has also been shown to load mostly on Eysenck's Psychoticism Scale (Eysenck & Eysenck, 1975), which is more related to anti-social personality than to schizotypy (Day & Peters, 1999). Thus, schizotypy consists of at least three, possibly four different factors.

The questionnaires that have been developed to measure schizotypy usually concentrate on measuring one of the above factors at the time. For example, the Magical Ideation Scale (Eckblad & Chapman, 1983) measures the positive aspects, aberrant perceptions and beliefs, whereas the Physical Anhedonia Scale (Chapman, Chapman & Raulin, 1976) measures some of the negative symptoms of schizotypy. Recently, a questionnaire was developed that measures the whole schizotypy construct (Mason et al., 1995). This questionnaire, the Oxford-

Liverpool Inventory of Feelings and Experiences (O-LIFE) consists of four factors. The aberrant perceptions and beliefs aspects of schizotypy make up a factor labelled Unusual Experiences. The cognitive failures aspect is labelled Cognitive Disorganisation. The negative aspects of schizotypy are labelled Introvertive Anhedonia. Finally, the factor that might be more related to anti-social personality than to schizotypy (Day & Peters, 1999) is labelled Impulsive Nonconformity.

Several studies have shown that people who believe in and experience paranormal phenomena score high on schizotypy measures, see Table 2. However, the studies on paranormal beliefs and experiences and schizotypy have often used measures that capture only one schizotypy factor, namely the one concerned with aberrant perceptions and beliefs. This limitation of past research to rely on unidimensional measures of schizotypy is problematic (Irwin & Green, 1998-99) since schizotypy is a multi-factorial construct. In most studies (see Table 2), paranormal believers and experiencers score high on those schizotypy measures that load on the aberrant perceptions and beliefs factor. In some studies they also score high on measures that load on the cognitive failures factor. It is rarely the case that they have high scores on the negative symptom aspects.

Paranormal beliefs, experiences, and psychological health

The schizotypy factor of aberrant perceptions and beliefs is a factor regarded as close to the core symptoms of psychosis (American Psychiatric Association, 1994). Thus, people who endorse paranormal beliefs or have paranormal experiences can be seen as being prone to psychological ill-health. Although the paranormal experiences of clinical groups seem similar to those of non-clinical groups, some differences have been reported regarding these experiences both in content and reactions to them. Paranormal experiences reported by clinical groups are more negative, bizarre, detailed, and more disturbing (Bentall, 2000;

Table 2

Summary of studies on schizotypy and paranormal beliefs and experiences

Study	Schizotypy measure	Schizotypy factor association (see Mason et al., 1997)	Paranormal belief and experience measure	Groups in study	Results (correlations are positive if nothing else is stated)
Gallaher, Kumar & Pekala, 1994	MIS	UE	AEI		significant correlation between MIS and AEI ability, experience, and belief
Houran, Irwin & Lange, 2001	SPQ-B	UE, CD, IN	PBS-R	New Age Philosophy (NAP) and Traditional Paranormal Belief (TPB) groups	significant correlations between NAP and SPQ-B Cog-Per and Disorg. factors and between TPB and SPQ-B Cog-Per factor
Irwin & Green, 1998	SPQ-B	UE, CD, IN	PBS-R		significant correlations between PBS-R and SPQ-B Cog-Per and Disorg. factors
McCreery & Claridge, 1995	PhA, PAS, MIS, Hypo, STA, SoA, LSHS, N/P, P	IA, IN, UE, UE, UE, IE, IN, UE, CD, IA (Paranoid Ideation subscale), IA, IN, UE, UE, UE, CD, IN, UE		out-of-the-body experiencers and controls	OBE:ers sig. higher on STA, Hypo, PAS, MIS, LSHS; sig. lower on PhA; non-sig. differences on SoA, N/P, P
McCreery & Claridge, 1996	PhA, STA, LSHS	IA, IN, UE, CD, IA (PI subscale), UE		OBE:ers and non-OBE:ers	OBE:ers (lab. induced OBE) sig. higher on STA, LSHS but not on PhA
McCreery & Claridge, 2002	PhA, PAS, MIS, Hypo, STA, SoA, LSHS, N/P, P, MMPI	IA, IN, UE, UE, UE, IE, IN, UE, CD, IA (PI subscale), IA, IN, UE, UE, UE, CD, IN, UE, UE, CD		OBE:ers and non-OBE:ers	OBE:ers scored sig. higher than non-OBE:ers on the unusual experiences factor, but not on the others
	schizoidia	UE, CD			

Key to schizotypy measures:

Hypo, Hypomania Scale (Eckblad & Chapman, 1986); LSHS, Launay-Slade Hallucination Scale (Launay & Slade, 1981); MIS, Magical Ideation Scale (Eckblad & Chapman, 1983); MIS reduced, MIS items of parapsychological nature removed (see Thalbourne & Delin, 1994); MMPI Hy, MMPI Hypomania Scale (Dahlstrom, Welsh & Dahlstrom, 1972); MMPI schiz, MMPI Schizophrenia Scale (Hathaway & McKinley, 1983); MMPI schizoidia (Golden & Meehl, 1979); N/P, Schizophrenism Scale (Nielsen & Petersen, 1976); P, Psychoticism Scale (Eysenck & Eysenck, 1975); PAS, Perceptual Aberration Scale (Chapman, Chapman & Raulin, 1978); PhA, Physical Anhedonia Scale (Chapman et al., 1976); SoA, Social Anhedonia Scale (Chapman et al., 1976); SPQ-B, Schizotypal Personality Questionnaire-Brief (Raine, 1991; Raine & Benishay, 1995); STA, Schizotypal Personality Scale (Claridge & Broks, 1984).

Key to paranormal beliefs and experiences measures:

AEI, Anomalous Experiences Inventory (Gallaher et al., 1994); ASGS, Australian Sheep-Goat Scale (Thalbourne & Delin, 1993); SOBEP, Survey of Belief in Extraordinary Phenomena (Windholz & Diamant, 1974); PBS and PBS-R, Paranormal Belief Scale-Revised (Tobacyk & Milford, 1983; Tobacyk, 1988).

Study	Schizotypy measure	Schizotypy factor association (see Mason et al., 1997)	Paranormal belief and experience measure	Groups in study	Results (correlations are positive if nothing else is stated)
Parker, Grams & Pettersson, 1998	MIS	UE		successful and not successful psi-task participants	successful participants sig. higher MIS scores
Thalbourne, 1994	MIS PAS MMPI schiz.	UE UE	ASGS		significant correlations between ASGS and MIS, PAS; non-sig. correlation between ASGS and MMPI schiz.; post hoc analysis showed sig. corr. for males only
Thalbourne, 1999	MIS (reduced) STA P LSHS	UE UE, CD, IA (PI subscale) IN, UE UE	question on belief that one is psychic		significant correlation between affirmative answer to the question and MIS, STA, LSHS, P
Thalbourne, Bartemucci, Delin, Fox & Nofi, 1997	MIS (reduced) P STA	UE IN, UE UE, CD, IA (PI subscale)	ASGS		significant correlations between ASGS and MIS, STA; nonsig. correlation between ASGS and P
Thalbourne & Delin, 1994	MIS (+ reduced) MMPI Hy	UE	ASGS	students manic-depressives schizophrénics	significant group differences on MMPI Hy (stud. highest), MIS, MIS reduced (schiz. highest); non-sig group differences on ASGS; sig. correlations between ASGS and MIS (+reduced), MMPI Hy in all groups
Thalbourne, Dunbar & Delin, 1995	MIS (+reduced)	UE	ASGS PBS		significant correlations between MIS (+ reduced) and ASGS, PBS
Thalbourne & French, 1995	MIS (+reduced)	UE	ASGS SOBEP		significant correlations between MIS (+ reduced) and ASGS, SOBEP
Tobacyk & Wilkinson, 1990	MIS	UE	PBS		sig. correlation between MIS and PBS
Williams & Irwin, 1991	MIS PAS	UE UE	PBS-R	schizophrénics, schizotypal students, paranormal believers, controls	controls differed sig. from the other groups on MIS, PAS; paranormal believers had lower scores on MIS, PAS compared to schizophrenics and schizotypes
Windholz & Diamant, 1974	MMPI schiz. MMPI Hy		SOBEP		paranormal believers scored sig. higher on MMPI schiz. and MMPI Hy than non-believers
Wolfradt, Oubaid, Straube,	SPQ-B	UE, CD, IN	AEI		significant correlations between all SPQ-B factors and AEI ability,
Bischoff & Mischo, 1999					experience and belief
Wolfradt & Watzke, 1999	SPQ-B	UE, CD, IN		OBE:ers and non-OBE:ers	OBE:ers sig. higher on SPQ-B Cog-Per and Disorg. factors

Honig, Romme, Ensink, Escher, Pennings & Devries, 1998; Jackson, 1997; Targ, Schlitz & Irwin, 2000). Regarding auditory hallucinations, clinical groups claim that their hallucinations are uncontrollable whereas non-clinical groups feel that they are in control (Honig et al., 1998). Individuals diagnosed with psychosis seem to be less likely to recognise the strangeness of their paranormal experiences compared to healthy experiencers (Targ et al., 2000). Accordingly, there seem to be differences regarding emotional reaction to the experiences, content, and locus of control between clinical and non-clinical groups.

Healthy schizotypy

Despite the evident overlap between paranormal beliefs and experiences and schizotypy, it does not necessarily follow that paranormal beliefs and experiences are associated with psychological ill-health. McCreery and Claridge (1995; 1996; 2002) found that out-of-the-body experiencers did show signs of schizotypy but otherwise appeared to be healthy. The out-of-the-body experiencers had higher scores than non-experiencers on positive symptoms of schizotypy but not on negative symptoms. Moreover, some of the experiencers seemed to not only be healthy despite their out-of-the-body experiences, but because of them. These individuals were called “happy schizotypes” (McCreery & Claridge, 1995), and in a recent study the concept healthy schizotypy was introduced (McCreery & Claridge, 2002). *Healthy schizotypy* is described as: “the uncoupling of the concept of schizotypy from the concept of disease” (McCreery & Claridge, 2002, p. 144). Healthy schizotypy represents a departure from the quasi-dimensional, pathological model for schizotypy and suggests an extension into a fully dimensional model (McCreery & Claridge, 2002) with health as a starting point (Claridge, 1997; Claridge & Beech, 1995).

A fully dimensional model for schizotypy

The fully dimensional model assumes that schizotypy represents continuously distributed traits. These traits are the sources of healthy variation and also predisposition to psychosis. The fully dimensional model consists of two continua, a personality continuum and an illness continuum. The illness continuum displays a spectrum of schizophreniform disorders, from schizotypal personality disorder to schizophrenic psychosis. The two continua are related in that the personality continuum describes a predisposition to the second illness continuum while otherwise remaining part of healthy variation (Claridge, 1987). The fully dimensional model views schizotypy as fundamentally neutral, sometimes connected to health and sometimes to ill-health (Claridge, 1997). Compared with the quasi-dimensional model for schizotypy, the fully dimensional model encompasses a personality continuum in addition to the illness continuum. Whereas the quasi-dimensional model states that people either have some kind of genetic flaw that leads to schizotypy or not, the fully dimensional model states that people exhibit schizotypy in various degrees. Claridge (1997) uses anxiety as an analogue to demonstrate the difference between the two schizotypy models. Anxiety as a healthy personality trait coexists with the idea of anxiety as a maladaptive disorder. It is possible for a person to have a high level of anxiety without ever developing an anxiety disorder (McCreery & Claridge, 2002). In this case, anxiety is not maladaptive. This would be the view of the fully dimensional model. Within the quasi-dimensional model, on the other hand, it is not possible to have a high level of anxiety without this being maladaptive. Therefore, the quasi-dimensional model is limited to only explain high levels of anxiety, or indeed schizotypy, in the context of a disorder; it cannot explain how it is possible to have high levels without this being associated with a disorder.

The idea of healthy schizotypy fits in with studies showing an increased sense of well-being and meaning of life in paranormal experients (Kennedy & Kanthamani, 1995; Kennedy, Kanthamani & Palmer, 1994). Both subjective

well-being and sense of meaning in life are related to health (Antonovsky, 1991; Diener, 1984; WHO, 1946). Moreover, some paranormal experiences are reported to affect the experients in positive ways (Harary, 1993), for example, making them happier and more optimistic about the future (Kennedy & Kanthamani, 1995).

Healthy schizotypy through cognitive processing

One reason for the findings linking paranormal beliefs and experiences with psychological health might be that the beliefs and experiences fulfil a psychological need for a certain world view. There is a need to distort reality because it often is unpredictable and unreliable. Creating illusions that make people think of reality as more controllable and perhaps nicer than it actually is fulfils this need. In other words, a paranormal belief system might help sustain psychic integrity through functioning as a cognitive bias (Schumaker, 1990).

Probability misjudgement is a cognitive bias that might play a role in the formation of paranormal beliefs. People who misjudge the probability of coincidences are more likely to misinterpret normal events as paranormal. In the case of paranormal believers, this kind of misinterpretation would encourage their beliefs (Blackmore & Troscianko, 1985). It would also create the illusion that reality is more controllable than it really is. Paranormal believers are also more inclined to attribute personal involvement in randomly determined processes than non-believers (Brugger, Regard & Landis, 1990). This also might make reality seem more controllable than it is. Moreover, believers perceive more meaningful patterns in random stimuli and perceive more meaningful relationships between distant associated events and objects compared to non-believers (see Brugger & Taylor, 2003 for a review).

The psychological need for a controllable and meaningful reality might explain why people believe in paranormal phenomena. Alternatively, paranormal believers might be deficient in for example intelligence, reasoning ability, and

critical thinking compared to non-believers. The latter alternative is labelled the cognitive deficits hypothesis (Irwin, 1993). There are studies showing that paranormal believers may have cognitive deficits. The results depend on which paranormal beliefs are measured and on the circumstances in which they are measured (Irwin, 1991; Smith, Foster & Stovin, 1998). There are also studies showing that paranormal believers and experiencers do not generally have cognitive deficits (see Targ et al., 2000 for a review). The cognitive deficits hypothesis alone does not explain why a vast amount of people believe in paranormal phenomena.

However, recent studies have shown that paranormal believers have a pattern of reality testing deficits that is characteristic of the formation of psychotic beliefs (Irwin, 2003; 2004). This reality testing pattern makes some people interpret an anomalous event as paranormal without critical testing of the logical plausibility of this belief. It is suggested that motivational factors, such as a sense of control over life events might explain the deficit reality testing (Irwin, 2004) thereby fulfilling a psychological need in people. Although the results of these studies clearly indicate a reality testing deficit in paranormal believers, it is less clear which paranormal beliefs that would be explained. These studies (Irwin, 2003; 2004) used the Rasch version of the Revised Paranormal Belief Scale (Lange et al., 2000; Tobacyk, 1988; Tobacyk & Milford, 1983) that only represents a limited range of paranormal beliefs. Notably, there is a lack of items measuring ESP beliefs. Consequently, more studies exploring the reality testing deficits in ESP believers are needed before any firm conclusions can be drawn.

Paranormal believers are also thought to have special views of causality. In a study on causality, subjects who were members of a spiritual community, and thus were paranormal believers, were compared with subjects who were not members. The group of members were found to have a higher internal orientation; they expressed belief in more personal responsibility, and had a stronger belief in a fully determined universe (Lesser & Paisner, 1985).

Causality associated with the paranormal beliefs of schizophrenic patients also differs from the causality thinking of members of a psychical research society (Williams & Irwin, 1991). The members of the psychical research society framed their causal concepts in terms of personal responsibility and in seeking meaningful connections, whereas the schizophrenic patients demonstrated a reliance on the role of chance in various areas of life. It was discussed that the rejection of the notion of chance in the non-patient paranormal believers does not necessarily mean that these people do not understand the operation of chance (Williams & Irwin, 1991). These people would in other words not be expected to differ from non-believers on measures of this cognitive deficit. Rather, the magical ideas concerning causality and chance might exist together with logic (Williams & Irwin, 1991).

The idea that paranormal beliefs help sustain psychic integrity (Schumaker, 1990), partially based on the finding that paranormal beliefs were negatively correlated with psychopathology (Schumaker, 1987), seems to need some qualification. For some people a paranormal belief system could be used as a cognitive defence against acceptance of the uncertainty of life events by creating meaningfulness out of coincidences but for others it could be indicative of psychopathology (Williams & Irwin, 1991). However, studies investigating causality and paranormal beliefs used groups of paranormal believers that might not be typical of paranormal believers in the general population. Consequently, it might not be possible to generalise the results.

Health and paranormality

In sum, paranormal beliefs and experiences are generally associated with psychological ill-health. They are described as hallucinations and delusions and are diagnostic criteria for severe mental disorders. Paranormal beliefs and experiences may also be associated with psychological health. They might fulfil a need to experience life as controllable and meaningful. Reports of subjective

paranormal experiences have sparked an interest to test the evidence for paranormal phenomena.

Paranormal beliefs and experiences as indicators of psi

A research tradition for paranormal phenomena has taken these phenomena into the laboratory. The neutral term psi is used for paranormal phenomena investigated in the laboratory. A difficulty with psi is the lack of any agreed upon theory that explains paranormal phenomena and how these phenomena are mediated by the brain. A promising area of research for investigating paranormal phenomena is modern physics (Josephson & Pallikari-Viras, 1991; Schmidt, 1984; Walker, 1984). However, the idea that especially quantum mechanics could explain PK (Jeffers, 2003) and other psi phenomena is problematic (Böwadt, 2003). Böwadt (2003) describes that the observation theories to a higher degree are based on unsolved problems or controversial interpretations of certain aspects of quantum mechanics rather than on results from quantum mechanics. Therefore, using observation theories to explain psi is using theories that only a few quantum physicists agree on (Böwadt, 2003).

Investigating psi

Psi studies have been conducted using various experimental paradigms. Recent reviews of these different paradigms have been conducted in the form of meta-analyses. A meta-analysis of PK studies showed a small but significant effect (Steinkamp, Boller & Bösch, 2002). A meta-analysis of dream ESP studies also showed a small and significant effect (Sherwood & Roe, 2003). A meta-analysis comparing clairvoyance and precognition experiments concluded that both data bases showed significant overall effects (Steinkamp & Milton, 1998). Two meta-analyses of studies that explored effects of distant intention on psychophysiological variables again report small but significant effects (Schmidt, Schneider, Utts & Walach, 2004). However, the authors are cautious and conclude that the existence of an anomaly related to distant intentions

cannot be ruled out but the lack of methodological rigour in the existing data base calls for independent replications on larger data sets before final conclusions can be drawn. The lack of methodological rigour in psi studies has been lively discussed (e.g. Alcock, 1987; 2003; Hyman, 1985). These discussions have contributed to methodological improvements, for example in the Ganzfeld experimental paradigm. The Ganzfeld paradigm became known as the flagship of psi research, especially after the first meta-analysis of autoganzfeld studies (Bem & Honorton, 1994) that supported the proposal that Ganzfeld is a suitable paradigm for demonstrating anomalous communication (Storm & Ertel, 2002). Although other paradigms are also used today, Ganzfeld is still one of the most widely used psi research paradigm.

Ganzfeld research

Ganzfeld is a mild sensory deprivation technique used to investigate ESP phenomena, especially telepathic communication between a "sender" and a "receiver". In the standard Ganzfeld procedure, the "receiver" has translucent halved ping-pong balls over the eyes with a red lamp directed towards them. This produces an undifferentiated visual field. Headphones are placed over the ears and a white noise produces an undifferentiated auditory field. This homogeneous perceptual environment is called Ganzfeld, which is German for total field. The "sender" is placed in a separate room. A visual, emotionally charged target is randomly chosen for the session. The "sender" is instructed to try to communicate the target content to the "receiver". Meanwhile, the "receiver" verbalises his or her imagery and this so-called mentation is recorded. After the completion of the session, the "receiver" is presented with four possible targets and is asked to rate the degree to which each matches the imagery and mentation experienced during the session. At this stage, the "receiver" or the experimenter has no way of knowing which of usually four possible targets actually was the target during the session. If the "receiver" assigns the highest rating to the target stimuli, it is scored as a "hit". Thus, the hit rate expected by chance is 25% in this Ganzfeld set-up.

Usually, several people take part in a Ganzfeld study and the results are reported on group level. The group needs to have scores that significantly exceed the mean chance expectation (25%), for the Ganzfeld study to be successful regarding psi hitting. Consequently, within the group of psi hitters, some individuals have scored hits due to chance and some possibly due to psi. It is impossible to identify the exact individuals who have scored chance hits and psi hits.

When conducting psi experiments there are some important issues to consider. One concerns methodological rigour. It is necessary to be able to rule out the possibility that positive results are due to other factors. Another issue concerns making experiments as psi conducive as possible in order to find an effect if it is there.

Psi conduciveness factors

Ganzfeld researchers have tried to find variables associated with successful trials. If there is a kind of recipe for psi success (e.g. Delanoy, 1997), then following it should enhance the chances to produce positive results and also to learn about how psi works (Dalton, 1997). Variables relating to the experiment itself as well as the participants have been explored. A number of variables related to study outcome have been identified in earlier Ganzfeld studies. Bem and Honorton (1994) stated that in order to maximise the effect size it was important to create a warm social ambience in the laboratory, to use dynamic targets rather than static ones, and to use participants with characteristics reported to correlate with successful Ganzfeld performance.

"Receivers" who believe in psi and have had personal psi experiences are more successful in psi experiments (Bem & Honorton, 1994). The relationship between the "receiver" and the "sender" might be important. Some studies have shown larger effect sizes in studies where friends of the "receivers" served as

"senders" (Honorton, 1985; Honorton et al., 1990) whereas other studies have failed to find this (Bem & Honorton, 1994; Broughton & Alexander, 1997; Parker, 2000). Instead, higher hit rates have been found when the participants are biologically related to each other (Broughton & Alexander, 1997).

In the new generation of Ganzfeld studies (Milton & Wiseman, 1999), it became impossible to evaluate if these studies matched the earlier ones (Bem & Honorton, 1994) regarding psi conducive variables. Unfortunately, the new studies failed to report the information needed for an assessment.

When exploring psi conducive variables, successful participants or sessions are compared with unsuccessful ones. It is a problem that the group of successful sessions consists of some sessions that are judged as hits due to chance and some sessions that are judged as hits possibly due to psi. The hit group is a mixture of chance hits and psi hits. Consequently, the results regarding psi conducive variables contain high levels of noise. So much, that it might be possible to find a significant effect that has nothing to do with psi hitters but instead is due to the chance hitters, or alternatively, to not find an effect that is present among the psi hitters. Therefore, to get reliable results regarding psi conducive variables, there is a need to change the Ganzfeld set-up so that the hit group consists of fewer chance hitters.

Psi and health

The idea that paranormal believers and experiencers are more successful in psi experiments is well founded. This is an established aspect of psi conduciveness (see for example Bem & Honorton, 1994; Parker, 2000). Since paranormal beliefs and experiences overlap with symptoms of severe mental disorders and since successful psi participants have high levels of paranormal beliefs and experiences, it seems like psi has something in common with mental disorders, like psychosis. Maybe this commonality is paranormal beliefs and experiences or maybe people with psychosis illnesses experience psi phenomena. If they do,

then people with psychosis illnesses should do well in psi experiments. There is not much research in this area, likely due to ethical and other difficulties when studying patient groups. A few studies have been conducted, mainly with negative results. People with mental illnesses do not do well in psi experiments (Greyson, 1977; West, 1952; Zorab, 1957) and people with psychosis illnesses cannot be distinguished from people with other diagnoses (Greyson, 1977) regarding psi performance.

However, later studies have shown that people who do well in psi experiments score higher on measures that load on the aberrant perceptions and beliefs factor of schizotypy, than people who are not successful (Lawrence & Woodley, 1998; Parker, 2000). The connection between psi and mental illness seems to be paranormal beliefs and experiences. Just like with paranormal beliefs and experiences in general, there might be healthy aspects of psi. Paranormal beliefs and experiences, and also successful psi performance might be associated both with psychological ill-health and health.

RATIONALE FOR THE PRESENT STUDIES

The fact that paranormal beliefs and experiences have been associated with both psychological health and ill-health is somewhat of a paradox. Two schizotypy models have been proposed, a quasi-dimensional model that describes paranormal beliefs and experiences as mild symptoms of psychosis, and a fully dimensional model that views paranormal beliefs and experiences as fundamentally neutral or even positive regarding psychological health. In order to better understand schizotypy and paranormal beliefs and experiences this paradox has to be explored. One way of doing this is to investigate which schizotypy model that best captures the construct schizotypy. Paranormal beliefs and experiences have strong associations with the aberrant perceptions and beliefs factor of schizotypy. Since one of the schizotypy models will be used as the point of reference when diagnosing, treating, and attempting to

prevent psychoses and personality disorders, research concerning the schizotypy models is important.

So far, research on paranormal beliefs and experiences has mainly focused on finding negative correlates for these beliefs and experiences (Goulding & Parker, 2001; Irwin, 1993). Only a few studies have used measures intended to tap the health end-point of the health - ill-health continuum (Kennedy & Kanthamani, 1995; Kennedy et al., 1994; McCreery & Claridge, 1995; 1996; 2002) and often these studies have been limited to one special kind of paranormal experience, the out-of-the-body experience (McCreery & Claridge, 1995; 1996; 2002). The studies that have included scales intended to measure the ill-health endpoint of the health - ill-health continuum in terms of schizotypy, have often used unidimensional schizotypy measures for this multi-dimensional construct (see Table 2).

The present studies will try to avoid the limitations of earlier studies by investigating a broader variation of paranormal beliefs and experiences than the out-of-the-body experience studies (McCreery & Claridge, 1995; 1996; 2002), by including measures of both the health and ill-health end-points of that continuum, and by using a schizotypy measure that captures the multi-dimensional structure of the construct.

It is also important to examine paranormal beliefs and experiences in the context of individual characteristics. If some paranormal experiences are indicators of psi then people who have had these experiences should be able to demonstrate psi in the laboratory to validate the experiences. This has important implications for how paranormal beliefs and experiences are viewed among the research community and health professionals. Moreover, it has important theoretical implications for how we attempt to explain mental disorders that are accompanied by signs and symptoms of paranormal phenomena.

In the meta-analysis of psi Ganzfeld studies (Milton & Wiseman, 1999) conducted after the Bem and Honorton (1994) meta-analysis it was impossible to draw any conclusions regarding psi conducive variables that might explain the failure to find psi, because these variables had not been measured or reported. Moreover, the conclusions that can be drawn from results concerning psi conducive variables are limited because in the Ganzfeld set-up, the hit group has scores that include both chance hits and psi hits. No studies have tried to explore the connection between schizotypy and psi performance beyond the level of finding predictor variables for psi. Furthermore, the studies including schizotypy as a possible psi predictor have only measured the aberrant perceptions and beliefs factor. Here, the psi Ganzfeld set-up was adjusted to create a hit group where a hit expected by chance was reduced from the usual 25% to 6.25% by having each participant take part in two subsequent sessions and then redefine a hit to have occurred when both targets for those sessions had been correctly identified. Moreover, variables that might be associated with psi conduciveness were measured and reported.

General aim

The general aim of this thesis is to investigate if paranormal beliefs and experiences represent signs of psychological ill-health or if they are neutral regarding psychological health. A further aim is to validate subjective paranormal experiences.

Research questions and analyses

Study I and II

The main purpose of both studies was to investigate which of the quasi-dimensional or fully dimensional model for schizotypy that best captures the construct.

Previous work on healthy schizotypy (McCreery & Claridge, 1995; 1996; 2002) hints at the possibility that different groupings of individuals on the schizotypy factors show different patterns with regard to health. For example, it might be the case that only individuals with high scores on the aberrant perceptions and beliefs factor who at the same time score low on the other schizotypy factors can be seen as healthy schizotypes. In order to investigate different groupings of individuals in relation to health, a research methodology for grouping individuals is needed. The reason for using cluster analytic approaches is that they can identify distinct groups of individuals (Everitt, Landau & Leese, 2001). None of the earlier cluster analyses investigating the way individuals fall into sub-groups in relation to different schizotypal traits (Loughland & Williams, 1997; Simmonds, 2003; Suhr & Spitznagel, 2001; Williams, 1994) has investigated if these sub-groups have different relations to health.

Study I used an agglomerative hierarchical cluster method, the Ward method, in which clusters are formed by combining the already existing clusters. In this procedure every individual is one cluster in the first step of the analysis so that there are as many clusters as there are individuals. In the last step of the analysis all individuals belong to the same cluster. A visual inspection of the dendrogram plot and the values of the fusion coefficients derived during the analysis constitute the basis for deciding the number of clusters.

Study II also used an agglomerative hierarchical cluster analysis. As a second step of the analysis, a k-means non-hierarchical cluster analysis was performed. This kind of cluster analysis has an ability to relocate individuals who have already been placed in certain clusters, if they resemble the other individuals in the new cluster more closely. The standardised means for the schizotypy subscales obtained with the Ward method were used as the initial seed points. The number of clusters was pre-specified to three, as suggested by the Ward's method cluster analysis. The approach of using both a hierarchical and a non-hierarchical cluster analytic method has been described as taking the advantages

of the hierarchical method and complement them with the fine-tuning ability of the non-hierarchical method (Hair & Black, 1998).

The cluster differences were investigated with one-way analyses of variance. For the quasi-dimensional model to gain support, there would be a cluster of individuals with high schizotypy scores who would have worse scores on the health-related measures compared to a group of individuals with low schizotypy scores. For the fully dimensional model to gain support, there would be a cluster with high scores on paranormal beliefs and experiences, and therefore also on the aberrant perceptions and beliefs factor of schizotypy, who do not have worse scores on the health-related measures compared to a group of individuals with low schizotypy scores.

The reported norms for the sub-scales of the recently developed schizotypy measure, the O-LIFE were compared with the results of study I and II. Eventual differences regarding the norms and these studies might signal the possibility of cultural differences, differences due to the special sample in study II, or other sample differences.

Study III

The main purpose of this study was to explore the possibility to validate subjective paranormal experiences using a newly developed Ganzfeld system aimed to induce psi. A secondary purpose was to evaluate the role of psi conducive variables that might be related to success in the Ganzfeld.

Study IV

The main purpose of study IV was to evaluate the role of potentially psi conducive variables related to the characteristics of the Ganzfeld "receiver". There were three possible Ganzfeld outcome groups since every individual took part in two subsequent Ganzfeld trials. Accordingly, one group consisted of trials where an independent judge failed to identify any of the two targets; one

group were trials where one target of two was correctly identified; and the last group consisted of trials where both targets were correctly identified. Study IV set out to explore differences between participants of the three Ganzfeld outcome groups. However, the overall Ganzfeld result of study III did not exceed the mean chance expectation and only three participants took part in trials in which both targets were correctly identified. The outcome of study III thus limited the analyses of the participant variables.

Based on results of previous studies (e.g. Bem & Honorton, 1994; Dalton, 1997; McCreery & Claridge, 2002; Parker, 2000), successful participants were expected to be higher compared to unsuccessful participants on paranormal beliefs and experiences, the Unusual Experiences factor of schizotypy, and meditation. They were expected to be lower on the Introvertive Anhedonia factor of schizotypy. Moreover, it was hypothesised that "receivers" who belonged to the two correctly identified targets group would also belong to a schizotypy cluster with a high level of Unusual Experiences but low levels on the other schizotypy factors.

METHOD

Participants

Study I

A total of 88 undergraduate psychology students from the University of Göteborg took part in the study on a voluntary basis with replies to questionnaires being made anonymously. Of the 86 participants who answered the question about their sex, 70 were female and 16 were male. The mean age was 25.9 years ($SD= 7.3$; *range* 18-52 years).

Study II, III, and IV

In study II, a total of 129 persons who reported subjective paranormal experiences, took part on a voluntary basis. Of the participants, 106 were female and 23 were male. The mean age was 46.8 years ($SD = 13.1$; *range* 21-85 years). An advertisement was placed in the main morning paper in the Göteborg area asking for participants who had had paranormal experiences. 160 persons contacted the researchers via telephone and were sent the questionnaires to fill in and return in a stamped envelope. 129 persons (81%) filled in and returned the questionnaires, no reminder was sent out to those who did not return their questionnaires. Of those 129 persons who participated in study II, 64 took part in studies III and IV. When a person had returned his or her filled in questionnaire, they were phoned to arrange a date for the Ganzfeld experiment. Thus, studies III and IV used a convenience sub-sample of those 129 persons who participated in study II. The mean age was 46.8 years ($SD = 12.3$; *range* = 22-74 years), 54 participants were female and 10 were male.

The participants were encouraged to bring with them a person who could act as a "sender" for the Ganzfeld session. The participants who did not bring their own "senders" were appointed a "sender". Three different people took turns to act as "senders" for the participants who did not bring a "sender" along. Nineteen of the 64 participants brought their own "senders" with them. All 64 participants were asked to evaluate their Ganzfeld sessions regarding similarity between imagery during the session and the four possible targets. Thirty-two participants agreed to do so.

There were mainly two persons acting as experimenters during study III. There were mainly three appointed "senders" in study III. These were all women. All had participated in Ganzfeld trials before, both as "receivers" and "senders", and one had acted as experimenter before. Some other persons took part in the beginning of the study as experimenters and "senders" but were unable to continue. One person acted as an external judge in study III. His training

consisted of participation in Ganzfeld trials as "sender" and "receiver", studying qualitatively good "hits", and evaluating Ganzfeld trials.

Equipment

The suite used for Ganzfeld experiments consists of two rooms in the basement of the Psychology Department at Göteborg University called the sender room and the receiver room (see Figure 1). The distance between these two rooms is approximately 30 meters. The receiver room is sound attenuated (>48 dB). The external judge was situated in Stockholm, approximately 500 kilometres from Göteborg.

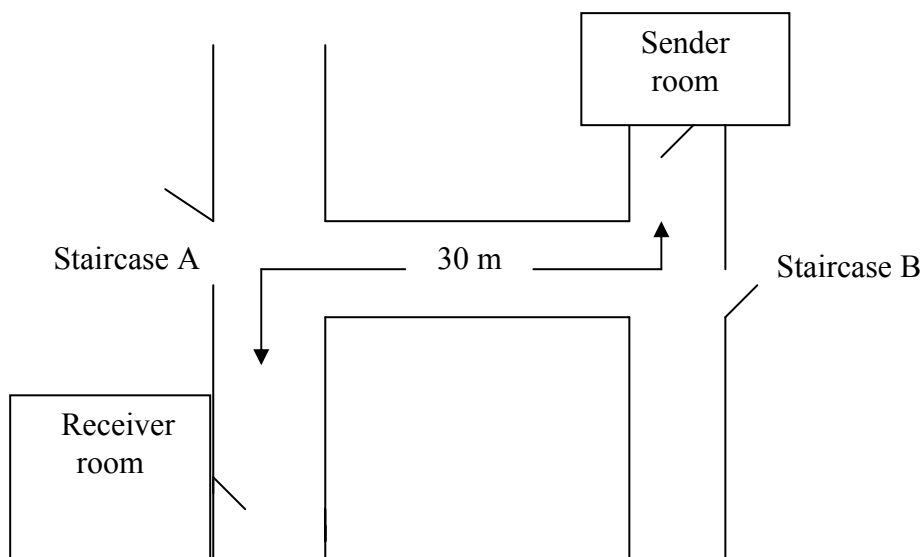


Figure 1.

Layout of the sender and receiver rooms. Both rooms lack windows.

The receiver and sender rooms and the room the external judge used for assessing the Ganzfeld trials were equipped with computers installed with the

Ganzfeld software and connected to the Internet. There was one-way communication between the receiver and sender room, so that the sound from the receiver room could be heard in the sender room.

It is crucial to consider security measures in psi experiments so that a positive outcome cannot conceivably be explained by anything other than psi. Security measures were taken and partly consisted of having a sound technician measure sound levels between the sender and receiver room.

Materials

The questionnaires used in these studies were the Oxford-Liverpool Inventory of Feelings and Experiences (Mason et al., 1995) to measure schizotypy; the Eysenck Personality Inventory (Bederoff-Petersson, Jägtoft & Åström, 1971; Eysenck & Eysenck, 1964) to measure neuroticism; the Australian Sheep-Goat Scale (Thalbourne & Delin, 1993) to measure paranormal beliefs and experiences; and the Sense of Coherence Scale (Antonovsky, 1991) that is related to health. There were also questions about age, gender, meditation habits, and professional help seeking or hospitalisation due to paranormal experiences. A description of the questionnaires follows below.

The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE)

Three sub-scales from the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE; Mason et al., 1995) were used to measure schizotypy. The O-LIFE consists of four sub-scales: Unusual Experiences (UE), Cognitive Disorganisation (CD), Introverted Anhedonia (IA), and Impulsive Nonconformity (IN). It is unclear if the IN sub-scale is a true schizotypy scale (Day & Peters, 1999; Loughland & Williams, 1997) and therefore it was excluded from the present studies. The 30 items of the UE sub-scale are thought to be consistent with the positive symptoms of psychosis and the sub-scale contains perceptual, hallucinatory, and magical thinking items (Mason et al.,

1995). The 24 items of the CD sub-scale describes difficulties with attention, concentration, and decision-making, together with a sense of purposelessness, moodiness, and social anxiety. These features of schizotypy are thought to correspond to the cognitively positive symptoms of schizophrenia (Loughland & Williams, 1997). The 27 IA sub-scale items tap a lack of enjoyment of social situations. Introvertive Anhedonia indicates a dislike of emotional and physical intimacy. This sub-scale is thought to be related to the negative symptoms of schizophrenia (Carpenter, Heinrichs & Wagman, 1988). The range for the three sub-scales combined was 0-81. Psychometric evaluation of the O-LIFE has shown good test-retest reliability, (coefficient alpha = .80; Loughland & Williams 1997), as well as acceptable internal consistency (coefficient alpha > .77; Mason et al., 1995). The Cronbach alpha measure of internal consistency was .89 in the Swedish O-LIFE.

The Eysenck Personality Inventory (EPI)

Form A of the Eysenck Personality Inventory (EPI; Bederoff-Petersson et al., 1971; Eysenck & Eysenck, 1964) was used to measure the personality trait neuroticism. It consists of three sub-scales; an Extraversion sub-scale consisting of 24 items, a Neuroticism sub-scale made up of 24 items, and a Lie sub-scale consisting of 9 items. The answer format for the EPI is yes or no, scored as one point and no points respectively. Thus, the theoretical range for the Neuroticism sub-scale is 0-24. Test-retest reliability was .78 for the Neuroticism sub-scale in the Swedish EPI (Bederoff-Petersson et al., 1971).

The Australian Sheep-Goat Scale (ASGS)

The Australian Sheep-Goat Scale (ASGS; Thalbourne & Delin, 1993) was used to measure paranormal beliefs and experiences. It measures beliefs and experiences of extrasensory perception (ESP), psychokinesis (PK), belief in life after death, and belief in the possibility of communicating with spirits of dead people. The ESP sub-scale consists of 11 items, the PK sub-scale of 5 items, and the belief in life after death sub-scale of 2 items. The answer alternatives

are yes, unsure, or no, which are scored as two points, one point, and no points, respectively. The range for this scale is 0-36. The Cronbach alpha measure of internal consistency was found to be .94 and the test-retest reliability was .66 for the ASGS (Thalbourne & Delin, 1993). The Cronbach alpha measure of internal consistency for the Swedish ASGS was .91.

The Sense of Coherence (SOC) Scale

The Sense of Coherence (SOC; Antonovsky, 1991) Scale is a health-related measure consisting of three components: 'Meaningfulness', 'Manageability', and 'Comprehensibility'. Meaningfulness (8 items) is an emotional component related to the degree of influence and involvement in what happens. Manageability (10 items) taps the subjective sensation of possessing or lacking sufficient resources to deal with different situations in life. Comprehensibility (11 items) is a cognitive component dealing with order and structure. The answering format is a 7-point rating scale. High points on this scale are interpreted as high sense of coherence. The SOC construct refers to a global orientation to one's inner and outer environments, which is thought to be a significant determinant of location and movement on the health - ill-health continuum (Antonovsky, 1993). Although the SOC Scale cannot be said to be equivalent to health, it is reported to covary strongly with subjective and objective measures of physical and psychological health (Antonovsky, 1991; 1993; Ebert et al., 2002; Larsson & Kallenberg, 1996; 1999; Pallant & Lae, 2002). A person with strong SOC has better opportunities to manage stress and stay healthy than a person with weak SOC (Antonovsky, 1991; 1993; Larsson & Kallenberg, 1996). The range of the SOC Scale is 29-203. Different studies have shown the Cronbach alpha measure of internal consistence to range between .82 and .95, whereas test-retest reliability ranges between .41 and .97 (Antonovsky, 1993).

Other questions

Apart from questions about gender and age, there were two questions concerning meditation habits and two questions concerning seeking professional help due to paranormal experiences. The first meditation question was: "Have you done any relaxation exercises, like for example meditation?" The second meditation question was: "If your previous answer was yes, do you still do relaxation exercises?". The first question concerning help seeking was: "Have you had any paranormal experiences that made you go to see a physician or a psychologist?" The second question was: "Have your paranormal experiences caused you to be hospitalised?" The answer format for these questions was yes or no.

Registration form

A registration form was used in study III. It contained questions to be answered by the participants. The first question concerned the "receiver's" confidence to succeed with the experiment. The question was: "How sure are you that the telepathic transference will succeed?" The answering format was a 10 point rating scale with the end points 1 totally unsure and 10 totally sure. This was asked both before the sending started and after it finished. The second question was concerned with the ability of the target film clips to affect the "sender" and the "receiver". The question was: "Did the target film clip affect you?" The answering format was a 10 point rating scale with the end points 1 "it did not affect me at all" and 10 "it affected me a lot".

Procedure

In study I, the questionnaires were distributed among the students during lectures. The questionnaires were returned in my mail box at the Psychology Department. The procedure for distributing the questionnaires used in study II and IV is described in the participant section.

When preparing for the Ganzfeld experiments, it was thought important to create a situation that was as psi conducive as possible (see Dalton, 1997; Delanoy, 1997). The experimenter welcomed the Ganzfeld participants of study III and offered them coffee, tea, or soft drinks. During the pre session chat, the experimenter explained the experimental set-up to the participants. Any questions the participants had concerning the Ganzfeld experiment were answered. The experimenter filled out the registration sheet throughout the session.

Before the Ganzfeld experiment started, the participants were showed the sender and receiver rooms and the equipment to be used. The "sender" was installed in the sender room and she or he was equipped with headphones and a computer mouse and was placed in front of the computer screen. The "sender" was instructed to start the session by clicking on a computer screen button saying 'Show films' when told to do so by the experimenter. From the point in time when the "sender" clicked on "Show films" onwards, the computer would do everything automatically. All the "sender" needed to concentrate on was to communicate the content of what was being shown on the computer screen. The "sender" was told to communicate the film content silently and to stay in the sender room without opening the door until the experimenter and "receiver" returned.

After entering the receiver room, the "receiver" was asked the question concerning her or his confidence of success in the experiment. The experimenter helped the "receiver" to put on the equipment to be used. The "receiver" was instructed that the session would start with 10 minutes of relaxing music and when the noise started, the sending started. Then it was time for the "receiver" to verbalise anything that entered his or her mind. The white noise would continue throughout the session without an indication of when the targets change.

At the start of the sending period the experimenter started to record the mentation on a cassette recorder. This was used as a back-up if anything went wrong with the computer recording of the mentation. Also, the experimenter wrote down the mentation during the session.

After 30 minutes the "receiver" was told that the sending period was over, and the equipment was turned off. The "receiver" was again asked a question about confidence of success in the experiment. An external judge evaluated all sessions and the "receivers" also judged half the sessions. If the "receiver" was going to evaluate his or her session, the experimenter and "receiver" stayed in the receiver room to do so. The experimenter started the Ganzfeld judging program on the receiver room computer. The "receiver" was shown the four film clips in the set belonging to the first half of the experiment. When the "receiver" felt ready, she or he rated the similarity between each film clip and the mentation on a rating scale ranging from 0 (no similarity between film content and mentation) to 100 (strong similarity between film content and mentation). Thereafter the procedure was repeated for the second half of the experiment. Then, the experimenter and "receiver" went to join the "sender" in the sender room for feedback. If an external judge alone was going to do the evaluation, then the "receiver" and the experimenter joined the "sender" in the sender room directly after the sending period for feedback. If the "receiver" brought his or her own "sender" along, the "sender" would stay in the sender room with the door closed while the "receiver" evaluated the experiment. If however, the "sender" had been appointed she had the option to leave the sender room after the sending period via staircase B (see Figure 1).

The feedback for the session is incorporated in the Ganzfeld experiment program. The computer feedback consists of the showing of the two target film clips together with the mentation. This meant that the "receivers" who did not judge their own sessions never got to watch the decoys of the target sets. When each of the target film clips had been shown, both the "sender" and "receiver"

were asked questions about the target (see the Materials section above). The identity of the target film clips was printed out together with information to the participants about the importance of them not revealing the target identities to anybody who did not take part in the experiment. The participants discussed the session until everybody felt satisfied. The participants were thanked for their participation and given a little token of appreciation in the form of a 50 kronor voucher.

The external judge who had to access the file server via the Internet and collect the mentation files evaluated all the Ganzfeld sessions. The mentation files were automatically stored on the file server after the end of the sending period. Together with the mentation files was information about which set of film clips had been used in a session but no information about the target identity. The external judge went through the same evaluating procedure as described above. However, the external judge had some training in evaluating Ganzfeld protocols and was more systematic in doing so compared to the "receivers". He listened to all the mentation and book-marked the sections where the mentation seemed the same as the film content. Thereafter he went through the same rating procedure as the "receivers". After he finished the judging he e-mailed the result to me. When all experiments that had been conducted also had been judged, I e-mailed the external judge back to give him feedback about which film clips were the targets for the sessions he had evaluated. I also gave the "receivers" feedback about the judge's assessment via telephone or mail.

RESULTS

Study I

The observed ranges, means and standard deviations are shown in Table 3 for the Australian Sheep-Goat Scale (ASGS), the Sense of Coherence (SOC) Scale, Neuroticism, and for the relevant sub-scales of the O-LIFE. Women scored significantly higher than men on the ASGS ($F_{(1,84)}=8.1, p=.005$). There were no other sex differences. A visual inspection of the dendrogram and the values of the fusion coefficients derived during the cluster analysis of the O-LIFE sub-scales suggested three separate clusters. Depending on the defining features, these were labelled Cognitive Disorganisation with Introvertive Anhedonia (CD/IA), Unusual Experiences (UE), and Low Schizotypy (LS), see Table 4. The CD/IA cluster comprised 16 individuals with high scores on Cognitive Disorganisation (CD) and Introvertive Anhedonia (IA) and slightly above average scores on Unusual Experiences (UE). The UE cluster comprised 23 individuals with high scores on UE, average on CD and below average on IA. The LS cluster consisted of 49 individuals with below average scores on all the sub-scales.

Table 3

Observed mean, and standard deviation for the ASGS, the SOC Scale, Neuroticism (N), and the IA, UE, and CD sub-scales of the O-LIFE in study I and II

	ASGS	SOC	N	IA	UE	CD
Study I <i>M (SD)</i>	15.1 (8.6)	136.8 (19.5)	10.1 (4.9)	4.4 (3.6)	9.6 (6.0)	8.3 (5.5)
Study II <i>M (SD)</i>	28.1 (5.0)	145.0 (20.9)	9.0 (4.5)	6.2 (3.9)	15.1 (6.6)	6.9 (4.9)

One-way ANOVA:s were conducted for the SOC Scale, the ASGS, and Neuroticism with the means of the scales as the dependent variable and the three O-LIFE clusters as the independent variable. There was a significant

difference between the clusters ($F_{(2,85)}=31.9$; $p=.000$) on the SOC Scale. A Tukey post hoc test showed that the CD/IA cluster was significantly different from the other clusters ($p=.000$) in that the SOC scores were lower compared to the other groups. No significant differences were found between the other two clusters.

Table 4

Mean, standard deviation, and z-score mean for the different clusters on the UE, CD, and IA sub-scales of the O-LIFE, the SOC Scale, Neuroticism (N), and the ASGS in study I and II

Study I		UE sub-scale			CD sub-scale			IA sub-scale			SOC Scale		N		ASGS	
Cluster	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M(z)</i>	<i>M</i>	<i>SD</i>	<i>M(z)</i>	<i>M</i>	<i>SD</i>	<i>M(z)</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
CD/IA	16	11.7	5.2	.3	16.0	4.4	1.4	8.4	4.1	1.1	110.0	20.7	15.2	4.8	14.6	7.3
UE	23	16.6	3.9	1.2	8.2	3.8	.0	2.5	2.0	-.5	140.9	9.5	10.2	3.8	19.9	9.1
LS	49	5.6	3.0	-.7	5.8	4.1	-.4	3.9	3.0	-.1	143.7	14.8	8.4	4.4	12.9	7.9
Study II																
Cluster	<i>n</i>															
IA	35	17.3	6.1	.3	9.5	3.8	.5	11.2	2.4	1.2	131.6	17.0	10.7	3.6	28.3	5.7
CD	33	18.0	6.3	.4	11.5	3.5	.9	3.3	1.8	-.7	136.3	16.5	12.5	3.8	29.0	4.8
LS	60	12.2	5.9	-.4	2.9	2.3	-.8	4.8	2.4	-.4	157.6	17.8	6.0	3.3	27.6	4.7

There was a significant difference between the clusters ($F_{(2,85)}=5.8$; $p=.004$) on the ASGS. Tukey post hoc tests revealed that the UE cluster was significantly different from the LS cluster ($p=.003$). The ASGS scores for the UE cluster were higher than the scores for the LS cluster. The difference between the CD/IA cluster and the UE cluster failed to reach significance. A Pearson correlation analysis between the O-LIFE factors IA, UE, and CD and the ASGS showed that the only significant correlation was that between the UE factor and the ASGS ($r=.45$, $p<.01$).

In order to investigate paranormal beliefs and experiences and SOC further, the individuals were divided into a low-scoring and a high-scoring ASGS group. The low-scoring group ($n=17$) had scores which were one standard deviation

below the ASGS mean, whereas the high-scoring group ($n=16$) had scores which were one standard deviation above the ASGS mean. The difference between the low- and high-scoring ASGS groups was non-significant.

There were significant differences across clusters on Neuroticism ($F_{(2,85)}=14.8$; $p=.000$). A Tukey post hoc test showed that the CD/IA cluster was significantly different compared to the UE cluster ($p=.002$) and the LS cluster ($p=.000$). The CD/IA cluster had a higher level of neuroticism than the other clusters. Moreover, both the CD/IA ($t_{(136)}=-6.0$; $p<.01$) and the UE ($t_{(143)}=-2.9$; $p<.01$) clusters had significantly higher levels of neuroticism compared with the Swedish norms ($M=7.6$; Bederoff-Petersson et al., 1971). Finally, none of the participants said that they had been in touch with health professionals or been hospitalised because of their paranormal experiences.

Study II

One individual's IA sub-scale score showed outlier status, it was extremely high. Therefore, this individual was omitted from further analyses. In Table 3, the observed ranges, means and standard deviations are shown for the ASGS, the SOC Scale, Neuroticism, and for the relevant sub-scales of the O-LIFE. There were no significant sex differences on these measures. Both the hierarchical and the non-hierarchical cluster analyses suggested the presence of three clusters labelled Introvertive Anhedonia (IA), Low Schizotypy (LS), and Cognitive Disorganisation (CD), see Table 4. The IA cluster comprised 35 individuals with very high scores on the IA sub-scale and moderately high scores on the CD and UE sub-scales. The CD cluster consisted of 33 individuals with high scores on the CD sub-scale, moderately high scores on the UE sub-scale, and very low scores on the IA sub-scale. The LS cluster comprised 60 individuals with below average scores on all three sub-scales.

One-way ANOVA:s were conducted for the SOC Scale, the ASGS, and Neuroticism with the means of the scales as the dependent variable and the

three O-LIFE clusters as the independent variable. There was a statistically significant difference between the clusters ($F_{(2,125)}=30.7$; $p=.000$) regarding the SOC Scale. A Tukey post hoc test showed that the LS cluster had significantly higher scores on the SOC Scale compared to the IA and the CD clusters ($p=.000$ in both cases).

There were no significant differences between the clusters regarding the ASGS. A Pearson correlation analysis between the O-LIFE factors IA, UE, and CD and the ASGS showed that the only significant correlation was that between the UE factor and the ASGS ($r=.53$, $p<.01$). Both the IA ($t_{(155)}=-4.3$; $p<.01$) and the CD ($t_{(153)}=-6.4$; $p<.01$) clusters had significantly higher levels of neuroticism compared with the Swedish norms, whereas the LS cluster had a significantly lower level of neuroticism ($t_{(180)}=2.8$; $p<.01$). There was also a highly significant difference between the clusters regarding neuroticism ($F_{(2,125)}=42.2$; $p=.000$). The LS cluster had a significant lower level compared with both the other clusters (Tukey; $p=.000$). Finally, eight of the participants said they had been in touch with health professionals because of their paranormal experiences whereas one person had been hospitalised. There were no differences between the clusters on these measures.

The norms and means of study I and II for the O-LIFE factors are presented in Table 5. Study I was compared with the averaged norms for the 16-25 age group whereas study II was compared with the over 25 age group. In study I, the scores on the UE ($t_{(337)}=2.6$; $p<.02$) and CD ($t_{(337)}=6.3$; $p<.01$) factors were significantly lower compared with the norms. In study II, the scores on the UE ($t_{(383)}=-10.1$; $p<.01$) factor were significantly higher compared with the norms, whereas the scores on the CD ($t_{(383)}=5.9$; $p<.01$) factor were significantly lower.

Table 5

Mean and standard deviation for the UE, CD, and IA sub-scales of the O-LIFE reported norms, study I, and study II

	Mason et al., 1995 Norms, age group 16-25	Mason et al., 1995 Norms, age group 16-25	Mason et al., 1995 Norms, age group 25-	Mason et al., 1995 Norms, age group 25-	Study I	Study II
	Female	Male	Female	Male		
	<i>M</i> <i>SD</i>	<i>M</i> <i>SD</i>	<i>M</i> <i>SD</i>	<i>M</i> <i>SD</i>	<i>M</i> <i>SD</i>	<i>M</i> <i>SD</i>
UE	11.5 6.9	11.7 6.7	9.0 6.1	7.1 6.0	9.6 6.0	15.1 6.6
CD	13.4 5.3	11.7 5.3	10.6 5.8	9.9 5.9	8.3 5.5	6.9 4.9
IA	5.0 4.5	5.2 3.9	5.7 4.4	8.0 4.9	4.4 3.6	6.2 3.9

Study III

The psi Ganzfeld result was a direct hit rate of 23%, which was close to chance expectation ($p=.386$, one-tailed binomial test). The effect size, π (Rosenthal & Rubin, 1989), was .47 where .50 was expected under the null hypothesis.

There were significant differences in the Ganzfeld results across the groups of participant relationships ($F_{(3,124)}=4.5$, $p=.005$), measured with a one-way ANOVA. There were four kinds of relationships: none (an appointed “sender”), biological relative, friend, and spouse (see Table 6). A Tukey post hoc test showed a significant difference ($p=.002$) between the target ratings of those Ganzfeld trials of “receivers” who brought a friend with them, compared to those who did not bring a “sender” of their own (the none group).

There was a significant difference between hit trials and miss trials regarding the target affect for “senders” ($t_{(124)}= -2.4$, $p=.016$) but no difference regarding target affect for “receivers”. In successful Ganzfeld trials “senders” regarded the target film clips as having affected them more ($M=7.1$, $SD=2.0$) than was the case in non-successful Ganzfeld trials ($M=5.9$, $SD=2.4$).

Table 6

Percentage of hits, number of trials, means, and standard deviations of the target ratings for the four types of participant relationships

Kind of relationship	None	Biological relative	Friend	Spouse
Hits (%)	18.9	16.7	45.5	20.0
<i>n</i>	90	6	22	10
<i>M (SD)</i> target rating	27.3 (22.0)	27.0 (24.9)	47.6 (29.9)	35.7 (20.9)

Confidence of success was measured both before and after the sending period. The hit trials ($M=6.2$; $SD=2.2$) were associated with higher confidence of success pre sending ($t_{(116)} = -2.0$; $p=.049$, two-tailed) compared to the miss trials ($M=5.2$; $SD=2.3$). The difference between the groups post sending failed to reach significance ($p=.064$) but was in the expected direction with hit trials associated with higher confidence than miss trials. Both the hit- and the miss trials were associated with higher confidence of success before ($M=5.4$; $SD=2.3$) compared to after ($M=4.6$; $SD=2.6$) the sending period ($t_{(117)}=4.1$; $p=.000$).

Study IV

Overall, there were no significant differences between the Ganzfeld outcome groups on any of the participant variables. The means and standard deviations from the different questionnaires are reported in Table 7.

Table 8 shows how the participants answered the questions on meditation and help seeking. None of the participants had been hospitalised but two persons said that they had sought professional help due to their paranormal experiences. These participants belonged to the one hit Ganzfeld outcome group. Again, there were no significant differences between the three Ganzfeld outcome groups on these measures.

Table 7

Means and standard deviations for the different ganzfeld result groups on Neuroticism (N), Cognitive Disorganisation (CD), Unusual Experiences (UE), Introvertive Anhedonia (IA), Sense of Coherence (SOC), and Australian Sheep-Goat Scale (ASGS)

Ganzfeld result group	N		CD		UE		IA		SOC		ASGS	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
no correctly identified target n=37	8.8	4.6	6.6	5.5	14.5	5.6	5.3	3.6	145.7	22.8	28.3	4.8
one correctly identified target n=24	10.5	3.6	7.6	4.8	14.8	6.8	7.4	4.7	143.5	17.3	27.9	5.0
two correctly identified targets n=3	4.7	2.9	4.0	3.0	11.7	8.6	4.3	0.6	163.7	11.0	30.3	5.0

Table 8

Frequencies of participants in different Ganzfeld outcome groups who answered yes and no regarding meditation and professional help seeking due to their paranormal experiences

Ganzfeld outcome group	meditation		help seeking	
	yes	no	yes	no
no hits	15	22	0	37
one hit	15	9	2	22
two hits	2	1	0	3

The participants in study IV were grouped in different schizotypy clusters in study II. There were no significant differences between the Ganzfeld outcome groups regarding cluster association.

DISCUSSION

Which schizotypy model is supported

Both study I and II aimed to investigate whether the quasi-dimensional or the fully dimensional model for schizotypy would be supported. A cluster of individuals with high scores on paranormal beliefs and experiences (measured by the ASGS and the Unusual Experiences factor of schizotypy) together with high scores on health-related sense of coherence and low neuroticism scores would support the fully dimensional schizotypy model. The results from study I and II support the fully dimensional model for schizotypy over the quasi-dimensional model since there was a group with high levels of paranormal beliefs and experiences together with a strong sense of coherence. The Unusual Experiences factor alone, or paranormal beliefs and experiences alone, were not associated with a weak sense of coherence, whereas paranormal beliefs and experiences *together with* cognitive disorganisation or anhedonia were. In study II, a group with a high level of paranormal beliefs and experiences also had a lower neuroticism level both compared with the other two clusters and the reported Swedish norms (Bederoff-Petersson et al., 1971).

These results are in line with previous findings that there are some individuals who are prone to paranormal experiences although they seem to be healthy (McCreery & Claridge, 1995; 1996; 2002). The results also show that it is not only the out-of-the-body experiencers who seem healthy but also individuals who believe in and experience other paranormal phenomena, i.e. ESP and PK. Moreover, a group of paranormal believers and experiencers in study II had a low neuroticism level, indicating mental health rather than ill-health. This might have implications for the diagnostic criteria of schizophreniform disorders described in the DSM-IV (American Psychiatric Association, 1994). If the fully dimensional model for schizotypy best describes the construct then this should be reflected in the DSM-IV (American Psychiatric Association, 1994), whereas

today, the DSM-IV (American Psychiatric Association, 1994) diagnostic criteria are based on the quasi-dimensional model.

However, more work is needed investigating the two schizotypy models. It can for example be argued that the people high on paranormal beliefs and experiences are in a pre-clinical stage and have just not become ill *yet*. They seem healthy at this point in time but will at some future point develop a mental disorder that has paranormal beliefs and experiences as diagnostic criteria. To investigate if this is the case, follow-up studies are needed. No such studies have been done with paranormal believers and experiencers. However, a longitudinal study of individuals with high scores on the Perceptual Aberration Scale (Chapman et al., 1978) and the Magical Ideation Scale (Eckblad & Chapman, 1983) showed that they exceeded control subjects at follow-up ten years later on psychoses, psychotic relatives, schizotypal symptoms, and psychotic-like experiences (Chapman, Chapman, Kwapil, Eckblad & Zinser, 1994). Both these questionnaires load on the aberrant perceptions and beliefs factor of schizotypy (Mason et al., 1997), and the Magical Ideation Scale shows a strong correlation with paranormal beliefs and experiences even when these kinds of items are removed from the Magical Ideation Scale (Thalbourne & Delin, 1994). However, it was noted that subjects who scored high on the Magical Ideation Scale and above the mean on a measure of social anhedonia were especially deviant (Chapman et al., 1994). Consequently, it might be the case that it is the paranormal believers and experiencers who also have high levels of cognitive disorganisation or anhedonia that are most likely to be in a pre-clinical stage for mental disorder.

It is premature to conclude that some paranormal believers and experiencers are as healthy or healthier compared to other groups. The main reason for this is that no studies so far have used objective and direct measures of health. Indeed, a limitation of the results of this thesis is that the Sense of Coherence Scale was used as a health-related measure. Although it is related to health, it is a weak

and indirect health measure. A more direct assessment of psychiatric history and a more direct health questionnaire could have provided stronger information. Accordingly, there is a need for studies investigating the two schizotypy models that use direct health measures and that follow up the health status of the participants at later points in time. Moreover, there is a need for studies that compare the paranormal beliefs and experiences of clinical and non-clinical groups in order to find out why some paranormal believers and experiencers seem healthy.

Another reason why it is premature to conclude that some paranormal believers and experiencers are as healthy or healthier compared to other groups concerns gender differences. In the studies presented in this thesis, most participants were women. Women tend to have higher levels of positive symptom characteristics than men and men tend to have higher levels of negative symptom characteristics than women (Mason et al., 1997; Venables & Bailes, 1994). Positive symptom characteristics are not as detrimental to a person's health as negative symptom characteristics and people diagnosed with psychosis who only have positive symptoms have a better prognosis for recovery (American Psychiatric Association, 1994; Lewine, 1981). Therefore, it might not be the case that paranormal believers and experiencers are as healthy as others but that female believers and experiencers might be. In a sample of only men, there might not be a cluster of individuals who have high scores on the aberrant perceptions and beliefs factor only.

The results from study I showed that the Unusual Experiences cluster and the Low Schizotypy cluster had a very similar level of sense of coherence while the cluster with high scores on the Cognitive Disorganisation and Introvertive Anhedonia factors had a significantly lower level of sense of coherence compared to the Low Schizotypy cluster. As to the high and low scoring paranormal beliefs and experiences groups, the group difference failed to reach significance but the group with a low level of paranormal beliefs and

experiences had a lower level of sense of coherence than the group with a high level of paranormal beliefs and experiences. The Cognitive Disorganisation with Introvertive Anhedonia cluster and the Unusual Experiences cluster both had significantly higher levels of neuroticism compared to the Swedish norms (Bederoff-Petersson et al., 1971). Moreover, the Cognitive Disorganisation with Introvertive Anhedonia cluster also had a higher level of neuroticism compared with the other two clusters. It seems likely that the Cognitive Disorganisation with Introvertive Anhedonia group is most vulnerable to psychological ill-health of the three.

The results from study II showed that both the Introvertive Anhedonia and the Cognitive Disorganisation clusters had lower levels of sense of coherence than the Low Schizotypy cluster. Moreover, the Low Schizotypy cluster had a very high level of sense of coherence compared to the norms for that measure, which are reported to range from 117-153 (Antonovsky, 1993). Although the SOC scores of the Introvertive Anhedonia and Cognitive Disorganisation clusters were indeed lower compared to the Low Schizotypy cluster, they were not very low compared to the normative data base (Antonovsky, 1993). For example, U.S production workers and an Israeli Jewish sample are reported to have about the same SOC mean scores as the Introvertive Anhedonia and Cognitive Disorganisation clusters (Antonovsky, 1993), which is surprising since these clusters would be expected to have lower scores on a health-related measure. On the other hand, the individuals taking part in this study stem from the normal population, which might explain the result, since they are all seemingly healthy.

There were no differences between the clusters regarding paranormal beliefs and experiences. All three clusters had high levels of paranormal beliefs and experiences as would be expected in this population. Both the Introvertive Anhedonia and the Cognitive Disorganisation clusters had higher neuroticism compared to the Swedish norms (Bederoff-Petersson et al., 1971). The Low Schizotypy cluster on the other hand, had a significantly lower neuroticism

level both compared with the Swedish norms and with the other two clusters. The results show that the relationship between the subjective reports of health-related sense of coherence, neuroticism, and subjective reports of strong paranormal beliefs and experiences is complex. It seems more likely that strong paranormal beliefs and experiences together with anhedonia or cognitive disorganisation is related to perceived ill-health rather than strong paranormal beliefs and experiences on its own.

However, the results might have been affected by the fact that the sample was self-selected and that the return rate of the questionnaires was imperfect (81%). The people who failed to fill out and return their questionnaires might belong to a slightly different population. Actually, it can be suspected that especially people with high levels of anhedonia or cognitive disorganisation might fail to fill out and return questionnaires. The results might also have been affected by a need for people with high levels of paranormal beliefs and experiences to feel socially acceptable. Although people in general might feel this need, maybe paranormal believers and experiencers feel a stronger need, considering that paranormal beliefs and experiences themselves are not widely socially acceptable. Studies using a randomised selection of paranormal believers and experiencers that measure social desirability are needed in order to overcome these limitations.

One major difference concerning the Low Schizotypy clusters in studies I and II needs to be addressed. The Low Schizotypy cluster of study I had low scores on paranormal beliefs and experiences as can be seen both on their ASGS scores and their scores on the Unusual Experiences factor (see Table 4). The Low Schizotypy cluster of study II had slightly lower scores on paranormal beliefs and experiences compared to the other clusters in that study *but* compared to the students in study I, the paranormal belief and experience scores were considerably higher. There was no Unusual Experiences cluster in study II. This result is due to the population in study II and was to be expected. The

participants were all people who reported that they had experienced paranormal phenomena and that they believed in the existence of these phenomena. Therefore, one can think of *all* the clusters of this study as being high on aspects of unusual experiences.

Validation of subjective paranormal experiences

Study III made use of a newly developed digital autoganzfeld design to validate subjective paranormal experiences. This design would allow an investigation of participant variables in a group of participants where the mean chance expectation of a successful outcome had been reduced from 25% to 6.25%. However, the pre-specified hypothesis regarding the Ganzfeld result was not confirmed. The direct hit rate was close to the mean chance expectation.

The results regarding psi conduciveness might help to explain why the Ganzfeld result was only at chance level. First however, a more obvious explanation needs attention. No psi was found in study III because it is not possible to validate subjective paranormal experiences. So far, parapsychological research has not managed to show a highly replicable psi effect (Alcock, 2003). However, meta-analyses of different psi paradigms have shown significant effects (Bem & Honorton, 1994; Schmidt et al., 2004; Sherwood & Roe, 2003; Steinkamp et al., 2002; Steinkamp & Milton, 1998), indicating that it might be possible to validate subjective paranormal experiences.

There are a number of variables that are thought to be important for experimental success. Some of these, so-called psi conducive variables have been explored with different results while others have not been experimentally tested at all. The psi conducive variables tested in study III are often thought to be important for experimental success. Bem and Honorton (1994) reported that in order to maximise the effect size it is important to use dynamic targets rather than static ones. Accordingly, the present study used only dynamic targets.

There was a significant difference between hit trials and miss trials regarding the target affect for "senders". In successful Ganzfeld trials "senders" regarded the target film clips as having affected them more than was the case in non-successful Ganzfeld trials. The targets were chosen so that they would attract the attention of and affect the "sender", since this is thought to be psi conducive (Delanoy, 1988; Watt, 1988). If all "senders" had been affected by the targets, the Ganzfeld result might have been more successful. Future studies might investigate the ability of the targets to elicit emotional responses before the experimental series starts and select the most promising ones for the experiment.

The relationship between the "sender" and "receiver" might also affect the psi performance (Honorton et al., 1990). There was a significant difference between the target ratings of those Ganzfeld trials of "receivers" who brought a friend with them, compared to those provided with an appointed "sender". This might indicate why the study failed to find psi. It can be argued that if the study had only used "receivers" who had friends with them as "senders", it would have been successful.

While the effect of paranormal belief seems to be firmly established in psi research (Bem & Honorton, 1994), it might not only be the general belief in psi that is important for a study's outcome but also the "receiver's" belief that she or he will succeed in the particular trial she or he takes part in at that particular point in time. The "receivers" of successful trials indeed showed significantly higher confidence of success than the "receivers" of non-successful trials pre sending. Furthermore, "receivers" of both hit- and miss trials showed higher confidence of success before the sending period compared to after the sending period. One explanation for this is that pre sending the participants have been affected by the positive success-expectant attitude of the experimenter and appointed "sender". The "receivers" might also have some kind of idea what the images they perceive during the sending period might be like. If this idea does

not fit with how it really turned out to be, this in itself might make them less confident post sending. Some "receivers" actually said that the images they experienced during the sending period were much more unclear than expected and sometimes also unexpectedly bizarre, which might lend support to the above speculation.

Bem and Honorton (1994) also point to correlations between psi performance and characteristics of the "receivers". One important "receiver" characteristic is personal psi experiences (Bem & Honorton, 1994) and accordingly, all subjects taking part in this study reported personal psi experiences. Other "receiver" variables thought to be important are level of paranormal belief, schizotypy, and meditation habits. Neuroticism and sense of coherence were also of interest here since they are health-related.

Overall, none of the Ganzfeld outcome groups differed on any of these variables. However, one problem with the interpretation of the results was the different group sizes. The group with two correctly identified targets only consisted of three participants. Even though this group was so small, the pattern of results regarding the questionnaires is interesting, since in this group the probability for an individual to have two correctly identified targets is 6.25%, instead of the usual 25%. Thus, if there was psi in any of the participant subgroups, this group is the best candidate. The largest differences were expected to be found between the no hit and two hits groups since they are the two extremes. This was not the case here. The largest (but non-significant) differences were instead found between the one hit and the two hits groups. The two hits group had a lower level of all three factors of schizotypy and neuroticism together with a higher level of sense of coherence. These individuals also belonged to the Low Schizotypy cluster as was predicted. Moreover, none of the individuals of the two hits group reported seeking help because of their paranormal experiences whereas two individuals had done that in the one hit group. This pattern of results points towards the possibility that

earlier studies concerned with “receiver” variables might have found significant differences between a hit group and a miss group because the hit group consisted of a mixture of chance hitters and psi hitters. For example, the finding that positive symptoms of schizotypy predict psi hits (Lawrence & Woodley, 1998; Parker, 2000) might instead be interpreted as positive symptoms of schizotypy predict chance hits. The small two hits outcome group here had a lower mean on positive symptoms of schizotypy compared to the one hit outcome group but still had a higher level of paranormal beliefs and experiences.

Since the two hits outcome group was so small, and the group differences were not significant, no conclusions can be drawn. In order to investigate the possibility that people who score hits by chance contribute to significant differences found so far between hitters and missers, it is important to collect psi data in such a way that hit scoring due to chance is reduced. However, as was seen here, it might be impossible to collect enough data in one study to form a reduced chance hit group that is large enough. Therefore, researchers might need to cooperate and pool their reduced chance hitters from different studies and then compare them with other outcome groups on different variables.

All in all, these results indicate that if some people are successful in psi experiments due to "psi ability", then these people are closer to the health endpoint of the health – ill-health continuum than to the ill-health endpoint. However, due to small groups and low power, the results can at best be considered as tentative.

Conclusions

The results of this thesis show that the relationships between the subjective reports of health-related sense of coherence, neuroticism, and subjective reports

of strong paranormal beliefs and experiences are complex. It seems more likely that strong paranormal beliefs and experiences together with anhedonia or cognitive disorganisation are related to perceived ill-health rather than strong paranormal beliefs and experiences on their own. The results support the notion of healthy schizotypy and the conclusion that paranormal beliefs and experiences should be viewed as neutral regarding psychological health.

Some of the limitations in the present studies concern the use of a sample of paranormal believers and experiencers. The use of such a sample also constitute a major strength because it provided opportunities to examine other characteristics in a group reporting beliefs and experiences of paranormal phenomena. However, on the other side this selection limits the possibility to generalise the results to a broader population.

Since paranormal beliefs and experiences are common in the general population it is possible that most paranormal believers and experiencers are healthy. If so, maybe the notion of them being "not normal" will fade away. At the very least it should be clear that any branch of science that aims to understand human beings also needs to account for paranormal beliefs and experiences, independent of our own biases.

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