

Belief in the Paranormal: Measurement Development and Evaluation.

By

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Abstract

This thesis evaluated paranormal belief measurement. Particularly, it considered the weaknesses of existing published measures. An extensive literature review identified frequently used paranormal scales and common associates. Consideration of identified measures produced a comprehensive pool of items (see Dagnall et al., 2010a and 2010b). Analysis of these items assessed the factorial structure of paranormal belief. Research progressed through four discrete phases that evaluated measurement of paranormal belief. **Phase I: Exploratory factor analysis:** Respondents completed a 64-item scale. Analysis supported a conceptually coherent and internally reliable 8-factor solution (haunting/ghosts, extra-terrestrial, superstition, religious beliefs, psi [premonition/psychokinesis], extra-sensory perception, astrology, and witchcraft). **Phase II: Confirmatory factor analysis:** Tested the emergent structure (47-Items) further. Respondents completed items retained from phase I alongside additional items (indexing astrology and witchcraft) to create a 50-item scale. Following removal of items sharing excessive variance, analysis confirmed an 8-factor solution. The emergent measure demonstrated good internal reliability and validity (content and face). **Phase III:** Alongside the emergent scale, respondents completed established paranormal measures (Revised Paranormal Belief Scale and Australian Sheep-Goat Scale), a series of probabilistic reasoning tasks and a measure of proneness to reality test deficits. Results revealed the new measure was psychometrically sound, contained coherent subscales, assessed construct breadth and correlated positively with established measures. In addition, non-believers perform less well on perception of randomness reasoning tasks. Finally, belief in the paranormal correlated positively with proneness to reality testing deficits. **Phase IV:** Further examined the newly constructed measure alongside mental toughness to assess validity and reliability in a real world context. Findings were in line with previous phases, suggesting excellent levels of consistency, while correlational analysis produced ideas for additional development of paranormal items and subscales. Measurement of the current MMUpbs, psychometric performance and subscale coherence, reveal improvements for future item design.

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Keywords: paranormal belief, self-report measure, factor analysis, item functioning and real world application.

Brief Outline

Within contemporary society, belief in the paranormal is widespread and many people claim to have had paranormal experiences (Blackmore, 1997). The general aim of this thesis therefore was to explore the nature and composition of such belief in the paranormal. The majority of previous research has employed self-report measures to investigate these occurrences (beliefs and claims), and numerous scales have been established (Blackmore and Troscianko, 1985; Irwin, 1993, 2009; Thalbourne and Delin, 1993). However, these have received some conceptual and psychometric reproach. Accordingly, this thesis sought to develop a new measure of paranormal, which reconciled prominent criticisms.

Thesis Aims

Progression of this thesis comprised primary and secondary aims. The primary aim focused on development of a new measure of paranormal belief. Whilst secondary aims centred on scale evaluation, particularly consideration of the new emergent scale alongside existing measures, paranormal correlates and scales related to real world applications. The next section outlines specific primary and secondary aims.

Primary Aims of the Research

Several important studies motivated the current doctoral research: Dagnall et al. (2007); Foster, (2001); Irwin, (1985, 1993, 2004, 2013 and 2014); Kumar et al. (2001); Thalbourne, (2001) and Thalbourne and Storm, (2005). Particularly, this thesis extends the research of Dagnall et al. (2007), Dagnall et al. (2010a) and Dagnall et al. (2010b) by constructing a conceptually coherent/comprehensive measure of paranormal belief. Principally, this required refinement of factors extracted originally from the Dagnall et al. (2007) paper. This entailed enhancing validity by increasing factor extensiveness (by adding additional items), further assessing the psychometric property of subscales and examining relationships between belief clusters. The intention being, to produce a global scale, which functioned as a measure of overall paranormal belief, while individual facets act as discrete, standalone subscales (e.g., haunting, extra-terrestrials, and astrology).

Specifically, several objectives underpinned progress:

1. Review the development and history of paranormal belief measures (Introduction¹).
2. Develop a better understanding of the constituents of paranormal belief; by cataloguing and producing a compendium/battery of related measures (variables examined alongside paranormal belief) (see Appendix B. Complete literature search and Compendium of measures, pp. 363-381).
3. Identify comparable measures of paranormal belief (e.g., Revised Paranormal Belief Scale, RPBS; Australian Sheep-Goat Scale, ASGS) and examine further relationships between the new measure/subscales (phase I and II).
4. Examine the performance of the new measure (MMUpbs) in relation to anomalous measures (i.e., endorsement of conspiracies and urban legends).
5. Consider the relationship between paranormal belief (new and established scales) and subjectively reported experiences. Thus, the primary aims relate to developing and assessing scale reliability and factor structure.

Secondary Aims of the Research

Secondary aims were to assess the performance and validity of the MMUpbs by examining its relationship with the following:

6. Common correlates (schizotypy, transliminality, reality testing) (phase III).
7. Real world scales, specifically level of mental toughness (MTQ48) (phase IV). This allows consideration of the psychometric performance of the MMUpbs (validity and reliability) in a real world setting alongside a recognised measure: Mental Toughness (MTQ48: Clough et al., 2002; Crust and Clough, 2005).

¹ The information in brackets, designates the areas within the thesis which focused upon each specific aim

Chapter 1. Understanding paranormal beliefs: the main associates'

1. Introduction

1.0. Preamble

This section explores common/predominant delineations (perceptions, characterisations and conceptions) of the paranormal. Particularly, it outlines the nature, contents and scope of paranormal beliefs and experiences. The purpose of this process, from an academic and layperson's perspective, was to define what is and what is not paranormal. Hence, the current section elucidates practical and theoretical understanding of the paranormal.

1.1. What is the paranormal?

Several prominent surveys reveal that the general population extensively hold paranormal beliefs (Blackmore, 1997; Clarke, 1991; Diaz-Vilela and Alvarez-Gonzalez, 2004; Rice, 2003). Notably, Gallup polls conducted in 1991, 2001 and 2005 report high levels of paranormal belief within contemporary American society (Gallup and Newport, 1991; Moore, 2005; Newport and Strausberg, 2001). Illustratively, the Gallup survey (2005) reported that three-quarters (73%) of American people believed in at least one paranormal phenomenon (Moore, 2005). The most popular beliefs are extra-sensory perception (ESP) (41%), possession by the devil (41%) and ghosts (32%). Equivalent polls in the UK revealed similar levels of endorsement. For example, 38% of respondents believed in the existence of ghosts (MORI, 1998, 2007). Other studies report also that paranormal experiences are prevalent. Illustratively, Dagnall et al. (2016) sampled 1215 people and found that 42% reported a paranormal experience.

Whilst surveys such as these, sample a range of beliefs and experiences, the majority of reported phenomena falls within a restricted range. These include ghosts/hauntings, ESP (including telepathy, clairvoyance, precognition), life after death (including god and the devil), out of body experiences, witches, astrology, reincarnation and extra-terrestrials (ET). Consequently, these core paranormal belief/experiences reflect and reinforce typical, conventional and academic conceptualisations of the paranormal. However, they do fail to capture other important supernatural aspects, such as Psychokinesis (PK), near death experience, superstition and psychic or spiritual healing. This raises important questions about the nature and classification of the supernatural (i.e., what is, and what is not paranormal).

1.1.2. Characterisations of the paranormal

Consideration of academic literature reveals a number of characterisations (individual accounts, claims, media, culture, beliefs and common measures of paranormal belief), which reflect, inform and influence perceptions of the paranormal. These depict ubiquitous everyday views of what constitutes the paranormal vs. anomalous/unusual phenomena.

1.1.3. Individual accounts

These include anecdotal descriptive accounts (e.g., seeing unidentified flying objects (UFO), experiencing extra-sensory perception, encountering a ghost) or encounters that defy scientific explanation (Butler, 2002; Peters and Martinez, 2003; Power, 2007). Whilst interesting, these narratives by their subjective, individual (phenomenological) nature, lack objectivity and conceptual clarity (Irwin et al., 2013). Specifically, they inform understanding of personal interpretations of the paranormal, without reference to objective definitions (Power, 2007).

In this context, the paranormal is what people perceive it to be. Some individuals when confronted with unusual/anomalous situations/perceptions, chose supernatural elucidations (e.g., sudden changes in temperature, or dizziness reflect a presence) (French and Wilson, 2007), whereas others may undergo an anomalous encounter without reconstructing it in terms of the paranormal (i.e., explain the experience as coincidence, a misperception or illusion) (Irwin et al., 2013). Acknowledging this distinction, Irwin et al. (2013) developed the Survey of Anomalous Experiences (SAE). This asks respondents to decide if ‘unusual’ experiences are paranormal, or an outcome of ‘normal’ non-paranormal mechanisms (Irwin et al., 2013). Accordingly, the SAE delimits relative incidence of anomalous experiences from the inclination to attribute such experiences to paranormal processes (Lohmann, 2003). This is a useful attributional distinction to consider, when attempting to classify paranormal experiences.

1.1.4. Claims

The paranormal is also categorised in terms of notable (in some cases infamous) claims. Such contentions have often involved psychics, who declare abilities to perform implausible/fabulous feats (bending metal, moving objects with just the power of their mind, stopping clocks from working etc.). One of the most famous of these psychics is Uri Geller. Russell Targ and Harald Puthoff tested Geller extensively in the 1970’s at the Stanford

Research Institute (now SRI International). They concluded that Geller demonstrated paranormal perceptual ability in an unambiguous and conclusive manner, for instance, he was able to find hidden objects (Targ and Puthoff, 1974). However, sceptical paranormal researchers (i.e., Ray Hyman and James Randi) contested this view, asserting experiments occurred in a chaotic atmosphere. For instance, a hole in the wall of Geller's isolation room potentially enabled him to spy on the scientists during their ESP experiments (Randi, 1982). This example illustrates the inherent difficulties encountered by researchers who attempt to validate paranormal claims. Additionally, many psychics' claims have proved to be false (Randi, 1982). For instance, Randi exposed Peter Popoff (faith healer) as a fraud. Similarly, Dan Korem (journalist) exposed James Hydrick as a fake. Randi has been revealing deception, challenging paranormal and pseudoscientific claims since the 1970's. This involved designing measures that assist scientists detect/identify potential deception and fraud (i.e., eleven caveats) (Randi, 1983a, 1983b, 1983c). Concomitantly, 'Project alpha' deliberately fooled scientists in an attempt to replicate the results of psychics (Randi, 1983b, 1983c).

However, not all psychics are fraudulent. For example, the integrity of Chris Robinson (dream detective) remains unquestioned despite his inability to demonstrate his powers to the satisfaction of scientists. Robinson claims to be able to use precognition to obtain direct knowledge (or perception) of future events (e.g., bomb blasts, bank robberies). The Chris Robinson example is typical of people who profess to hold paranormal abilities. Indeed, during the course of the James Randi Educational Foundation (JREF 1964-2015) (One Million Dollar Paranormal Challenge), nobody was able to satisfy the requirements of the foundation (reproduce psychic powers under experimental conditions). Overall consideration of professed paranormal abilities reveals a relatively narrow range of supernatural powers (e.g., ability to communicate with the spirits of the dead, able to read minds, communicate telepathically, foretell the future and see distant objects/places) (Randi, 1982). Such assertions influence popular insights into what constitutes paranormal phenomena.

1.1.5. Media

The media also influences sensitivity to and attitudes towards the paranormal (Kurtz, 1985). For instance, Sparks and Miller (2001) revealed an association between television viewing habits and paranormal beliefs. Particularly, personal experience of a paranormal event

increased the likelihood of viewing paranormal-related programmes (e.g., *Most Haunted*, *Ghost Adventures*). Reciprocally, films/programmes containing uncanny/supernatural content (e.g., *The Sixth Sense*) affect audience's awareness of the paranormal (Sparks and Miller, 2001). For instance, reality-based programmes (e.g., *Most Haunted*) attempt to validate parapsychological phenomena via pseudo-scientific and spurious means (i.e., the unverifiable claims of paranormal investigators and mediums) (Haard et al., 2004). Furthermore, these programmes appear to provide a legitimate approach for studying/investigating paranormal and supernatural claims.

Indeed, many amateur research investigation groups (ARIG) (Hill, 2010) employ these methods; ARIG's are normally 'hobbyist groups' bound by their interest in paranormal/supernatural. ARIG's in turn, often provide evidence for the paranormal (e.g., hauntings, mystery animals, unidentified aerial objects) and publicise findings via media such as podcasts and the internet (Hill, 2010). This information is important because the public frequently confuse claims with genuine paranormal research (see Irwin, 2007, 2009, 2015; Rabeyron and Watt, 2009). Additionally, content determines what is strange and paranormal (Hill, 2010). Paranormal media coverage also focuses public attention and on occasion, creates sensation. A notable example being, the rotating ancient Egyptian statue that Manchester Museum officials believed was supernatural (Radford, 2013). However, the actual cause was vibrations from road traffic. Prominent stories such as this can while defining the subject matter of the paranormal trivialise the subject and skew public perception of what the paranormal is (French and Wilson, 2007).

1.1.6. Culture

Paranormal research frequently explores phenomena deemed strange or unusual. Such supernatural, mystical events have been propagated by civilization (French and Stone, 2013; Clarke 2012). Indeed, many television shows refer to strange and weird occurrences (*Fringe*, *Ghost Whisperer* and *Most Haunted* etc.), locating the paranormal genre firmly at the centre of popular culture (Hill, 2010, 2012). Generally, tales of the supernatural, occult and ghostly encounters help to shape fascination and understanding of our existence (Singer and Benassi, 1981; French and Wilson, 2007). In mainstream contexts, the assimilation of strange encounters, stories and myth serve to normalise such phenomena to the point at which they appear as playful, whimsical leisure time activities (Truzzi, 1972). Concurrently, atypical/uncanny occurrences rooted in tradition remain culturally significant (e.g., Anne

Boleyn's ghost appears regularly to be walking in and around the tower of London). Such notable specific instances can affect beliefs and inform understanding.

Presentation of historical accounts within the mass media influences paranormal depictions and accounts (Goldstein et al., 2007; Motz, 1998). Examples include, chilling tales of the haunted house, near death experience, and psychic phenomena (e.g., telekinesis/extra-sensory perception). These narratives provide archetypal examples of paranormal singularities (Henry, 2009) and identify subject matter as socially significant. Accordingly, they place paranormal within a thoughtful and important research position as a social phenomenon (Greeley, 1975; Lohmann, 2003). Hence, prevailing paranormal beliefs and traditions generate specific social and cultural influences that lead to misperception of ordinary events (Castro et al., 2014).

Additionally, discussing paranormal/supernatural topics makes the subject matter widely acceptable to certain groups and individuals within contemporary society (Castro et al., 2014; Greeley, 1975). This, in part, explains why reports of paranormal experiences are commonplace (50% of people in the UK have experienced one or more phenomena) and why many people consider them to be an 'everyday' occurrence (Castro et al., 2014). For instance, individuals seek out meaningful relationships with spirit encounters, which are then regularised within their daily lives/routines (MacKian, 2012). This may suggest that specific relationships are contained within cultural beliefs held by many individuals (Houran and Lange, 2001). Additionally, lifestyle/media consumption of paranormal subjects may directly influence individuals reporting a paranormal experience (Castro et al., 2014).

Investigation of the paranormal provides clarification of experiencers' claims, encounters and beliefs. However, standardisation of supernatural experiences is potentially problematic because critics view this approach as anti-science. This criticism originates from the fact that experiences occur outside controlled environments and are not replicable; paranormal experiences by their very nature are subjective and rely on personal testimony. Combining specific aspects or facets of the paranormal allow further taxonomy between extraordinary experiences and the anomalous (Cardeña et al., 2000; Inglis, 1986, 1987; Haraldsson, 1985). Supplementary clarification of exceptional experiences (mystical, psychic and encounter type phenomena etc.) appear located in specific cause and effect, where events or objects may appear voluntarily or involuntarily affected (White, 1990). Intrinsically, science is as yet unable to fully explain satisfactorily all such occurrences and

whilst it struggles for causation, the miraculous and unexplained still require further elucidation and classification (Vaknin, 2005).

1.1.7. Beliefs and common measures of paranormal beliefs

Experience influences and shapes belief, forming an essential part of what it means to be human (Castro et al., 2014; Schmied-Knittel and Schetsche, 2005). As such, misinterpretation, potential bias, and personal philosophies influence experience and individual belief in the paranormal. Intrinsically, varied paranormal beliefs do exist; are widely held, and generally accepted by many people in today's society (Moore, 2005). These are important to investigate because of the significance they apportion to everyday existence and psychological wellbeing. Believing in paranormal phenomena for example, ESP, PK, life after death (religiosity) may result in acknowledging the existence of the paranormal and such beliefs (Hergovich et al., 2005; Moore, 2005). This may in turn, make available to believers a justifiable foundation with which to accept the world as having greater meaning, interest, enjoyment, or simply generate an alternate worldview (Hergovich et al., 2005; Vaknin, 2005). Justification of beliefs might involve defending theories and opinions, which arise from those who are more capable of defending such beliefs (Shermer, 1989). It may also directly affect paranormal belief generation, which reaffirm belief in the existence of an afterlife (Farah, 2007).

Noticeably, a balanced approach should assist delineation of the variety of explanations and interpretations of paranormal beliefs and experiences (French and Wilson, 2007). In its current state, paranormal (supernatural, the weird and bizarre) includes familiar terms such as, extra-sensory perception/ESP, psychokinesis/PK, precognition, astrology, haunting/ghosts, life after death, extra-terrestrial (ET), witchcraft etc. Intrinsically, these terms shape how experiences express such encounters and experiences. Belief in the paranormal may mean that people believe in something that lies outside what is currently known/described by science (Thalbourne, 2001). Alternatively, it may simply be that these phenomena do in fact exist, and people believe in them for this reason. Certainly, this would change the face of science if this were true. Furthermore, in accepting certain beliefs, it suggests that believing in the paranormal/supernatural, may either result in a particular faith/trust in something that appears physical/tangible, or may simply be what somebody perceives to exist. In either case, generation of such beliefs relies on the generation and maintenance; fuelled by experience, and subsequent perceptions of seeing a ghost or

experiencing déjà vu (Irwin, 1999, 2012, 2013). Whilst there is no consensus, regarding what reasons exist for the popularity of such belief endorsement, it appears that dimensionality and correlates can help to explain these beliefs (Aarnio and Lindeman, 2005; Lindeman and Aarnio, 2006).

Irwin (1993) notes that many people believe in phenomena such as ESP and PK irrespective of whether or not psi processes actually exist. Irwin posits that beliefs are legitimate and are not dependent upon the ultimate resolution of this debate regarding the reality of the paranormal. Developing the concept of personal perception and interpretation, an interesting dichotomy appears. One whereby paranormal phenomena existing or otherwise needs further examination through psychological explanations going beyond the norm, from personal experience, to help explain unusual experiences (Bell et al., 1985; French, 2009; Irwin, 2009). Thoughts and feelings about experiences encountered might shed light on our paranormal beliefs, possible existence, while helping to make sense of the world we encounter. To that end, the following subsection will outline prevalent self-report measures that are utilised in ascertaining a level of paranormal belief.

1.1.8. Prevalent self-report measures

Much research has utilised self-report measures (questionnaires) particularly, the Australian Sheep-Goat Scale (ASGS; Thalbourne and Delin, 1993) and the Revised Paranormal Belief Scale (RPBS; Tobacyk and Milford, 1983; Tobacyk, 1988) the most widely used measures of paranormal belief (Goulding and Parker, 2001). Indeed, few studies extend research beyond these widely accepted scales. The measurement approach assumes that beliefs outside the realm of science needs to be further quantified (Haught, 2005; Thalbourne, 1995) and belief interpretation is largely a product of the instrument employed. For example, the Revised Paranormal Belief Scale (Tobacyk, 1988) derives from Broad's (1949/1978) definition of paranormality. Broad, (1949/1978) theorized that paranormal beliefs are processes, which in principle are physically impossible lying outside the realm of human capabilities, as presently conceived by conventional scientists (Thalbourne, 1982). This is the notion that causes must occur before their effects (no backward causation); that we can perceive objects and events only via our senses (perception appears unmediated by sensation); a mind cannot produce a change directly in the material world; and the brain is necessary for any mental event (no disembodied consciousness) (Irwin, 1993)

The current thesis, by adopting Irwin's (2009) delineation, extends the measurement of paranormal belief. Particularly, the construction of an expansive measurement tool is a primary objective. Similarly, further work is required to understand/explore the nature of paranormal belief and its relationship with experience. In this context, paranormal experience merely refers to an individual's attribution that an experience is paranormal; there is no assumption that a genuine paranormal event has occurred (see Rabeyron and Watt, 2010). Research denotes links between paranormal belief and paranormal experience; degree/level of paranormal belief correlates positively with subjective paranormal experience (Glicksohn, 1990).

This dissertation further explores subtle nuances and the strange occurrences inherent in one's perception and evaluation of belief in the paranormal. Belief in something tangible, understandable is perhaps where we (as humans) strive to comprehend and apportion judgement regarding real world phenomena. Intrinsically, the failure to subject individual explanations of sensory experience to critical evaluation leads to failures in explaining certain phenomena (Irwin, 2009). Given the breadth of extraordinary events classified potentially as paranormal, it is prudent to ask whether paranormal belief is a homogenous/single belief or several independent but related factors (Dagnall et al., 2012b).

In this context, a detailed history of scale development and a thorough explanation of the definitions of paranormal (see section 1.3. below) provide support for the current research. Indeed, detailed explanations, and specific facets of paranormal belief development (e.g., ESP, PK, things pertaining to ghosts/apparitions, ET and UFO) will also lend support to current research. Pertinently, paranormal categories suggest that numerous descriptions/definitions pertaining to the paranormal, which are in turn, explored by self-report measures currently used to explore paranormal beliefs (see Table 1 below).

Table 1. Paranormal classification: Descriptions that influence perception and belief

Category	Description
Anomalous	Defined as the study of extraordinary phenomena of behaviour and experience, including (but not restricted to) those which are often labeled "paranormal". In essence, certain events and experiences which may appear to involve paranormal phenomena can in fact be fully explained in non-paranormal, usually psychological, terms (French and Stone, 2013).
Parapsychological	Study of mental phenomena that are excluded from or inexplicable by orthodox scientific psychology (such as hypnosis, telepathy, etc.) (Irwin, 2009).
Pseudo-science	A theory, methodology, or practice that is considered to be without scientific foundation. It can resemble ideology/religion whilst seen as protoscience or as an emerging science (Bunge, 1984).
Belief in science	Science is a reliable source of knowledge about the world; only some perceive science as a superior, even exclusive, guide to reality, and as possessing a unique and central value. We refer to such attitudes as belief in science (Haught, 2005; Sorell, 1991; Farias et al., 2013).
Supernaturalism	A belief in an otherworldly realm or reality that, in one way or another, is commonly associated with all forms of religion. Supernaturalism depicts conscious will or volition as the ultimate cause of phenomena (Lohmann, 2003).
New age philosophies	Encompasses a diffuse set of groups variously in pursuit of human transcendence and are loosely described as eclectically 'holistic' (Houtman and Mascini, 2002).
Mysticism	Mysticism is popularly known as becoming one with God or the Absolute, but may refer to any kind of ecstasy or altered state of consciousness which is given a religious or spiritual meaning. Beyond the basic goal of immediate experience and knowledge of the Divine Being (Coulson, 1995).
Spirituality	Searching for meaning in life: Spiritualism is a religion that embodies the main ideas of all religions, that there is a life after death, immortality and the existence of a God. Dimensions of spirituality include: interpreting life's happenings, accepting the past, appreciating the present, and looking hopefully to the future. (Haug, 1998).
Religiosity	Religiousness/religiosity are used interchangeably but often defined as an individual's conviction, devotion, and veneration towards a divinity (Gallagher and Tierney, 2013).

These are key concepts that influence understanding and shape/demarcate the definitions of paranormality whilst developing myriad explanations. These often contain reference to, or allude to, definitions of paranormal phenomena.

1.2. Paranormal belief - definitions

It is clear that belief in the paranormal embraces myriad unusual experiences perceived as mystical, extraordinary, and or supernatural (White, 1990; Cardeña et al., 2000). However, this is reliant on cognitive processing, thinking style, or beliefs regarding the existence of

both paranormal and supernatural phenomena (Irwin, 1993). Definitions have proposed that paranormal is something that current scientific thinking cannot fully explain (Thalbourne, 1983) and refer theoretically to a number of processes/capabilities considered “physically impossible” (Thalbourne, 1982). In its broadest sense, paranormal may include; the supernatural, religiosity, superstition, demonology, the occult, life after death, reincarnation, haunted houses, ESP, angels, elves, magical powers, premonition and being able to move things with the power of the mind (PK). Indeed, belief in the “paranormal” refers to belief in one or more extraordinary phenomena that defy explanation according to current scientific understanding of natural law (Sparks and Miller, 2001). As such, aspects of the paranormal may also include those experiences perceived as unexplained, strange, mysterious, ghostly, and macabre. In addition, those experiences deemed less positive or unsettling may suggest occurrences that lie outside our control; an experient can perceive these to be more paranormal (Roe and Bell, 2016). Perception of these experiences are framed within the unexplained or supernatural (Lohmann, 2003), and appear positive in nature, even when strange happenings are connected with those forces outside the laws of physics, and beyond nature (Thalbourne, 1982, 1983).

The current thesis adopted a definition of paranormal consistent with that proposed by Irwin, (2004, 2009). It also embraced Broad’s definition aligning this with Irwin “a proposition that has not been empirically attested to the satisfaction of the scientific establishment but is generated within the non-scientific community and extensively endorsed by people, who might normally be expected by their society to be capable of rational thought and reality testing” (Irwin, 2009, p.16-17). It is important generally to note that there is no universally agreed view of paranormal phenomena. This influences the way in which different researchers approach the subject area. Particularly, parapsychologists investigate paranormal and psychic phenomena in order to establish whether it exists. Contrastingly, anomalistic psychology attempts to explain paranormal phenomena via mundane psychological explanations (Bell et al., 1985; French, 2009; Irwin, 2009).

The term ‘paranormal’ generates countless explanations/definitions, describing paranormal phenomenon that if trustworthy/reliable, would violate the basic principles of science (Broad, 1949; Tobacyk, 1995). A definition criticised by Lawrence (1995a). Alternatively, a more modern view, is of paranormal cognition; the acquisition of information about an external event, object, or influence (mental or physical; past, present, or future) (Tobacyk, 1995). Traditional definitions may account for ‘paranormal’ phenomena

via ESP and PK items (French, 1992), whereby cognition is perceived through known sensory channels' (French, 1992). These definitions are excellent for framing the subject, and not only assist in belief understanding but also help provide a good grounding to assess belief formation.

Lawrence (1995) however, recommends a more vigorous proposal for the definition of paranormality, suggesting that hypothesised principles are physically impossible, and lie outside the scope modern science (Irwin, 1993). Whilst debate continues regarding the existence of specific psi processes, many people do believe in such phenomena for example, ESP and PK (Irwin, 1993). Signifying that it is the belief in something (existing or otherwise), that needs further elucidation. Goode, (2000) extends an alternative estimation, where 'paranormalism' is belief in any power (or force) in which the vast majority of scientists argue contravenes basic science. Those who appear to accept paranormal explanations as more valid, possibly accept paranormal explanations without critically evaluating the experience (Goode, 2000) or reality testing (Irwin, 2004). The information-processing style of believers predisposes them to generate conclusions based on limited information, where failure to assess/hypothesise critically, leading to further belief in paranormal explanations (Zusne and Jones, 1982). Certainly, specific definitions assist in outlining principles of paranormal belief and belief measurement.

Undoubtedly, while belief can be divided between single/individual facets (e.g., ESP within the ASGS measure: Thalbourne, 1995a; Thalbourne and Haraldsson, 1980) and the more polygonal (multifaceted) measurement tools for example, PBS or RPBS (Tobacyk and Milford, 1983; Tobacyk, 1988) have allowed for empirically based investigations to further expand foundations of belief in the paranormal (Irwin, 1992, 1993). They have endorsed additional assessment while improving understanding of the construction of paranormal beliefs. Additionally, multifaceted scales do add to the individual nature of the singular sheep-goat scales (ASGS), where elements such as witchcraft, psi, precognition, and spiritualism are included alongside existing ESP/clairvoyance items (Thalbourne, 1983). Adjustments/additions to measures have developed more multidimensional scales, but are not without problems (Thalbourne et al., 1994; Thalbourne, 2001).

One such problem is the potential for researchers to form implicit beliefs, where scales measuring the same aspects of belief in the paranormal (e.g., superstitious belief and spiritualism). This suggests that paranormality is unidimensional (Irwin, 1993; Tobacyk, 1991), when clearly both constructs are different and demonstrate differences in believers. In

addition, level of belief in specific phenomena may differ when respondents provide alternate responses. Gray (1990a) observed differences between estimates of belief from respondents who ticked off a simple response (lower) than those who provided a level for each phenomenon in turn (higher). Furthermore, aspects of answer design may also affect level of endorsement; for example, Gray (1990a, 1990b) noted that adding or omitting a 'don't know' or 'uncertain' response appeared to affect level of belief, resulting in belief inflation (Irwin, 1993). Further evaluation of the structure of measurement tools/items, factor design, dimensionality and general make up of paranormal belief is required. Subsequently, there have been several alternative measures of paranormal belief developed. These measures include the Paranormal Short Inventory (PSI) (Randall, 1997), and the Anomalous Experiences Inventory (AEI) (Kumar et al., 1994). Both measure anomalous/paranormal experiences and beliefs, employ narrow definitions of paranormality and are accepted research tools.

In the context of this thesis, the RPBS represents a good starting point to investigate paranormal beliefs facets and specific beliefs. Whilst comparisons and differences exist between how scales/surveys fully assess belief in the paranormal, it appears that the interpretation of findings from the more narrow range of constructs (ASGS) compared with multidimensional (RPBS) has still to be resolved. The RPBS incorporates a wide-range of belief components and yet more expansive may not necessarily be best in all situations. The advantage of the RPBS over the ASGS is that it incorporates a comprehensive range of components (traditional religious belief, psi, witchcraft, superstition, spiritualism, extraordinary life forms, and precognition), while the ASGS measures only core aspects of belief in the paranormal. The ASGS explores a more condensed range of factors (ESP, PK, and life after death). The strength of the RPBS, and its extensiveness, has also attracted criticism (i.e., inclusion of religious items and those measuring extraordinary life forms) (Dagnall et al., 2007). Additionally, frequent investigation of paranormal belief has employed self-report measures (see Blackmore and Troscianko, 1985; Thalbourne and Delin, 1993), whilst, Lawrence, (1995b) has frequently questioned the validity and content offered by such measures. Subsequently, paranormal belief finds itself juxtaposed between two well-established areas: psychology and the system of investigation: anomalous vs. parapsychology.

1.2.1. Summary

Drawing on the work of Christopher French, (see French and Stone, 2013) an important distinction of classifying phenomena as paranormal is whether specific explanations occurs using conventional, psychological/scientific wisdom. A phenomenon ceases to be paranormal if explained by current scientific wisdom (French and Stone, 2013). With reference to the present section, regardless of validity, paranormal claims influence perception of what is and what is not supernaturally possible. Claiming to bend spoons, read minds or make accurate prediction/prophecies of course, may constitute paranormal (Irwin, 2004). They are certainly consistent with the core tenets of what establishes belief in, and classification of the paranormal. However, claiming to exhibit mental, spiritual and rational abilities make such believers feel specially empowered with fantasies of unlimited power and success (Tobacyk and Mitchell, 1987). However, those who are willing to believe in paranormal phenomena may be open to hyperbole, misinterpretation and deception. Typical researchers do remain highly unconvinced by the claims supporting paranormal phenomena (e.g., Shermer, 2007; Wolpert, 2006). Certainly, measuring such effects is problematic, as science has explained countless unknown phenomena (e.g., out of body experience or demonic possession) which could be due to epileptic attack disorder. Consequently, replacement of the paranormal and the supernatural has been qualified within the more normal and the natural (French and Wilson, 2007; Shermer, 2016).

Notwithstanding, additional research is required to assess the dimensionality of paranormal beliefs. Supplementary aspects of how we define paranormal within the non-scientific community may reveal interesting alternatives, necessitating further consideration of what ‘belief in the paranormal’ represents (Wolpert, 2006). Consequently, the following subsections of this thesis will outline important theoretical features regarding belief formation and maintenance. These include belief systems and associates, magical ideation/delusion, cognitive correlates (reasoning), transliminality, schizotypy and conspiracy. Certainly, such mechanisms require consideration, because anomalous constructs (e.g., schizotypy, transliminality, conspiracy, and scepticism/disbelief) appear to influence belief formation, (Goulding, 2005; Hall and Habbits, 1996; Shermer, 2003).

1.3. Beliefs and associates

According to Guidano and Liotti, (1983) belief systems are dynamic and fluid, simply adjusting to a feedback gleaned from a person’s experience. It does appear that such belief

systems are at a high cognitive level, and may simply be by products of belief in the supernatural or paranormal. Whilst changeable and modifiable, they are symptomatic of an individual's attempt at making sense of his/her experiences (Mahoney, 1991) while increasing perceived control (Tobacyk et al., 1988). Belief as an assumed truth, or the point at which we believe something is true, which in turn may stimulate a false response. It can be argued that having belief in something may make us act or react to a stimulus or situation; correctly or incorrectly; positively or negatively; appropriately or inappropriately (Mahoney, 1991). While perceiving such facets may allow for misinterpretation and errors of judgement to occur (Summers, 1998).

Experiences and cultural influences shape our worldview, and the values we hold determine beliefs (Mahoney, 1991). A lack of satisfactory empirical information can lead us to make decisions without critically assessing reality (Drinkwater et al., 2012; Irwin, 2004). Thus, without sufficient consideration of information, misperception could lead to conclusions potentially lacking clarity. This could also affect judgment and subsequent level of trust/belief in the information/evidence brought to us from the media. As such, information reported may assist in shaping belief, reinforcing either distrust or trust about certain material presented (Goldstein et al., 2007; Vankin and Whalen, 1997). Specifically, how the media report an event has implications for those who believe the information presented, and source of that report. For example, the tragic assassination of John Fitzgerald Kennedy (22nd November 1963) was reported immediately by newspapers, radio and television. The official twenty-six volumes of the Warren Commission, which took nine months to compile, concluded that Lee Harvey Oswald had acted alone. However, this has proved to be a controversial report, because the majority of American citizens believe that the Warren Commission failed to investigate satisfactorily the possibility of conspiracy (Marrs, 1989, 2013).

Conspiracies extend several alternative theories (9/11 was an inside job, Marilyn Munroe was murdered, the assassination of JFK was a government led conspiracy to remove JFK from office and subsequently frame Oswald for the murder etc.) suggesting that reality may lie within a conspiracy (Marrs, 1989)². Rhetoric or misinformation however can mask the accuracy of an event while sufficient propaganda can orchestrate sophisticated cover up, one that shapes popular belief. Belief generation through manipulation of

² (author of 'Crossfire: The Plot that Killed Kennedy' Revised Edition, 22nd October 2013)

information/material can afford changes in the maintenance of beliefs, producing a need for closure from questions/answers offered. That is not to say certain events are untrue, merely that we are reliant upon critical appraisal and rational thinking to arrive at a version of the truth (Menninger, 1992; Vankin, and Whalen, 1997). Perhaps there is a tendency for percipients to form a 'subjective validation' of two unrelated events, perceived as related because of belief expectancy, or hypothesis demands in that they make meaningful relationships occur (Marks, 2011). Moreover, there may be a motivated need for certainty where humans strive heuristically to make decisions (McKay et al., 2006). They may jump to conclusions or discover more definitive and suitable answers (Colbert and Peters, 2002). Consequently, our guiding principles help afford meaningful direction, meaning in life whilst filtered through our insight and sensitivity to the world around us (Rao et al., 2009). Alternatively, beliefs may simply embody internal representations of the world (Colbert and Peters, 2002; Rao et al., 2009). Consequently, 'man may be what he believes' (Rao et al., 2009). Thus, analytical thinking, critical reasoning and intellectual processing certainly appear important in establishing and subsequently altering, existing beliefs (Aarnio and Lindeman, 2005). Belief modification may simply be from neuronal/chemical exchanges permitting emotional development or behaviour change to occur (Rao et al., 2009; Tarlaci and Pregnoloato, 2016; Wig et al., 2008).

1.3.1. Belief systems

According to Krippner (1989), in order to make sense of our world we employ a belief system (Krippner, 1989). This may involve believing in positive outcomes, for example visiting a doctor who advises us to take medication regularly to improve health. In this context, guidance itself can facilitate positive outcome in the same way as placebo. However, seeking the assistance of, physicians, psychotherapists, can propagate a "need to believe" leading to improved health and affect recovery. Problems arise once a belief has formed, while predisposed to accepting a belief system, making a commitment that belief exists despite arguments and evidence to the contrary (Blackmore, 1988; Loewenthal, 1986; Williams et al., 2012).

Accepting a belief while encountering healers, spirit guides and mediums may install certain beliefs and belief systems. This mechanism may allow individuals to define or reaffirm a sense of reality. Problems arise when there are two opposing suggestions/beliefs in direct opposition (Irwin, 2004, 2009). Reduction occurs if one is accepted and the other

rejected (Erikson, 1962). Irwin (2004, 2009) suggests that further problems may produce conformity, more extremists and lead to brain washing (Loewenthal, 1986). This might also suggest that the more exotic beliefs or having a stronger inclination towards fantasy might help explain the increased levels of suggestion, belief in the paranormal and UFO type beliefs (Spanos et al., 1993).

1.3.2. Magical thinking/ideation

Magical thinking has a part to play in the formation of belief in the paranormal and may explain some of the justifications and elucidation of such beliefs (Williams et al., 2012). In this context, magical thinking defined as the way of explaining any behavioural or experiential phenomena that lies outside the laws of science, and or where one's thoughts, words or actions can achieve specific effects not governed by the laws of transmission of energy or information (Zusne and Jones, 1989). Eckblad and Chapman's (1983) Magical Ideation (MI) Scale was the first scale to investigate the relationship between paranormal belief and magical ideation. This measure evaluated paranormal phenomena and level of schizotypy, while assessing subjective elements of magical ideation i.e., 'belief in causation that by conventional standards is invalid' (Eckblad and Chapman, 1983, p. 215; Zusne, 1985; Zusne and Jones, 1982, 1989).

Randall and Desrosiers (1980) suggest that magical ideation (or magical thinking) possess elements of uncertainty, dogmatism, locus of control and sensation seeking. This in itself may affect personality traits (Tobacyk and Milford, 1983), altering actions and decisions based on superstition and chance (Jahoda, 1968; Vyse, 1997; Robins et al., 2007). In this context, magical ideation attributes appear to affect directly percipients ability to reason. They may be suppressed or considered more religious or philosophical in nature (Bell et al., 2007). For instance, 'theosophy' (a religious and philosophical belief appear responsible for human existence, seen in part as created by the divine; see Zusne and Jones, 1989). Thus, specific sensory perception and logical inference appear guided by culture, defining magical ideation (Zusne, 1985).

It appears that in trying to solve one problem another is fashioned. Thus, a state of flux remains between subjective vs. objective continuums where understanding is fashioned from alternate perspectives: the world-view and one's own view (Zusne and Jones, 1989). This may help us explain the need for further understanding of the variety of attitudes and beliefs realized in the world we live in today (Zusne, 1985). Furthermore, having the will to

"believe" may influence a desire to act, or passion and preference to choose to believe, and as such, other aspects such as intelligence might shed further light on which beliefs lay claim to our action (James, 1956).

1.3.3. Intelligence and paranormal belief

Another facet of belief that needs mentioning is the relationship that exists between intelligence (IQ) and belief in the paranormal. Previous studies (Emme, 1940; Zapf, 1945; Killen et al., 1974) found belief in the paranormal to correlate negatively with IQ levels whilst another found that there was a positive correlation between global belief and level of IQ (Jones et al., 1977). This needs further investigation whilst further research offers an alternative to the cognitive deficits hypothesis proffered (Irwin, 1993). Furthermore, this raises the dispute concerning critical assessment and the relationship with paranormal belief.

Studies by Alcock and Otis (1980) observed poorer critical thinking ability in psi believers when compared to sceptics (Gray and Mill, 1990). Unlike Tobacyk and Milford (1983) who found a lack of critical thinking, ability is not symptomatic of all dimensions and aspects of paranormal belief. Alternatively, Roe (1995) has criticised these studies on methodological grounds, while Irwin (1993) suggests greater care is required when assessing intelligence and cognitive deficits of paranormal believers. It appears that intelligence and reasoning skill has not generated indisputable support for insufficiency, whilst raising doubts about the validity of the cognitive deficits hypothesis (Irwin, 1993). In this context, Irwin (1993) produces a clear outline to appraising research literature concerned with belief formation. Specifically, he outlines two important cognitive factors: reasoning and I.Q that help to shed some light on the difference between believers and non-believers. Several notable papers demonstrate their importance; for example, Killen et al. (1974) confirmed that paranormal belief correlates negatively with IQ, while Jones et al. (1977) established that a more positive correlation exists between global paranormal belief and intelligence.

In this context, both intelligence and personal beliefs about the world appear influenced by validity judgements and there may be a causal relationship between poor decision-making and specific deficits (Bechara et al., 2000; Damasio et al., 1996; Goel and Dolan, 2003a, 2003b). This may lead to problems in judgment and possible reasoning deficits. It seems that emotion and cognition both contribute to making sense of experiences and as such, the nature of this relationship and the developmental changes over time may affect decisions about the real world (Denham, 1998; Saarni, 1999). Whilst emotional

processes and reasoning (cognition) are both deemed information processing, its differences between motivation (emotion) and knowledge (cognition) that contrasts (Izard, 1994). It appears that personal emotional processes can and do influence specific reasoning skills, specifically, where cognitive processes are directed by the alert activation of our emotions (Oatley and Jenkins, 1996) as well as goal selection throughout stressful/challenging circumstances (Lemerise and Arsenio, 2000).

This is an under researched and a problematic area of paranormal comparison. Additional exploration of possible connections between level of intelligence and paranormal belief is required. Considering claims made by a percipient regarding a paranormal event, which may seem implausible and impossible in the context of current science but do constitute one's weird belief vs. another's normal theory (Shermer, 2003). This leads Shermer to ask why people believe in the weird and wonderful, where he postulates that it is that they are deceived or merely deceive themselves (Shermer, 2002a; Irwin, 2004). In this context, paranormal/supernatural experiences may support belief and may converge in a mutually supportive network (Shermer, 2009). However, the precise nature of intelligence requires further assessment in relation to paranormal belief endorsement. It appears that intelligence may influence our ability to hold certain beliefs whilst dismissing alternatives. It might even influence the tendency for experiencers to find meaningful patterns within important and inconsequential experiences (patternicity), especially where multi-layered theories and hypotheses incorporate both logical, illogical, rational and irrational beliefs (Shermer, 2003, 2011).

Additionally, Shermer, (2011) is more sceptical about intelligence and level of belief. Several aspects might explain the inherent objective of a sceptic to demonstrate that there is a potential deficiency seen in intelligence, personality, education, and social standing with regard to a paranormal believer (Irwin, 1993). This may demonstrate motivation of some sceptics' to collect empirical literature of a more negative composite. As such, intelligence forms one part of belief formation and maintenance, which suggests other potential associates responsible for belief enhancement (Shermer, 2003). Fundamentally, Shermer argues for architecture for our belief systems. After forming our beliefs, we defend, justify, and rationalize. This process serves to nurture, reinforce, reform, and extinguish beliefs (Shermer, 2011). However, Irwin (2009) airs on the side of caution deeming that further extensive research is required to establish the appropriateness of such dual processes: cognitive deficit hypothesis and level of intelligence. Therefore, intelligence and paranormal

beliefs requires further elucidation, to explore further potential influence over belief generation and maintenance to its applicability to explain such beliefs (Tambini et al., 2010).

1.3.4. Cognitive correlates and belief

The ability to solve problems, evaluate situations and consider rationally our experience plays an important role in the configuration of both paranormal/normal beliefs. Essentials of such cogent arguments, intellectual reasoning, and rational explanations need further explanation within a paranormal context (Shermer, 2011).

Whilst paranormal beliefs are thought to be widespread amongst Western society (Rice, 2003), differences are also observed amongst level of education and specific thinking styles (Aarnio and Lindman, 2005). Aarnio and Lindman (2005) propose that contradictory evidence suggests that there is no clear consensus as to type of believers, their thinking styles and level of paranormal belief (See Jahoda, 1968; Salter and Routledge, 1971). In this context, intuitive thinking rather than critical thinking plays more of a part in forming belief about the paranormal. It appears that the formation of such beliefs follows on from the more personal/experiential type experience, and therefore these events can become defensible and conjectured by the percipient, which suggests that a positive correlation may exist between intuitive thinking and experiential experience (Epstein et al., 1996; Pacini and Epstein, 1999b). Additionally, education acts upon this multifaceted mechanism suggesting that a link may exist between poor critical thinking/judgments, levels of education and belief in the paranormal (Aarnio and Lindman, 2005; Musch and Ehrenberg, 2002).

This autonomous subsystem (thought to be a set of sub-systems of universal cognition that all animals possess) including both innate modules as well as domain-specific knowledge acquired by a domain-general learning mechanism (Evans, 2003). In other words, there are two different modes of processing: system 1 involving: unconscious, rapid, automatic, and high capacity and system 2 that involves conscious, slow, and deliberative cognition (Kahneman and Frederick, 2002; Stanovich, 1999). This is a dual process, which includes automatic and controlled cognition especially where “automated” aspects have influenced the development of dual-process accounts of social cognition (Chaiken and Trope, 1999). A growing body of research suggests that dual processing or abstract reasoning and hypothetical thinking (constrained by cognitive capacity) may correlate with measures of general intelligence (Evans, 2003; Evans et al., 1983). Some of this research has focused on a ‘belief-bias’ effect (Evans et al., 1983) where a conflict occurs between

respondent responses (from those derived from prior belief about the truth of conclusions) and one's ability to reason (Evans, 2003).

Contrastingly, Greenwald and Sakamura (1967) outlined a selective learning mechanism which may help to explain the conflict between believers in the paranormal and non-believers. The hypothesis (or selective learning process) extends the relevance of information (i.e., information agrees with a person's own prior beliefs) where individuals maintain their beliefs even when presented with disconfirming evidence (Greenwald and Sakamura, 1967). Assessing the effect a selective learning hypothesis has on those who believe in the paranormal is the best way to understand the correlation that exists between reasoning and paranormal belief (Jones and Russell, 1980). Jones and Russell (1980) conducted several studies that investigated selective learning in conjunction with belief in the paranormal. These studies involved exploring the asymmetry that exists between believers vs. non-believers. Study one involved forty-five respondents, grouped as either believers or sceptics following median split on a paranormal belief scale (Jones et al., 1977). They found that disbelievers made fewer errors when contradicting their own beliefs than believers did, and they found that believers demonstrated selective attention regarding ESP belief. Wierzbicki, (1985) further examined the errors and selective learning process in a study of 64 men and women (30 men and 34 women). They asked participants to complete a 12 item, reasoning task and a 25 item paranormal belief scale (PBS). Findings suggest that believers in the paranormal made more errors in the reasoning tasks than the sceptics. In addition, there was a significant correlation between number of errors made and belief in the paranormal, thus concurring with Jones et al. (1977).

Previous studies have found that a relationship exists between global paranormal belief and errors in syllogistic reasoning for instance, belief in the paranormal among college students moderately correlated with reasoning ability, when the reasoning problems contained paranormal content (Wierzbicki, 1985).

1.3.5. Reasoning and problem solving

Reasoning involves dealing with many uncertain and certain events (Tversky and Kahneman, 1974, 1983). In this context, cognitive processes define higher order function such as decision-making, thinking, social estimation (Evans, 2011). Subdividing the process of thinking and reasoning into clusters of processing involves consciousness, evolution, functional characteristics and individual differences, and specific attributes. These allow

comparison of implicit vs. explicit, automatic vs. controlled, associative vs. rule based, universal vs. heritable facets (Kahneman and Frederick, 2002; Stanovich, 1999). In its simplest sense, it is how we are able to assess intuitive inferences and probabilistic judgements regarding rules of logistics, probability and statistics (Tversky and Kahneman, 1983; Kahneman and Tversky, 2000).

Reasoning specifically can be a form of non-monotonic reasoning (NMR) where conclusions are drawn from a general set of rules containing exceptions (e.g., “all birds fly” except the ostrich, emu or the ‘Maltese’ falcon), or from a set of facts representing accessible information (Benferhat et al., 2000; Matura and Varela, 1987). It appears however, that there are many theories of paranormal belief which favour the more mundane and conventional explanations, specifically selective bias; misperception of chance and misinterpretation (Houran and Lange, 1996; Lange and Houran, 1998). Other reasoning studies suggest a more negative correlation exists between one’s ability to perform a critical evaluation task and the level of belief in the paranormal (Alcock, 1981; Otis and Alcock, 1982). Otis and Alcock, (1982) compared disbelievers and believers and established that believers are often poorer when performing critical thinking tasks. Clarifying reasoning and paranormal belief correlates requires care because problems may exist with experimenter bias and environmental controls (Irwin, 2009).

Dagnall et al. (2007) found that a general weakness associated with probabilistic reasoning and perception of randomness (misrepresentation of chance), best predicted belief in the paranormal. Generally, this suggests that flaws in probability judgements and heuristics may explain paranormal beliefs (Blackmore and Troscianko, 1985; Diaconis and Mosteller, 1989; Musch and Ehrenberg, 2002). Particularly individuals lacking an appreciation of randomness (Blagrove et al., 2006) are more likely to attribute meaning (causation) to everyday random occurrences (Brugger et al., 1990; Chambers, 2005).

1.3.6. Delusional ideation and paranormal belief

Previous research suggests that delusional thoughts and beliefs are present within the normal population (Eaton et al., 1991; Johns and van Os, 2001; Jones and Fernyhough, 2007). In order to measure delusional beliefs, Peters et al. (1999b) developed the Peters Delusions Inventory (PDI). The PDI originally comprised 40-items, shortened to 21 (PDI-21: Peters et al., 1999b; Peters et al., 2004). The PDI-21 can also measure the distress, preoccupation and conviction associated with delusional beliefs (Jones and Fernyhough, 2007). The scale

(designed to sample a wide range of delusions) contains items measuring paranoia (suspiciousness, persecution and paranoid ideation), grandeur, depersonalisation and reference and religiosity (Jones and Fernyhough, 2007; Peters et al., 2004). The unidimensional nature of the measure was demonstrated using confirmatory factor analysis (Peters et al., 2004) and confirmed by subsequent research (Jones and Fernyhough, 2007).

Gianotti et al. (2001) believe that paranormal ideation is located on a continuum between a creative and a delusional elaboration of spontaneous associations. Pertinently, Lawrence and Peters (2004) found that individuals with strong belief (vs. weaker beliefs) in the paranormal displayed higher delusional ideation. In addition, paranormal beliefs share similarities with delusional beliefs (Kwapil et al., 1999). Indeed, the diagnostic DSM-IV criterion acknowledges that unusual perceptual experiences, ideational disorder, odd thinking are defining characteristics of schizotypal personality disorder (American Psychiatric Association, 1994).

1.3.7. Transliminality and paranormal belief

Paranormal beliefs, mystical experiences and magical thinking are associated also with transliminality (Thalbourne et al., 1997; Crawley et al., 2002). Transliminality is a perceptual-personality construct defined as, hypersensitivity to psychological material (Thalbourne and Maltby, 2008). Specifically, Transliminality refers to the tendency for psychological material to cross thresholds into or out of consciousness (Thalbourne et al., 2005; Houran and Thalbourne, 2003; Thalbourne, 1999). In this context, boundary thinness or synaesthesia (neurological phenomenon) allows for stimulation of either sensory or cognitive pathways producing involuntary or automatic responses where one is constantly aware of both thoughts and feelings (Hartmann et al., 2001).

Whilst a unitary construct transliminality, possesses seven underlying psychological variables: mystical experience, magical ideation, fantasy proneness absorption, manic experience, dream interpretation, and hyperesthesia (Thalbourne et al., 1997; Thalbourne et al., 2003). It is believed that paranormal belief/experience is a core constituent of transliminality (Thalbourne and Houran, 2000) supporting the notion of strong positive correlations between transliminality and paranormal belief and paranormal experience (Thalbourne and Houran, 2000). Transliminality correlates highly with temporal lobe lability (Thalbourne et al., 2003). This is important because previous work reports an association between temporal lobe lability, mystical experiences, paranormal beliefs and psychic

experiences (Persinger and Makarec, 1987, 1993; Persinger and Valliant, 1985). Furthermore, reports of fluctuating magnetic fields across the temporal lobes of participants have also induced paranormal experiences (Persinger, 1995; Wig et al., 2008).

Pertinently, features such as tendency to form conclusions from limited/restricted information, failure to assess critically hypotheses are associated with delusional thinking and are likely to foster development of and adherence to unconventional beliefs (e.g., belief in conspiracy theories). This particular processing style inclines individuals towards less scientific, unsubstantiated notions. Indeed, several studies have found that reality-testing deficits link directly to a belief in the paranormal (Irwin, 2004, 2009).

Irwin defines reality testing as a failure to test critically the logical plausibility of beliefs (Irwin, 2003a, 2004). Langdon and Coltheart (2000) explicated this in terms an individual's failure to explain sufficient sensory information, suggesting more of a delusional and pathological set of beliefs. In this context, an increased awareness and veracity of self-generated (causal attributions) once critically assessed produces more non-pathological beliefs (Drinkwater et al., 2012). Irwin explains that this approach produces an overreliance on more of an intuitive experiential processing³ of paranormal experiences leading to a reduction in analytical rational processing (Irwin, 2009). Testing of self-generated interpretation of experiences lacks rigor, resulting in paranormal type beliefs and those of a more anomalous nature (Irwin, 2009; 2003a; 2004).

A potential limitation might be a lack of motivation to think more deeply about an experience/event/topic producing an overdeveloped experiential processing in a mechanical manner (Epstein et al., 1996; Pacini and Epstein, 1999b). Such subjective elucidations are likely to accelerate the generation of paranormal explanations, reinforcing pre-existing beliefs. Further subsequent subjective evidence to scrutiny propagates personal belief hypotheses maintaining and generating less robust self-generated explanations of the world (Irwin, 2004, 2009). The point here is not that certain individuals make reasoning errors, but rather intuitive-experiential processing is likely to be the preferred information processing style for devout believers (Goel and Dolan, 2003a). In this context, paranormal beliefs are

³ According to Denes-Raj and Epstein, (1994) people process information in one of two ways: 1) a rational system: analytical, deliberative, propositional, and 2) an experiential system: extensional, automatic, intuitive, narrative, and natural. Dual process theories, such as cognitive experiential self-theory (CEST) apply these systems to thinking style. The systems work in unison; emotional involvement determines level of influence and the nature of the situation (Epstein et al., 1992).

regularly associated with a tendency to favour the intuitive experiential style explaining difficulties perceived on some reasoning tasks (Lindeman, 1998).

Moreover, previous work notes believers in the paranormal are more susceptible to cognitive and perceptual biases (French and Wilson, 2006). Such biases may inhibit performance on certain reasoning tasks and could play an important role in the development and maintenance of belief in the paranormal (French, 1992). Of relevance to this report, is the observation that poor comprehension of probability (Musch and Ehrenberg, 2002; Stuart-Hamilton et al., 2006), particularly misrepresentation of chance events (i.e., coincidence; misperception of randomness) (Bressan, 2002), has been found to be higher in believers than non-believers (Dagnall et al., 2007). Thus, percipients of paranormal events may incorrectly attribute chance happenings to paranormal causes (Blackmore and Troscianko, 1985). Other unrelated problem-solving tasks (e.g., base rate estimation) do not consistently appear to be subject to such bias. These findings suggest that belief in the paranormal may arise from specific reasoning deficits related to misrepresentation of chance rather than general cognitive ability.

1.3.8. Schizotypy and belief in the paranormal

In the context of the current research, schizotypal personality disorder correlates with cognitive perceptual distortions, including odd beliefs or magical thinking (Chequers et al., 1997; Goulding and Parker, 2001). Theorists define Magical thinking as the belief in forms of causation, by which conventional standards are considered, invalid (Eckblad and Chapman, 1983). This may explain why studies have robustly reported a positive correlation between schizotypy and paranormal belief (Genovese, 2005; Goulding, 2004, 2005; Wolfradt, et al., 1999). Indeed, an association exists between schizotypy and general measures of the paranormal and unusual beliefs, for example, thought broadcast or reading people's minds (Chequers et al., 1997). The multidimensional nature of schizotypy highlights the varied relationship with paranormal belief dimensions (Mason, Claridge and Williams, 1997). Clear delineations/differentiations appear to exist between paranormal belief and the facets of schizotypy (Irwin, 2009). Results require careful consideration because the correlation between schizotypal personality and paranormal beliefs is medium (Dagnall et al., 2016).

Schizotypy on the other hand, describes a continuum of personality characteristics; an experience related to psychosis, in particular, schizophrenia a multifactorial psychological

construct (Thalbourne, 1994; Goulding, 2004). Claridge, (1997) and McCreery and Claridge, (2002) define schizotypy in terms of three distinct models that outline a personality dimension (Eysenck, 1967; Robins et al., 2007), a psychosis continuum (where psychoticism is at the upper end) and a compromise model that ranges from healthy to more psychotic (Claridge, 1997). Both the latter models suggest that schizotypy play a part in the development of cognitive perceptual experiences, entail reality-testing deficits eliciting paranormal belief generation (Irwin, 2009). More recently, Hergovich et al. (2005) explored the relationship between schizotypy and belief in the paranormal amongst adolescents. Schizotypy was a predictor of precognition, psi, witchcraft and spiritualism. Whilst, subscales of the paranormal belief measure (RPBS) revealed increased levels of religious belief, superstitious thoughts and extraordinary life forms than did the measure of schizotypy (Hergovich et al., 2005).

In addition, the cognitive-perceptual component of schizotypy (Genovese, 2005; Hergovich and Arendasy, 2007; Wolfradt et al., 1999) was supported by the notion that paranormal belief has a positive relationship with schizotypy (Hergovich and Arendasy, 2007) as well as associated with new age philosophies and religious beliefs (Day and Peters, 1999; Farias et al., 2005). Additionally, those individuals who have unusual or strange beliefs can usually show signs of one or more of the following traits: anxiety, magical ideation, paranoia, or suspicion (Barlow and Durand, 2009). A stronger relationship exists between paranormal belief and the cognitive-perceptual aspects of schizotypy than the interpersonal and disorganised factors. Hergovich et al. (2008) note that their findings should not be generalised beyond adolescents because there is evidence that the factorial structure underlying belief in adolescents differs from that of adults (Wolfradt and Straube, 1998).

1.4. The role of disbelief (scepticism)

It appears that pre-existing beliefs and religious beliefs may hold the key to understanding paranormal belief and disbelief (scepticism) (Beck and Miller, 2001; Clarke, 1991; Pennycook et al., 2012; Shermer, 2003). Beck and Miller explain experiences reject quasi-empirical claims that are not consistent with their own beliefs or assumptions. If reliable then quasi-empirical claims are simply accepted and trusted. These beliefs are restructured and reformed in order to explain and predict new experiences alike (Mahoney, 1991). Alternatively, disbelief is to accept something as untrue, no matter how much evidence is presented to the contrary (Beck and Miller, 2001; Boyer, 2001). Formally, there is an inability, refusal or resistance to believe something as true. In addition, significant cognitive effort is required to resist powerful biases (Boyer, 2001). In many ways, there can be insufficient information that can change someone's belief no matter how plausible it seems. For example, belief in existence of god may result in a simple yes or no. On the other hand, if the answer is 'do not know/not sure' then saying that someone does not believe is rather one-dimensional. Personal, rational and deferment in responding may suggest that the person may be sceptical rather than being a disbeliever/debunker (Mahoney, 1991). In this context, to assume something is untrue or not supported by sufficient evidence might (e.g., the JFK assassination) promote a resistance to believing in something that directly opposes official reports. As such, personal abridgment about the accuracy of a theory/event or experience can appear more difficult to assimilate (Summers, 1998).

The formation of religious disbelief may shed light on how varieties of motivational, cognitive, cultural learning mechanisms are involved in belief/disbelief generation. In a similar way, development of scepticism may also share similar traits (Norenzayan and Gervais, 2013; Shermer, 2003). In this context, believers and disbelievers may be composed of a variety of analytic theorists, and are just as likely to be attracted to science, as are thinkers to the more intuitive (Epstein et al., 1996; Haught, 2005). Adopting a more scientific approach may lead to a more materialistic understanding of the disbeliever/sceptic (McCauley, 2011; Sorell, 1991). Perhaps, refraining from decision making or simply disbelieving in something may simply influence people's explanations/interpretations regarding paranormal experiences (Tambini et al., 2010). For example, the newly developed 'Belief in science scale' (Farias et al., 2013) explores how respondents rationalise scientific achievement within their intrinsic worth of science (Sorell, 1991). Therefore, the effect of

induced existential anxiety regarding belief in science may play a part in the formation of both disbelief and belief.

William James, (1956) suggested that delaying a decision until all of the evidence has been assimilated is personal choice, where it is better to reduce risk of error by compromising truth. In this context, Milton and Wiseman (1999) explained that having doubt about an experience, or hearing second hand information can contribute to the formation of skepticism (Milton and Wiseman, 1999). Other aspects linked with disbelief are how people receive and assimilate scientific information. One such study by Chinn and Brewer (1992), found that students presented with contradictory scientific evidence about phenomenon began mirroring the scientific community; reject the data offered, reinterpret data presented and retain their own beliefs. In this way, they appear to generate personal theories about how the "real world" operates by formulating and reconstructing prior beliefs.

Chinn and Brewer (1992) used the term "entrenched beliefs" to describe those that are "deeply embedded in a network of other beliefs," noting that these are the ones an individual is least likely to surrender, especially if they are ontological (i.e., beliefs about the fundamental properties and categories of the world). Beck and Miller, (2001) believe that such entrenched beliefs are generated by either a pre-existing religious belief or by no religious belief and are shaped by negative life events. To this end, percipients that experience prolonged negative experiences may simply search for solutions or explanations for unusual events. Searching for solutions and or interpretations may lead to various interpretations, specifically those anomalous experiences couched in non-paranormal framework, may simply prompt respondents to be more cautious in their paranormal attributions (Irwin et al., 2014). Furthermore, such respondents may also be intent on rejecting any paranormal interpretation of their life experiences rather than believing they are immune to occurrences of anomalous experiences (Irwin et al., 2014).

1.4.1. A need to believe in something

Personality and personal desires appear to govern the development and formation of paranormal beliefs (Irwin, 2000; Williams et al., 2007). In fact, there is an underlying drive or need to believe in something (Krippner and Winkler, 1995, 2006). There may be a requirement for people to understand and simplify their world, giving meaning to their life experiences. Consequently, connecting experience with meanings (from within life experiences) can be explained as synchronicities or consequential coincidences (Storm,

2008). Which can help explain both paranormal and anomalous experiences and present some form of reassurance for those who experienced or believe in the supernatural (Irwin, 1999). Subsequently, deciding to believe or refute an experience depends upon the position a person takes when faced with inexplicable phenomena. As such, exploration of one's own mind/thoughts may shed light on why many believe in the supernatural, and may appear central to our understanding (Russell, 1921), a mental system that is paranormally coded, forming positive symbolic meaning for that event (Gilbert, 1991).

Importantly, a basic idea for establishing and maintaining beliefs appears within our understanding and our need to believe. From the elements that form and shape our beliefs for example, experience, reflection, or experimentation these can affect our ability to generalise experiences. The nature and source of paranormal beliefs are best conceptualised as psychological, perceptual, and part of an experiential process (Alcock, 1980; Blackmore, 1991). Typically, survey instruments outline cultural, religious, or philosophical paranormal beliefs correlates (Gallup and Newport, 1990; McClenon, 1994). Consequently, the concept of paranormal belief (either psi or parapsychological), may become more problematic for western civilisations (Irwin, 1993). Because, concepts of both lie within normal vs. abnormal perspectives generated from myriad events and occurrences, thus are difficult to explain. In this context, aspects of each experience rely on a predisposition or orientation to respond auspiciously/adversely toward the event, person or object (attitude). This assists with belief explanation or perspective considered to be true/false, which appears effective for paranormal belief formation (Krippner and Winkler, 1995). They also form part a series of ideologies, often perceived as altered states of consciousness (Laughlin et al., 1990). They may simply inform our understanding of such mechanisms and are not simply a construct or alternative way of knowing something but can explain events or occurrences, whilst disregarding behavioural and emotive mechanisms (Holt et al., 2004; Krippner and Winkler, 1995).

1.4.2. Can belief ownership affect data collection?

Control, in this sense, may simply be like 'possessions' owned by the percipient, in that they are shaped by persuasion, not only influencing our beliefs generation, but supporting their formulation, development and with the attitudes held as a consequence of such beliefs (Abelson, 1986).

Abelson explored this premise in relation to reasoned argument/persuasive attempts to change people's beliefs. The framework used is one of refuting a friend's belief about attachments to beliefs in UFO's, astrology, afterlife etc. namely, the paranormal. The validity of this paper is important re: belief generation, reasoned arguments vs. unshifting beliefs, where attitude shifts or entrenched thinking shape beliefs. This raises the question of just what belief is and what purpose does it serve? Abelson, (1986) tenders that belief simply serves a social reality function, that is, enabling and equipping us with social tools allowing us to act in a competent way from within that world. For example, if you believe that an office worker is extremely hostile, then you may tend to avoid, raise concerns or even complain about that individual (Abelson, 1986). Ownership of such a belief (hostile office worker) needs to be explicitly collected, and questionnaires are one of the most fruitful methods for doing this. Surveys/measures and questionnaires capture responses of participants (instantaneously), which may reduce the need deeply thinking about questions posed. Alternatively, Converse (1970) and Rosenberg (1968) suggest that measures used in this way might construct 'non-attitudes' regarding an item.

The more considered, thoughtful and possibly more meaningful judgements of some respondents may point to those who may possess their own beliefs or attitudes, where they alter very little over time (Abelson, 1986). A 'freezing effect' takes root within new and novel beliefs leading to permanence (Ross et al., 1975). Ross et al. (1975) found that introducing a novel belief and removing the supporting evidence, led participants to hold onto that belief; perseverance phenomena. Similarly, those subjects who explained a rationale for a belief allowed a stabilizing effect to occur, meaning beliefs in this context were more likely to remain intact (Banaji and Bhaskar, 2000).

1.4.3. Religiosity

Any study exploring belief in the paranormal and paranormal phenomena must also take into account the influence and development (in some part) that religion and religiosity plays in underpinning paranormal research. For example, a recent Chinese study found traditional Chinese religious believers had higher scores on paranormal belief than did Christians and atheists. This study also produced a higher mean score amongst for Chinese participants than previously reported in Western studies (Shiah et al., 2010). They found that Christianity offers the least support for belief in the paranormal. In this context, it is important to contemplate religious movements and the impact that religion has had on the civilised

world's development. It may be that religious belief in Buddhism, Christianity (Protestant, Catholic), Hinduism, and Judaism may extend astonishing stories, which are considered paranormal (e.g., the son of god was slain only to return after his crucifixion as the Messiah). This is not to criticise personal beliefs, but brings into question, the reliability and value of measuring such religious beliefs. Flannelly et al. (2004) suggest that it is a measure of subjective religiousness where a person has apparent specific religious beliefs may belong to a particular affiliation while offering little in the way of explanation regarding the strength or adherence to that belief (Flannelly et al., 2004). Kurtz (1986) points out, that people may well believe in a particular religion or movement, because of failure to be exposed to factual criticisms of (or about) their faith suggesting misinformation effects.

Religion and religious belief still appear to be the most pervasive and enduring characteristic of human culture (Kurtz, 1986) because they offer the masses an outlet, hope and something beyond this world. It appears that religion has established scriptures, religious books and church going to promote religion and cultural systems that enable the believers to accept the 'unbelievable' whilst, providing insufficient evidence to the contrary about the part science plays in explaining religion (Shiah et al., 2010). Kurtz has taken this a step further, and extends why religion has been so dominant in many civilisations, because freethinkers have been restricted in their questioning and challenging established beliefs for fear of recriminations. For example, questioning divine authority of Mohammed may appear as a form of blasphemy punishable by fatwa (Kurtz, 1986).

Religious belief and paranormal belief differ. Religiosity is underpinned and supported by culture, whereas paranormal phenomena and belief in paranormal is not. The wider population accepts and generally raises no concern when a person endorses a particular religion. However, believing in certain phenomena or offering personal paranormal examples (e.g., seeing a UFO, encountering an apparition), is often met with scepticism and cynicism (although now more widely accepted) (Norenzayan and Gervais, 2013). In this context, paranormal beliefs may have become an alternative to mainstream faith (Orenstein, 2002). Interestingly Emmons and Sobal (1981) suggest those who have the greatest need to believe in the existence of the paranormal are those who do not follow or believe in religion (Orenstein, 2002). Nevertheless, 'none believers' are actuality not always supporters of the paranormal, requiring no compensatory mechanisms for something allegedly missing from their lives (Emmons and Sobal, 1981).

Irwin (1993) however, believes positive relationships exist between paranormal beliefs, religious belief and practice where belief in the paranormal functions as a substitute for religious belief. However, some researchers believe a negative relationship exists between religious belief and the paranormal (Emmons and Sobal, 1981; Persinger and Makarec, 1990; Beck and Miller, 2001). Some, contrary arguments/empirical findings suggest that there is no relationship (Clarke, 1991). It appears that religiosity correlates positively with belief in psychic healing and negatively with UFO belief. However, while allowing for differences between religion and paranormal belief, there exists an association (Clarke, 1991, 1995). For instance, practitioners of voodoo (e.g., voodoo, vodun) believe deities and spirits can be pacified by, trances, dances and incantations in secret languages. Vodouists (servants of the spirits) use their powers to deliver specific curative healing and rituals to deliver both astrological and potion creations (telling fortunes, analysing dreams, casting spells, invoking protection spells etc.). Additionally, those who believe in voodoo may also endorse angels, curative healing while accepting both ghosts and voodoo (Irwin, 1993; Rice, 2003). Thus, the paranormal undoubtedly shares a common characteristic of both religiosity and parapsychology.

Voodoo uses a variety of religious ceremonies to summon spirits and to do their bidding. Consequently, interesting elements of voodoo (spell casting, control etc.) assist the development of specific voodoo religions/affiliations and belief. Positive correlations exist between belief in witchcraft and religiosity but not for spiritualism (Tobacyk and Milford, 1983) suggesting that there is a mutual component. Interestingly, those people with little or no religious affiliation had the highest paranormal endorsement (Thalbourne and O'Brien, 1999). However, there appears not to be a relationship between religious affiliation and the more global paranormal beliefs (Irwin, 1993).

1.5. Additional correlates

Other correlates play a part in the formation and maintenance of beliefs. These include personality, gender, age, education, locus of control. Whilst these variables are not central to current research, they are included for completeness and context.

1.5.1. Personality and belief

According to Irwin, (1993, 2009) belief systems are constructed and realised by personality dynamics and these contribute to an understanding and control over life events. More specifically, the psychodynamic functions hypothesis (PFH) establishes correlates of personality. These explain the functions played by personality and belief dimensions within paranormal belief (Irwin, 1993).⁴ Certainly, the investigation of personality looks at the quality of the individual's interpersonal or social behaviour (for example, extraversion and ESP; Thalbourne, 1981, Thalbourne and Haraldsson, 1980, paranormal and social interest; Tobacyk, 1983b, and trust in others; McBeath and Thalbourne, 1985).

1.5.2. Gender

According to Blackmore, (1995) 64% of females have a strong belief in the paranormal, in contrast to 36% of males. It appears that females tend to be believers in the paranormal whilst males are more than likely to be disbelievers. Women, overall appear to endorse belief in the paranormal higher than males (Irwin, 2009). Additionally, several global measures demonstrate this apparent difference (see Bressan, 2002; Schulter and Papousek, 2008). While specific dimensions of the paranormal appear more strongly endorsed by women i.e. ESP, astrology and hauntings (see Haraldsson, 1981; Kim, 2003; Rice, 2003). However, other studies have reported no difference (Sjoberg and Wahlberg, 2002). Specifically, gender differences/trends emphasised by location, cultural differences and socioeconomic status may shape the formation of paranormal belief (Schulter and Papousek, 2008).

1.5.3. Age

In addition to gender differences/trends, age similarly influences the level of belief (Irwin, 2009). It appears that women who may still appear to be socially marginalised would present

⁴ For further information regarding the correlates of personality and belief in the paranormal see Harvey Irwin's (1993) *Belief in the Paranormal: A Review of the Empirical Literature* for a pertinent and substantial survey .

with stronger paranormal beliefs especially when the socially marginality hypothesis is applied (Irwin, 2009). Counter intuitively, men are sometimes seen as having stronger beliefs in the paranormal than do women i.e., stronger belief in the existence of extra-terrestrial life. Such belief differences may exist between genders and may be attributed those of sensation seekers who are often are attracted to ideas that are outside the realm of normal science (Parra, 2015; Schuler and Papousek, 2008).

Correlates of age appear to suggest that beliefs about the paranormal are stronger in younger people than the more venerable among us (Irwin, 2009). In common with religion, age appears robust and is strongest of all the paranormal correlates (Emmons and Sobal, 1981). In a study conducted by Heinz and Baruss (2001) younger people reported higher belief in the paranormal than their elderly counter parts (Over 60 years of age) and this is demonstrated the trend for age differences in the factors of belief for paranormal. Belief in UFO and or extra-terrestrial life is more prevalent in younger people and there appears to be a higher reported belief in facets of spiritualism and witchcraft within the younger population (Sobal and Emmons, 1982; Torgler, 2007). Finally, important aspects regarding item functioning need mentioning here, because age affects the way a person confidently answers (positively vs. negatively) or understands/perceives a particular type of question (Irwin, 2009). Consequently, people in one age bracket appear to respond/interpret a question a particular way (see Lange et al., 2000 for age related differential item functioning). This might relate to the intensity of the beliefs held or may be how a different meaning is drawn from the question. Either way, it seems that there is a confound that needs further elucidation.

1.5.4. Education

Level of education (or attainment) appears to relate to the level of endorsement for paranormal. However, no clear evidence other than research pointing to some minor weak correlations exists (Musch and Ehrenberg, 2002). Studies conducted by Messer and Griggs (1988) and Tobacyk (1984) point out that evidence is also unclear concerning delineating a correlation/relationship between belief in the paranormal and level of attained grade. Certainly, methodological challenges lie ahead whilst trying to disentangle academic influence and scholastic level regarding how we understand the relationship with cognitive ability (Irwin, 2009). Irwin (2004, 2009) postulates that confounds of ability achievement, both educational/academic need further investigative research assessing the cognitive deficit

hypothesis sufficiently to make available a more suitable and viable answer to the paranormal.

1.5.5. Locus of control

Locus of control: the propensity for people to either accept that they are in control of the decisions they make, those affecting their lives, or that factors external to perceived control over their life and the decisions they make (Irwin, 2009; Roe and Bell, 2016). For those who believe that they have control/volition over their actions are thought to possess internal locus of control, whilst those who believe that external agencies and governments (conspiracies), institutions or powerful people and or luck/superstition controls them to some degree are thought to possess external locus of control (Vyse, 1997). In this context, the work of Nowicki and Strickland (1973) needs allusion. They outline Rotter's (1966) dictum of reinforcement attached to reward (during development), thus shaping locus of control through social learning theory. This suggests that the locus of control dimension appears to be a significant variable in determining experiential explanation and interpretation of their experience. Several studies outline cultural/ethnic variance of locus of control, where the world is perceived as unpredictable and uncertain, either controlled (internal) or beyond control due to outside forces (external) (Irwin, 1986; Peltzer, 2002). Others suggest that luck directly affects locus of control and proclivity for life events (Irwin, 2000; Roe and Bell, 2016). Consequently, further research should explore this dimension.

1.6. Methods used to measure belief in the paranormal

While some believe that Minot's (1887) questionnaire documenting people's superstitions produced for the American Society for Psychological Research is the first recorded scale that attempted to measure superstition, credit must go to the production of a Nixon's Superstition Scale: a workable paranormal belief measure (Irwin, 2009). Gallup polls, surveys and questionnaires have successfully examined level of belief in the paranormal (see Gallup Poll, Moore, 2005; Pew Research Center, 2009; Harris Poll, 2013).

In fact, belief dimensions have continually changed over the past two hundred years seeming dependent upon a variety of lay beliefs arising in social contexts, and from previous paranormal research conceptualisations (Grimmer and White, 1990; White, 1990). Today, it appears that measures assessing belief in the paranormal have made a shift away from unidimensional constructs becoming more multi-dimensional: assessing a range of beliefs and constructs about the paranormal (Irwin, 2009). In this way, conceptualised beliefs collected appear to represent internal cognitive domains, comprising a stable cognitive, affective and behavioural component (cf. Fishbein and Ajzen, 1975; Irwin, 2009).

Other researchers have tried to construct scales that measure belief in a variety of topics concerned with belief in the paranormal. Tobacyk and Milford (1983) developed the PBS and the RPBS where they composed a 61-item collection that following factor analysis produced an initial 25-item measure containing seven factors: traditional religious belief, psi, extraordinary life forms, precognition, superstition, spiritualism, and witchcraft. They concluded that the structure of belief in the paranormal is one that is multidimensional (Toback and Milford, 1983, 1988). The basis of this PhD thesis is in part a replication of the analysis employed by Tobacyk and Milford but also used as an exemplar for construction of a new measure. Whilst their analysis pointed to 18% variance for the primary factor and produced a 26 item, seven-point scale instrument, the current research phase produced a 64 item measure.⁵

The most commonly used self-report measures, (Houran et al., 2001; Lange et al., 2000) are: the Mystical Experiences Scale (Lange and Thalbourne, 2007), the Anomalous Experiences Inventory (AEI; Gallagher et al., 1994), Australian Sheep-Goat Scale (ASGS; Thalbourne and Delin, 1993), Revised Paranormal Belief Scale (RPBS; Tobacyk, 1988),

⁵ The factor selection criterion developed by Grimmer and White (1990), assisted with development of the MMUpbs measure, forming a suitable factorial structure.

and, the magical ideation scale (Eckblad and Chapman, 1983). These measures allow for further examination of the factors and items assessing belief in the paranormal. However, certain aspects of these items/measures deliver an uneasy association between specific cognitive deficits whereby concluding that belief in the paranormal may be as a result of a susceptibility for advocates or believers to appear to demonstrate something problematic, especially with regard to critical thinking, reasoning and critically testing one's reality (Irwin, 2009; Jinks, 2012). Jinks explored this further, and outlined current methods of data gathering (self-report measures) suggesting that while wide ranging context and subjects are covered within this array, that earlier items have simply been amended and modified and not redefined sufficiently (e.g., pseudo-sciences and unsupported quasi and proto-sciences such as the Bermuda Triangle, the Loch Ness Monster and unidentified flying objects).

This raises concern about how percipients actually answer the items/questions, where answers appear not solely driven by level of belief. In addition, this questions the very nature of item function, and questionnaire design (Jinks, 2012). Jinks (2012) suggests differential item functioning (DIF) or bias or comparison of item performance, conditional on overall ability, competence, or skill (Zwick, 1990) will play a part in how respondents answer questions. This is where response is not simply driven by level of belief (local independence), but influenced by so-called secondary traits, gender and age (Houran and Lange, 2001; Lange, Irwin and Houran, 2000). What is important is that individual item scores will differ according to items answered leading to biased conclusions regarding the factorial structure of paranormal belief (Jinks, 2012). Additionally, this leads to a misinterpretation of responses given leading to equivalent 'levels' of paranormal belief between respondents, where item scores are clearly different (Jinks, 2012). Finally, it appears that people who belong to the group believing in supernatural/paranormal phenomena may not fully address the question asked, or they may simply possess 'emotive' qualities encouraging them to answer all paranormal measures in a somewhat shallow and casual fashion, fashioning the appearance of paranormal belief (Jinks, 2012; Recanati, 1997).

In this context, the work of Jinks is important for this thesis for it adds convolution to the design and construction process required for any new measure: to produce a more precise, robust and comprehensive scale one that examines the core facets of belief, allowing for unbiased categorising without skewed analysis. The subsequent chapter (chapter 2) outlines the history and development of the modern scales proposing structure/context for scale design within the current research.

1.7. Ethical considerations of measurement/design

Consideration of ethics is an integral feature of self-report development and administration. This is true for measures across all settings, but especially true in situations where results are likely to impact upon, or influence individuals. An important part of the ethical process is psychometric scale validation (Clark and Watson, 1995; Hinkin, 1995). Whilst this is evident in employment, practise and clinical settings (Streiner et al., 2015), it applies also to the study of paranormal beliefs and experiences, because, they are personal, often private pieces of information, which may contain sensitive material and/or relate to important/significant life events (Streiner et al., 2015). For example, Drinkwater et al. (2013) explored general subjective paranormal experiences (GSPEs) and found that paranormal experiences are personally meaningful and profound.

A further ethical consideration stems from the social nature of beliefs. Some paranormal beliefs are common and acceptable (e.g., life after death) whilst others are less common and more controversial (e.g., Alien Abduction). In the case of less socially acceptable beliefs, endorsement may be associated with social stigma (Dagnall et al., 2016). Internet mediated research (IMR) while reducing social stigma also reduces geographical and physical barriers (Valaitis and Sword, 2005; Joinson, 2002; Weisband and Kiesler, 1996; Hewson et al., 1996). In this context, the use of IMR within the present study provided a non-judgemental and safe environment in which to disclose openly sensitive personal beliefs and experiences. Additionally, the use of, IMR offers many advantages to parapsychologists seeking to collect data. Principally, it allows wide scale sampling of populations and offers a great reduction in time and cost-efficiency (Hewson et al., 2003). Consequently, in the last decade it has enjoyed an expansive multidisciplinary influence allowing research gathered from those who normally would not be able to participate in research of this type (Dagnall et al., 2010b; Hewson, 2003). However, several criticisms have been raised when using IMR particularly, sampling and validity issues (Whitehead, 2007; Schmidt, 1997).

Generation of items are also ethically important in establishing construction of sound and psychometrically valid measures (Hinkin, 1995; Hinkin and Schriesheim, 1989). Particularly, content validity built into the current scale allowed further development, refinement and replacement of items (Schriesheim et al., 1993). Several core principals and best practices required for the construction, modification and evaluation of a valid and reliable scale/measure. These involve, the psychological measurement, the dimensionality of the scale under construction as well as the psychometric properties and quality of current

data, which allows evaluation and examination for accurate interpretation of reliability and validity (Furr, 2011). The scale construction process allows examination of the statistical results. This takes into account the psychometric properties, and specific scale qualities. Secondly, consideration of the psychological implications of findings, validity (degree to which scores reflect the psychological variable) and reliability (good indicators) of the measure addresses whether the scale is performing well within the sample measured. Finally, by assessing whether the scales scores truly reflect constructs that the current research aims to quantify (e.g., assessing the degree to which people endorse the paranormal) (Furr and Bacharach, 2013).

1.7.1. Conclusion: Ethics of scale development

From an ethical perspective, it is important to ensure that scales and measures possess good psychometric properties. To this end, the current measure employed scale development allowing generation of suitable subscales and items, providing sufficient responses, and quality that satisfy the purpose of the research/study (Hunt et al., 1982). Scale development therefore, is utilised in order to create suitable measures that demonstrate both validity and reliability, but importantly, indicate the level of construct validity in order to ensure quality of the items, subscales and full-scale measure (Hinkin, 1995, 1998; Schmitt and Klimoski, 1991). The current scale construction embraced the following: item generation, assessment of conceptual consistency of the items, questionnaire administration, factor analysis (exploratory and confirmatory), and assessed scale reliability, to regulate criterion related validity and replicate the scale testing process within a new data set (Hinkin et al., 1997). This systematic approach to development provides the basis for careful and good quality psychometric examination (Hinkin et al., 1997). As such, devising a suitably constructed measure, data gathering and analysis should lead to accurate and useable data (Ford et al., 1986)⁶.

The current measure employed a development process, which incorporates numerous ethical considerations (e.g., providing informed consent, guaranteeing confidentiality⁷ and

⁶ Final validation of a new measure can only take place once adequate data collection has ensued (Streiner et al., 2015).

⁷ Sometimes however, some data collection means that confidentiality is not always feasible, where test and retest reliability of a measure needs further comparison to scores already generated from the same measure (Streiner et al., 2015). These data requires safe storage in a locked cabinet from which only the researcher had access. (Violation of confidentiality can only occur when the Tarasoff rule (Tarasoff, 1974) is applied thus: 1)

avoiding deception) that need factoring into research where appropriate design of a study allows a suitable method, assessment or measure to gather data appropriately, whilst respecting the individual's autonomy. In this context, autonomy refers to the individual's right not to participate or to withdraw at any time without penalty (Gitterman and Germain, 2008), whilst the current research respected and protected the individual's anonymity (Streiner et al., 2015. see footnote 7, pp. 56-57). These were all inherent within the instructions presented to respondents. The instructions explain the purpose of the research and follow strict guidelines set out by the ethics committee of the Manchester Metropolitan University's code of ethics and in accordance with the BPS code of ethics (2011).

Accessible instructions notified respondents of the following: nature and purpose of the research, what this involved/entailed, that ethical approval confirmed and services available to support any underlying problematic issues following completion of the measure. Finally, respondent confidentiality and right to withdraw including any desire to remove of their data was included: clearly stated this was allowable within a four-week period and would not result in any penalty for them. Furthermore, anonymization, via unique numbers/identifiers, protected respondents' identity. Secure data storage and controlled restricted access to measurement scores, ensured confidentiality of individual responses. These procedures ensured that only the research team (researcher and supervisors) had access to the collected data. Finally, these data were protected; via file encryption, and were contained within a secure password protected website (BOS – Bristol online survey).

Subpoena by a court, or 2) when a person is in imminent danger, or deemed to be capable of hurting themselves or others. When applied, the researcher has a duty of care to report or warn, which supersedes confidentiality in such a case).

Chapter 2. Paranormal history

2.1. Brief Summary

This chapter briefly outlines some significant events in history related to the study and observation of the paranormal from the earliest recorded episode approximately 2500 years ago, to more recent supernatural, paranormal and parapsychological experiences/episodes. Initially, religious belief seems to have shaped the notion of belief, where a basic premise of ghosts/apparitions appear as souls of the departed. In a straightforward form, this relates to animism (a belief in inanimate objects, places, and creatures) all possessing a distinct spiritual essence (soul or life energy). This is important, because it has shaped subsequent belief in the paranormal and mythologies and within culture. Cognitive biases have also influenced and influenced beliefs; for instance, they emerge from perceptions of agency, mind-body dualism, and teleological intuitions (Willard and Norenzayan, 2013).

Therefore, previous historical narratives help to establish background to the current doctoral thesis by establishing context that informs development of a paranormal belief measure. They help frame, categorize measurement within the nature of purported paranormal phenomena, and provide a foundation of parapsychology and parapsychological research from past to present. Early examples include mental manipulation, communication with the spirit world and apparitional/hallucinatory experiences (see *Phantasms of the Living*, Gerney and Podmore, 1886); *visual hallucinations*, Tyrrell, 1943). Improving experimental control and increasing scientific rigor have meant that there has been a change from searching for fantastic manifestations, to measuring statistical changes and a desire for reliable, replicable measured effects (Irwin and Watt, 2007). In this context, historical beginnings and developments in understanding supernatural, paranormal, and parapsychological inquiry provide a suitable starting point for this developmental narrative.

2.1.1. Early beginnings

Historically, Herodotus (Greek historian) wrote about the first example of the paranormal, namely clairvoyance. He outlines a type of consumer testing procedure (course of action) for the king of Lydia (King Croesus) who in the year 550BC asked advice regarding future military action. Numerous independent delegations of the king asked seven of the most influential/important oracles “What is the King of Lydia doing today?” and in by doing so, established a telepathic (clairvoyant) test. Only the Delphic oracle suggested development of religious scriptures. Croesus saw this as a positive signal that he should consult with the

Delphic oracle on more important matters (e.g., going to war with the Persians). The advice outlined how a great army would perish in battle. Unfortunately, Croesus perished, not the Persians.

Other examples of prediction, foretelling, prophetic dreaming and examples of the supernatural can be seen throughout history e.g. Muhammad's revelation about his contact with God. In this way, religion and in particular, religious belief can be strongly associated with paranormal phenomena. Numerous cultures, especially from around the 19th century have revealed a variety of miracles, foretelling of future events/hardships that have led to people to appportion greater meaning (stronger belief in god) by avoiding specific disasters, for example, the plague. Further examples are documented within the Catholic Church, whose saints often account or report similar examples of paranormal phenomena. Levitation cases (backed up by eyewitness testimony) became popular at the time. It was even said, that Saint Teresa of Avila used to rise up to the ceiling during prayers; which was substantiated by Anne of the Incarnation at Segovia (a fellow sister) and by a bishop after receiving Holy Communion; Saint Joseph of Copertino was also alleged to have levitated in front of parishioners.

Experiments conducted by Alchemists in the Middle Ages were arguably parapsychological in nature. For example, John Dee (1500s) an astronomer, astrologer and mathematician for Queen Elizabeth, conducted experiments using a pendulum and a pair of divining rods to locate missing items. Queen Elizabeth also asked him to contact spirits. Thus, a more enhanced and structured approach to investigating psychic phenomena was under development, and towards the end of the 18th century grew considerably, following the impact of both mesmerism and spiritualism.

2.1.2. Spiritualism and mesmerism

Important advances came from within two distinct areas: Spiritualism and Mesmerism (Beloff, 1993, 1997; Inglis, 1977). Spiritualism began in 19th Century America (Fox sisters), and was grounded in both philosophical and spiritualist movements that encompassed philosophy, science and religion. It appears from the outset that spiritualism is a belief in the hereafter, where one believes in the survival of human personality (soul) after death (Henry, 2009). This belief seen in myriad cultures and faiths across the world and seems to represent a trade-off between good and evil, where we exist in accordance with the law of sowing and reaping (Broughton, 1992; Irwin, 2009).

What is important is how exploration of mysterious and unexplained anomalous communications ensues. For example, Isaacs (1983) outlines a story concerning a blacksmith (Fox) where he and his wife experienced so called 'percussive activity' and had a variety of furniture move without anyone present. Some researchers believe that a man called Charles Rosma (a murdered peddler) was a spirit communicating with the Fox's; as a previous occupier, demonstrated his unrest because of the association with his own murder (Irwin, 1993).

This story is synonymous with a number of other so-called fraudulent cases where financial gain appears to be the motive (Isaacs, 1983). It also allows us to become influenced by the possibility of a life after death (Irwin, 1999; Thalbourne, 1996a) which is extended to mental and physical mediums and spiritualists where today's society deems there to be additional exchanges or 'channelling' are a way of communication (Alcock, 1996). Mesmerism (spiritual forces that conjugate with a natural energetic transference developed in all animated and inanimate objects) is also important, established by Franz Anton Mesmer (1734-1815), mesmerism allows individuals to be placed in a trance like state (hypnosis) where suggestion appears relieve pain and suffering. The use of magnets (later became known as animal magnetism), which were used on patients. Many showed signs of sickness, convulsions, loss of arm control etc. However, according to Mesmer, health appeared to improve and restorative healing occurred (Broughton, 1992). It appeared that these events/happenings give the impression of being far beyond that of the normal individual (Irwin, 1999).

2.1.3. Important developments

February 20th, 1882 represents the birth of parapsychology in England (Irwin, 2009). Parapsychological/paranormal enquiry has utilized a variety of scientific methods, analyses and investigations to explore anomalous, spiritual, supernatural and paranormal events. In this context, psychical research originated (following support from Cambridge University) with the Society for Psychical Research (SPR). The SPR primarily investigated anomalous experiences through the more meticulous and precise methods of interview and testing to scientifically investigate and explain the weird, strange and unknown (Irwin, 1999). Initially, actual cases of the paranormal appear virtually impossible to prove, and pose somewhat of a problem. For example, certain individuals appeared to be emotionally disturbed, recounting

puzzling anomalous experiences, whilst merely unusual, unexplained, are interpreted as paranormal in origin (Broughton, 1992).

Sceptics and hoaxers alike opposed scientific endeavours during a prolonged period of enquiry throughout the 19th century. This produced two sides; those who believed in the existence of paranormal phenomena (actively seeking mediums and spiritualists) and those opposed, seeking to expose paranormal claims as fraudulent. They had never previously considered the existence of the paranormal, let alone believed in such phenomena. These conflicting beliefs established distinct believers or non-believers. Regardless of whether somebody endorsed or was sceptical about the paranormal, this established a foundation for paranormal investigation (Beloff, 1993; Broughton, 1992). The SPR established that by actually investigating certain phenomena many people became mindful of this kind of material/phenomena establishing both believers and sceptics. The ensuing argument about the anomalous produced an overabundance of distrust and unreliable evidence. Various percipients with inaccurate supporting evidence, questionable/unreliable investigative techniques initiated a need for more scientific scrutiny. Subsequently, investigation that is more rigorous, strict approaches and procedures for conducting paranormal research ensued (Irwin, 2009).

In the context of this doctoral thesis, Chapter 3 will briefly outline developments in conducting paranormal research, whilst presenting paranormal measures/scales that introduce several social and cultural influences important for item design. It will also delineate pertinent scales that have guided subsequent item improvements within the MMUpbs (paranormal belief measure).

Chapter 3. Development of paranormal scales

3.1. Developing a suitable measure

In order to critically appraise and explore significant characteristics concerning measurement of belief in the paranormal (with a view to constructing a suitable paranormal measure/tool) one must consider both historical and current scales/measures. Thus, it is important to frame any exploration and subsequent development of a new tool for paranormal measurement within the boundaries of past and present paranormal belief research. Importantly, there have been pertinent moments/events and influential figures who have shaped parapsychological research, for they are important in terms of how we understand paranormality currently.

Initially, Gertrude Schmeidler was a pioneer in developing psi research, specifically experiments using Zener cards explored the effect belief has on psi performance. Schmeidler conducted a series of double blind studies between (1948 and 1951) to assess the ability to predict cards hidden from view. Results produced significant differences between sheep (those who believe in the existence of psi) and goats who believe that psi does not exist (Schmeidler and Murphy, 1948). These studies (funded by the Hodgson Fellowship in Psychical Research at Harvard) employed extra-sensory perception (ESP) cards and represent commencement of contemporary paranormal measurement (Irwin, 2004, 2009). Paranormal researchers French (1999) and Irwin (2004), advocate the work of Schmeidler suggesting that it was fundamental in paranormal research for establishing differences between believers and non-believers. Essentially, the sheep-goat effect refers to those people 'sheep' that are confident about belief in psi/paranormal, opposed by those "goats" believing that paranormal/psi does not exist. Schmeidler produced three research papers published within the *Journal of the American Society for Psychical Research (JASPR)*; Schmeidler, 1943a, 1943b, 1945) which demonstrate distinct factors exist and form an important background for the context of this doctoral thesis.

The first and second papers (Schmeidler, 1943a, 1943b) examined scores that predicted level of clairvoyance, whilst a third explored the sheep-goat effect directly (Schmeidler, 1943c). A follow up study, co-authored with Murphy, published in the *Journal of Experimental Psychology*, extended sheep-goat research (Schmeidler and Murphy, 1946; Schmeidler, 1966). Schmeidler and Murphy's use of numerous cycles of ESP card-guessing experiments enabled the advance of the sheep-goat effect within mainstream literature (Thalbourne, 2005, 2010; Thalbourne and Delin, 1993). Such research generates significant developmental opportunity, establishing and improving existing measures of paranormal

belief by making them more sophisticated and accessible. Accordingly, research has influenced both the parapsychological and anomalistic approaches thus improving an understanding of paranormal belief and disbelief. Consequently, ESP research and card guessing has not only helped to establish more mainstream research methods, but has fundamentally transformed how researchers measure such phenomena (Thalbourne, 2005).

Both parapsychological and the anomalistic refer to differing aspects of the exploration of paranormal phenomena outlining psi as a matter of perceptivity, subjectivity and sensitivity (Irwin, 1993). For example, the Gale Encyclopaedia of Psychology, (Gale Group, 2001) refers to 'Parapsychology' as the scientific and scholarly study of certain unusual "psychic" events associated with 'human experience'. These certainly attempt to demarcate both unusual and psychic events in terms of the human experience. Irwin, (1999) advances this further, referring to parapsychology as the 'scientific study of experiences which are outside the realms of human capabilities conceived by scientists'. This idea encompasses the notion that subjective experiences may appear to be paranormal, and whilst lacking definition, may permit the experient to interpret them as such. Further interpretation leads to an individual's intuitive-experiential expression (Irwin, 2009).

The distinction between parapsychological experiences, belief in the paranormal and one's perception of an unusual/anomalous experience needs further investigation within the context of paranormal belief, measurement and design. More nonconventional individual "paranormal" explanations (e.g., Irwin, 2009) are generated through a series of intuitive-experiential interpretations of anomalous events, leading to the formation of paranormal beliefs that are maintained because of a lack of significant self-evaluation by the percipient (Irwin, 2004). In fact, some have suggested that paranormal belief relates to cognitive and perceptual distortions, including odd beliefs or magical thinking (Goulding and Parker, 2001). Three underlying Schizotypy factors classify cognitive or perceptual distortions (Goulding, 2004, 2005):

- Aberrant perceptions and beliefs in other worlds (the positive symptoms of psychosis, i.e., hallucinations and delusions);
- Cognitive failures (thought blocking and attentional difficulties) together with social anxiety; and
- Introvertive anhedonia (inability to experience pleasure and social withdrawal

The development of suitable scales must take into account other main components/scales used today, such as RPBS allowing subsequent models of belief to be

suitably explored, examined and extended. A two factor(s) and potentially three factor(s) Model of Paranormal Belief encapsulate an important aspect of the development of scales and methods of measurement. Development of the PBS led to an improved measure; RPBS. This outlines the importance of both PBS vs. RPBS respectively with regard to measurement/item design, along with equal importance, the contribution made by the sheep-goat scale (ASGS) to enable more appropriate paranormal belief measurement (Thalbourne and Delin, 1993; Tobacyk and Milford, 1983; Tobacyk, 1988).

Lawrence (1995) suggests that any paranormal research assessing belief is only as good as the apparatus measuring it. This suggests the importance of assessing such belief in order to further our understanding of those people who believe in the paranormal and those who do not. In this context, Lawrence extends several alternative paranormal questionnaires that are equally useful, shedding further light on belief in the paranormal (Jones et al., 1977; Randall and Desrosiers, 1980; Thalbourne and Delin, 1993; Tobacyk, 1988). In fact, the most popular of these questionnaires is Tobacyk and Milford's (1983) Paranormal Belief Scale (PBS, Tobacyk, 1988). Perhaps the PBS's greatest contribution to the area of paranormal belief measurement is its emphasis on the multidimensional nature of paranormal belief (Lawrence, 1995). In this context, Tobacyk and Milford (1983) developed the paranormal belief scale (PBS) which comprised the following items: traditional religious belief, psi, witchcraft, superstition, spiritualism, extraordinary life forms and precognition. A 5-point rating scale indicated degree of belief shown by individual participants. This produced results pertaining to seven dimensional belief factors stated above. Subsequently, a new precognition subscale and a 7-point Likert rating scale was introduced, while several witchcraft items and one of the alien life form items were replaced (Tobacyk, 1988). The net effect was to increase the overall scale reliability, validity and reduce the limitation within the range of items presented.

Lange et al. (2000) developed a revised version of the RPBS dividing belief between two core facets: Traditional Paranormal Beliefs (TPB) vs. New Age Philosophy (NAP). Randal and Desrosiers (1980) identified a single paranormal factor 'spiritualism' (explaining 70% of the variance). They were not only concerned with the development of a single factor/scale, but were concerned with how accurately specific items assess belief. They found the factor of supernaturalism to be independent of orthodox religious attitudes in both men and women, and postulated that personal acceptance of supernatural (i.e. causality versus acceptance of scientific explanation) and suggested that women showed a greater

positive level of acceptance or belief. However, later development suggested there to be a much more varied and complicated design for paranormal belief. Both the PBS (Tobacyk and Milford, 1983; Clarke, 1991; Thalbourne and Delin, 1993) and RPBS (Tobacyk, 1988) were developed to further expedite the search for a suitable explanation of paranormal belief.

Whilst, the PBS explains paranormal belief phenomena through the following seven distinct dimensions: traditional religious belief, psi beliefs (mostly psychokinesis questions), witchcraft, superstition, spiritualism, extraordinary life forms and precognition (Lawrence, 1995): just how many items are required to answer a simple paranormal yes/no question, and what constitutes a reliable and valid measure of belief in the paranormal remains unresolved. Irwin et al. (2013) and Jinks (2012a) have started to investigate design and construction of items and measures positing that certain items provide a dichotomy between non-believers and believers. However, categories of the types of believer and non-believer appear inadequately explained. What categories lay within each type, where one sheep may appear to be the same as another, presents the question, are all believers the same?⁸ Surely, this also allows further deliberation and examination as individuals develop items and measures while researchers interpret their answers (Jinks, 2013).

This PhD doctoral thesis sheds light on the conundrum, by exploring pertinent scales/surveys. A comprehensive list of paranormal related measures appears within the appendices (see Appendix A. Questionnaires p279-362). Research phases (I, II, III and IV) examine item content and new scale development.

3.1.1. Measuring belief in the paranormal

One prominent avenue of psychological inquiry has been the investigation of individual differences in belief in the paranormal, with this, research into the correlates of such belief has also become widespread. Such investigations can be viewed in terms of four major themes; demographic, attitudinal, cognitive and personality correlates, which in turn bear on four quite different theoretical approaches developed to explain such individual differences (Irwin, 2006). However, research into individual differences in paranormal belief, is only as good as the devices used to measure it (Lawrence, 1995; Lawrence and Roe, 1997). Since

⁸ ‘Do you believe in the existence of paranormal phenomena?’ or ‘do you believe that people have had genuine experiences of the supernatural (an occurrence that relates to something paranormal in nature?)’

the 1970's, there has been a variety of measurement devices utilised by researchers investigating the implications of paranormal belief. The present review aims to consider and evaluate the array of available measures of belief in the paranormal. The review suggests that existing paranormal measures are less than satisfactory, and suggests recommendations for future item adaptation.

3.1.2. Early scales of paranormal belief

The earliest attempts to produce an instrument to measure paranormal belief came in the 1970/80's (e.g., Davis et al., 1974; Davis and Smith, 1985; Jones et al., 1977; Murphy and Lester, 1976; Windholtz and Diamant, 1974). However, as Tobacyk and Milford (1983) identified, such attempts were on the whole, rationally derived whereby researchers constructed the instruments based on a priori assumptions about what constituted paranormal belief. Otis and Alcock's (1982) Extraordinary Belief Inventory demonstrate an approach to scale construction. Scale item selection occurred on the basis that they constitute "popular paranormal and extraordinary beliefs, having received considerable interest in the media" (Otis and Alcock, 1982, p. 78). Thirty items were selected covering traditional religious beliefs, luck, spirits, psychic phenomena, fortune telling and creatures (such as the Loch Ness monster). However, the factorial structure of the scale remained unverified.

Other authors at this time approached the measurement of paranormal belief using more simple measures designed to divide respondents into believers and non-believers. Thalbourne and Haraldsson (1980) employed a ten-item scale assessing belief in ESP and personal experiences of ESP as well as belief in an afterlife. Items had three alternative responses; "true" (two points), "uncertain" (one point) and "false" (zero points). Scores over the 10 items were summed and those scoring in the top third were given the status of sheep i.e., believers, and those in the bottom third given the status of goats i.e. non-believers. Similarly, Blackmore and Troscianko (1985) asked respondents to indicate their degree of belief in each of four phenomena (precognitive dreams, telepathy, extra-sensory perception, and their own psychic ability) on a 5-point scale. Summation of responses informed categorisation of believers and non-believers. This "sheep-goat" approach was later employed by Brugger et al. (1993) who, somewhat crudely, had respondents indicate on a 6 point scale whether they believed that extra-sensory perception exists.

Randall and Desrosiers (1980) pioneered movement away from a simple distinction between believers and non-believers, and definite empirical research into the actual

underlying structure of paranormal beliefs with the construction of their Supernaturalism scale. They generated 40 items considered to reflect a broad spectrum of paranormal beliefs including astrology, ESP, UFO visitations, magic and witchcraft. A rotated principal components analysis (PCA) revealed four factors: supernaturalism, acquiescence⁹, astrology, and UFO's. Of the four factors, supernaturalism accounted for 70% of the total variance. Randall and Desrosiers (1980) considered the supernaturalism factor to reflect a general belief component was a unidimensional generalised cognitive personality trait. However, Grimmer and White (1990) recognised problems in their reasoning. Firstly, the factor analytic procedure employed (PCA), which has the tendency to produce large single factors regardless of the underlying structure. Secondly, the extraction of both the third and fourth elements (astrology and UFO) suggested that the use of another factor analytic procedure was required, where a more complete and inclusive structure may have emerged. Following the work of Randall and Desrosiers (1980), McGarry and Newberry (1981) produced a unidimensional scale assessing acceptance or rejection of the paranormal. They used this to investigate the relationship between paranormal belief and locus of control. Their assumptions about the underlying structure of paranormal (based on a PCA), reflected a limited range of paranormal beliefs (e.g., psi - ESP abilities) and a few related phenomena. Therefore, McGarry and Newberry's (1981) assumptions regarding the dimensionality of paranormal belief is unsurprising.

3.1.3. Popular scales

Wiseman and Watt (2006) suggest that the most extensively used scales assessing paranormal belief today are the ASGS (Australian Sheep-Goat Scale; Thalbourne and Delin, (1993) and the PBS (Paranormal Belief Scale; Tobacyk and Milford, 1983; RPBS Revised Paranormal Belief Scale, revised by Tobacyk, 1988). Delineation of the ASGS occurs first.

The ASGS (18 statements); sixteen relate to belief in/experiences of extra-sensory perception (ESP) and psychokinesis (PK), while two residual items relate to belief in the after-life. The ASGS therefore, represents a belief measure (paranormal) which falls within the conventional boundaries of parapsychology and includes items on three traditional domains of parapsychological investigation; ESP, PK and the survival hypothesis (Irwin and Watt, 2006). As such, this measure has most often been utilised by parapsychologists

⁹ Items loading onto this factor were assumed to reflect acquiescent responding.

investigating the relationship between sheep and goats i.e. belief in the paranormal and performance in laboratory tasks. In this context, experiments have often documented the phenomenon known as the “sheep-goat effect” in which those who believe in psi tend to perform better on psi tasks than those who do not (Lawrence, 1993).

Criticisms of the ASGS may be in part, down to the number and type of items, i.e., where 18-items successfully demonstrate an elucidation then this appears to suggest that explaining paranormal beliefs is simple (Lawrence, 1995). However, perhaps lack of comprehensive coverage of the core psi facets in itself is a problem for the ASGS, for this measure mainly tackles ESP, life after death and psychokinesis (Thalbourne, 2010). Additionally, the Lange and Thalbourne’s (2002) version of the Australian Sheep-Goat Scale is considered to be simply an index of the “sheep-goat dimension”, that is, belief or disbelief in psi processes, and lacking interval-level measurement (Irwin and Marks, 2013).

The RPBS, however, represents a more complete and more multidimensional nature measure of paranormal belief, which falls outside traditional parapsychology, containing a wide range of phenomena for instance, unidentified flying objects, superstition, ESP, precognition, existence of hell and the Loch Ness monster. Due to the wide scope of the PBS and RPBS, it is this scale most commonly used by psychologists (as opposed to parapsychologists) examining paranormal belief correlates (see Goulding and Parker’s 2001 review). Following factor analysis of an original pool of 61-items, Tobacyk and Milford (1983) developed a 25-item scale producing seven distinct subscales. Tobacyk (1988) later revised the Paranormal Belief Scale replacing items and adding an additional item. Tobacyk (1988) also claimed changes resulted in greater validity and reliability. (For a more complete index of current/contemporary measures see appendix B, *Compendium of Measures*, p362 - 380)

3.1.4. Lawrence’s critique of the PBS

However, despite major improvements on its predecessors and its accepted use, Tobacyk and Milford’s (1983) Paranormal Belief Scale has not been devoid of problems. Lawrence (1995) gave a compelling conceptual and methodological critique of the scale that questioned both the construct validity and face validity of the PBS. Lawrence (1995) delineates below.

In the original version of the scale, the items on the precognition subscale appeared ambiguous, and replaced with four new questions. Lawrence (1995) highlighted the fact that

although this may have increased the reliability of the precognition subscale, the actual status of the subscale as a factor required scrutiny, a validation procedure, which Tobacyk had failed to perform. Similarly, Lawrence (1995) criticised the status of the psi subscale, suggesting it failed to cover the content of psi. Whilst, psi is composed of PK and ESP, with ESP comprising telepathy, clairvoyance and precognition, the psi subscale only addressed belief in PK and telepathy. Hence, belief in clairvoyance appeared overlooked whereas precognition appeared as a factor in its own right. Thus, Lawrence (1995) argued that both the precognition and psi subscales were poor measures of their respective constructs due to item content and comprehensive coverage respectively.

Moreover, Lawrence (1995) questioned the face validity of some of the subscales of the PBS. Firstly, the witchcraft subscale contained highly ambiguous items, which rendered the scale invalid. For example, the item “witches do exist” could be regarded as true whether or not an individual believes that witches actually have real magical powers, hence the statement could be endorsed by both “sceptic and Wicca worshipper alike” (Lawrence, 1995, p. 13). Consequently, such items would fail to differentiate between believers and non-believers in the paranormal. Similarly, the items on the extraordinary life forms subscale also came under criticism by Lawrence (1995). It was claimed that the status of some of the items on the subscale were of dubious paranormality e.g. “The Loch Ness monster of Scotland exists”. Lawrence (1995) argued that the mystery surrounding the Loch Ness monster originated from its elusiveness as opposed to the possession of any parapsychological characteristics i.e. characteristics regarded as impossible according to current scientific principles. Furthermore, the validity of the item “there is life on other planets” was questionable. Many people may believe that life exists on other planets, yet may not believe in other aspects of paranormal phenomena. Thus, again this item is unlikely to differentiate between believers and non-believers in the paranormal and leaves potential for enhancement of items.

A final PBS criticism is the independence of factors assumed in the factor structure of the scale. Lawrence (1995) claimed that evidence for orthogonality in the scale, loosely based on a premature dismissal of evidence for correlations between subscales. For example, the psi subscale correlated .49 with spiritualism, .40 with precognition and .34 with witchcraft, which offered sufficient evidence for relatedness between subscales. Further doubt regarding the orthogonal structure of factors, has been expressed by others (see Hartman, 1999; Lawrence et al., 1997).

Lawrence (1995) argued that construct and face validity of the paranormal belief scale was questionable, rendering the scale less than satisfactory as a device for measuring individual's belief in the paranormal. Following this a priori critique, Lawrence et al. (1997) carried out a confirmatory factor analysis that provided actual empirical evidence for much of Lawrence's (1995) claims. The CFA demonstrated that a five-factor model of the PBS, in which interrelatedness between factors existed, providing a significantly better fit to the data than Tobacyk's orthogonal seven. Improvement became likely because of the specification of an oblique factor structure.

However, Tobacyk and Thomas (1997) criticised research conducted by Lawrence et al. (1997), notably for its small sample size, claiming that it was too small to constitute a reliable database for performing confirmatory factor analysis on a 26-item scale. Nevertheless, Lawrence and De Cicco (1997) have replicated the pattern of results found by Lawrence et al. (1997) on a larger sample. Despite this, Lawrence and De Cicco (1997) recognised that although the oblique five-factor model represented an improvement on an orthogonal seven, the five-factor model still fell short of acceptance. To complicate matters further, Tobacyk and Thomas (1997) argued that a mixed model comprising of both orthogonal and oblique interrelationships would best represent the factor structure of the scale, whereas others such as Hartman (1999) using an alternative method of minimum average partial and parallel analysis criteria argued for the existence of just four factors. This continuing reciprocal debate led many researchers to suggest that the various problems associated with the PBS necessitated the development of a completely new measure of paranormal belief (e.g. Hartman, 1999; Lawrence, 1995; Lawrence and De Cicco, 1997).

Other researchers such as Lange, Irwin and Houran (2000) have offered new claims concerning the underlying structure of the paranormal belief scale. Lange, Irwin and Houran (2000) suggest that some of the items of the PBS demonstrated differential item functioning i.e. some items responded differently according to the respondent's age and gender, even when considering equally believing respondents. This, they argued, resulted in the emergence of "phantom factors". Using a Rasch scaling method¹⁰¹¹, which eliminated the

¹⁰ The Rasch model is a one-parameter logistic model within item response theory (IRT) in which the amount of a given latent trait in a person and the amount of that same latent trait reflected in various items can be estimated independently yet still compared explicitly to one another. It allows observations of respondents and items to be connected in a way that indicates the occurrence of a certain response as probability rather than certainty and maintains order in that the probability of providing a certain response defines an order of respondents and items. The Rasch model is a logistic one-parameter model allowing observations of

differential item functioning (Bradley et al., 2010) the authors proposed the existence of two distinct factors, New Age Philosophy (NAP - containing 11-items drawn almost entirely from the psi, spiritualism and precognition subscales) and Traditional Paranormal Beliefs (TPB - containing 5 items drawn from the traditional religious beliefs and witchcraft subscales). Several researchers investigating the correlates of paranormal belief (e.g. Irwin, 2003; Thalbourne, 2001) have, recently adopted this two-factor model, with some reporting construct validity for the two-factor structure (Houran and Lange, 2001). However, following Rasch scaling, some of the original items of the PBS load neither onto the New Age Philosophy cluster nor onto Traditional Paranormal Beliefs. This has led Lange et al. (2000) to acknowledge the possibility that adding new items; produces new paranormal belief clusters. Thus, allowing for broader facets and extended measures.

To summarise, following the debate concerning the factor structure of the PBS, many researchers advocate the development of an entirely new measure of belief in the paranormal. Nevertheless, despite the promising recent research utilising Rasch scaling procedures (Lange and Thalbourne, 2002; Bradley et al., 2010), it is still acknowledged that the most widely used scale to assess belief in the paranormal (even when accepting a two factor structure), is still likely not to be a entirely satisfactory instrument to measure paranormal beliefs.

3.1.5. More recent additions

During the 1990's a series of new scales have been utilised in parapsychological research. Blackmore and Moore (1994) devised a Paranormal Belief scale, which investigated the relationship between belief in the paranormal and cognitive style. Upon inspection of the 10-items, there is a predominance of items concerning the existence of psychic ability whereas a complete absence of items relating to belief in/ experience of PK, and only a single belief in

respondents and items to be connected indicating the occurrence of a certain response as probability rather than certainty. It also predicts that a the person endorsing an extreme statement, or answering a difficult item, should also endorse all less extreme statements, or answer correctly the less difficult items (Wright and Masters, 1982). In this context, Linacre (1995; 1999; 2012) and Bradley et al. (2010) report that item difficulty as well as difficulty to endorse are the main reasons affecting participant answers.

¹¹ Rasch techniques mean that respondents can be placed along a continuum whereby order is determined by level of difficulty (logit scale-log odds unit; "a unit interval scale in which the unit intervals between the locations on the (combined person-item scale) have a consistent value or meaning" (Bond and Fox, 2001, p. 29) in supporting some items, whilst ability or willingness to approve others (Bond and Fox, 2001).

an afterlife item. Thus, Blackmore and Moore's (1994) paranormal belief scale appears limited in its coverage, even for a more traditional paranormal belief measure. Wiseman and Morris (1995) also developed their own 'Belief in the Paranormal Questionnaire' consisting of questions relating to belief in ESP and PK. Although item coverage was relevant for their study, which was investigating paranormal belief and the recollection of different aspects of pseudo-psychic demonstrations, this scale is also limited due to its neglect of belief in afterlife.

Randall (1997) developed a shortened version of the Supernaturalism Scale (Randall and Desrosiers, 1980), named the 'Paranormal Short Inventory' that included 13-items relating to precognition, ESP, astrology, magic/rituals, and UFO's. The paranormal belief scale correlations indicate convergent validity exists (Tobacyk and Milford, 1983). However, while including a broader spectrum of potential paranormal beliefs such as UFO's, the Paranormal Short Inventory fails to cover belief in PK and afterlife, two areas thought to represent the traditional domains of parapsychological investigation. Therefore, the above scales with their limited coverage, by no means represent improvement on Tobacyk and Milford's (1983) Paranormal Belief Scale.

Kumar, Pekala and colleagues have developed a more promising attempt to develop a new measure of paranormal belief. For example, the Anomalous Experiences Inventory (Kumar et al., 1994) contains 70 "true or false" items that form five subscales; anomalous/paranormal: experiences, beliefs, abilities, fear and drug use. The authors claim that the AEI is the first self-report questionnaire to assess fear of anomalous/paranormal experiences. Furthermore, an advantage of the AEI is its ability measure paranormal belief, experience and ability independently. This in turn allows for the assessment of the relationship between these three constructs, for example, do paranormal beliefs encourage involvement with paranormal experiences, do paranormal experiences promote paranormal beliefs, or alternatively is the relationship between the two constructs bidirectional. The AEI has received preliminary evidence supporting its reliability and validity.

Gallagher et al. (1994) found that the experiences, beliefs and abilities subscales all correlated significantly with three other paranormal measures; Tobacyk's (1988) Revised Paranormal Belief Scale, Davis et al. (1974) belief scale, and a scale measuring experience of paranormal phenomena (Richards, 1988). Furthermore, the AEI belief subscale was found to correlate more highly with the two belief scales than with Richards (1988) experiences scale, whereas the AEI experiences and abilities subscales were found to correlate more

highly with Richards (1988) experiences scale than with the two belief scales. Further support for the AEI's validity exists in the correlations between the AEI and personality measures thought to be associated with belief in the paranormal. For example, the beliefs, experiences and abilities subscales correlate significantly with measures of experience seeking and magical ideation.

Nevertheless, given that the correlation between the AEI belief subscale and Tobacyk's Paranormal Belief scale was just .58, and the correlation between AEI belief subscale and Davis's belief scale was just .56, this indicates that there is a large amount of variance unshared by the AEI belief subscale and other measures of paranormal belief. In turn, this suggests that it is unlikely that the AEI belief subscale is measuring the same underlying construct as other paranormal belief measures. This may be because of the inclusion of items in the AEI that are anomalous phenomena, as opposed to strictly paranormal phenomena. For example, the AEI belief subscale includes the items; "I believe I have great power and energy within me waiting to be awakened", and "I want to understand the further reaches of my mind". Both these items appear ambiguous in terms of their paranormal status, and appear more relevant to dissociative tendencies than to belief in actual paranormal phenomena. Furthermore, the subscale includes the item; "I believe in the unconscious", this has particularly questionable paranormality. Such items endorsed by those who, for example, are familiar with psychological literature such as the writings of Sigmund Freud (Freud, 1911b). Therefore, it is difficult to see how such an item could differentiate between believers and non-believers in the paranormal. In summary, due to the inclusion of items relating to anomalous beliefs as opposed strictly to paranormal beliefs, the AEI considered to lack face validity as a measure of belief in the paranormal.

Therefore, it appears that the measures developed since Tobacyk's (1988) revised version of the Paranormal Belief Scale have been no more successful in their attempts to construct a valid measure of paranormal belief. Such measures either have been limited in their coverage of paranormal phenomena, or as with the AEI, have produced a rather 'diluted' measure of paranormal belief including items of questionable paranormality. Consequently, it is not surprising that in a review of the psychometric instruments used in research on paranormal beliefs/experiences published between 1993 and 1999, Goulding and Parker (2001) found that out of 29 different research groups, 16 groups utilised the PBS in 21 out of 76 studies. Comparisons made with just four research groups who used the ASGS, and three research groups who employed the AEI, in 24 and 5 studies respectively.

Therefore, despite the development of alternative measures, Goulding and Parker (2001) concluded that the Paranormal Belief Scale (Tobacyk and Milford, 1983; revised by Tobacyk, 1988) remains the most popular and widely used measure of paranormal belief.

3.1.6. What is missing from current paranormal measures?

Example of the issue of ghosts/haunting, UFO's, witchcraft and positive superstition.

If we are to refuse to accept the present available measures of paranormal belief, the question remains, where do we go from here? In his consideration of the PBS, Hartman (1999) made a series of recommendations for anyone undertaking the task of creating a new measure of belief in the paranormal. The recommendations regarding scale construction included the suggestion of producing numerous items representative of every imaginable sub-construct of paranormal belief, whilst keeping in mind the comments of Lawrence (1995) concerning the face validity of certain items. Therefore, following Hartman's recommendations, the next step in the development of a new scale would be to consider if there are any facets of paranormal belief, which the current RPBS fails to cover entirely or partially.

Firstly, within the scope of the RPBS several items pertaining to haunting, ghosts and poltergeist experiences appear to be lacking. However, there is a popular belief that poltergeist experiences are the responsibility of the spirit of a deceased person, which renders the link between poltergeist experiences and the survival hypothesis unquestionable. Similarly, the traditional theory of ghosts as an aspect of the individual's existence that survives bodily death also renders such phenomenon inextricably linked to the survival hypothesis (Irwin and Watt, 2006).

Conversely, more recent paranormal belief measures have included items on hauntings, ghosts and poltergeist experiences. For example, the Anomalous Experiences Inventory (Kumar et al., 1994) includes 8-items, judged as equivalent haunting/poltergeist experiences. These include items, which address two broad types of occurrences; seemingly subjective phenomena such as apparitions "I have seen a ghost or apparition" and more objective phenomena relating to the physical environment, or the movement of objects "I have experienced objects appearing or disappearing around me (materialization or dematerialization)". Further development of a "Poltergeist subscale" arose within two published pieces of research, allowing comparison of existing measures alongside haunting items (Houran and Thalbourne, 2001; Kumar and Pekala, 2001). Houran and Thalbourne, (2001) also found that the poltergeist subscale correlated positively with the Australian

Sheep-Goat scale ($r = .54$), suggesting that belief in such phenomena may indeed be a facet of paranormal belief. However, the Poltergeist subscale is admittedly rather limited in its content (Houran and Lange, 2001); it covers perhaps only three of seven categories relating to haunt and poltergeist experiences (Lange et al., 1996).

In summary, it appears that the majority of measures of paranormal belief, including the most popular measure, the PBS, fails to cover a key facet of parapsychology; that of hauntings, ghosts and poltergeist experiences. Where some measures of paranormal belief such as the AEI have sensibly considered these phenomena, they have done so in a limited fashion. Therefore, future measures of paranormal belief must be sure to cover all facets of paranormal phenomena including ghost and poltergeist experiences. Furthermore, where they do, they must do so in full, covering all aspects such experiences.

Secondly, when considering the coverage of the PBS there is only one item pertaining to belief in extra-terrestrial life (“There is life on other planets”). Diaz-Vilela and Alvarez-Gonzalez (2004) who argue that because UFO believers obviate the lack of physical evidence of extra-terrestrial existence, particularly evidence for alien visitations, and such beliefs considered typical paranormal beliefs have echoed this observation. However, the single item relating to belief in extra-terrestrial life, which is included in the PBS, reflects perhaps a less radical and more believable claim concerning the existence of life on other planets, which as Lawrence (1995) acknowledges, endorsement by non-believers. It is possible that the more extreme beliefs, regarding life on other planets visiting earth i.e. UFO visitations, may represent an aspect of paranormal belief.

In support of this supposition, Diaz-Vilela and Alvarez-Gonzalez (2004) administered the PBS with the addition of a number of items, four of which reflected belief in extra-terrestrial life and UFO visitations. Following factor analysis, the authors found the existence of 8 factors, for example, extra-terrestrial life and its presence on earth. It is important to note that belief in extra-terrestrial life forms originally belonged to the extraordinary life forms factor in Tobacyk and Milford’s (1983) analyses, however when including a greater degree of beliefs, it formed a factor in its own right. This suggests that such beliefs that cover *both* belief in extra-terrestrial life and extra-terrestrial visitation on earth, may represent an additional facet of paranormal belief. Therefore, anybody endeavouring to construct a new measure of paranormal belief should look to include more items on extra-terrestrial life, which covers all degrees of such belief ranging from belief in

the existence of extra-terrestrial life on other planets, to belief in extra-terrestrial visitations to earth.

The final consideration regarding the coverage of the PBS concerns the superstition subscale which contains 3 items; “black cats can bring bad luck”, “if you break a mirror, you will have bad luck”, “the number ‘13’ is unlucky”. All of these items classified as “negative” superstitions in that they all reflect the notion that certain behaviours or omens are mysteriously associated with unlucky or harmful consequences (Wiseman and Watt, 2004). However, as Wiseman and Watt (2004) argue, there are “positive superstitions” such as carrying a lucky charm, touching wood or crossing fingers, which reflect a desire to bring about beneficial consequences by promoting good luck or avoiding bad luck. Such positive superstitions falling into this category might serve different psychological functions than the more negative superstitions (Wiseman and Watt, 2004). They found cautious empirical support of this claim. In summary, recent research into superstitious belief suggests that the PBS is an incomplete measure of superstitious belief, and thus paranormal belief. Therefore, the development of a new measure of paranormal belief should remain attentive of these findings to ensure full coverage of the paranormal domain, incorporate items reflecting belief in both negative and positive aspects of the anomalous whilst incorporating broader superstition and the more comprehensive elements of good fortune.

In summary, with contemplation about current empirical literature, improvements within the current research scale may need to include the development of three significant areas to extend the current measures. These as follows: increase haunting type items (for example, ghosts and poltergeist experiences); add additional extra-terrestrial items (for example, belief in life on other planets and extra-terrestrial visitations) and, increase the number of astrological and witchcraft statements, whilst expanding both breadth and complexity of the items/subscales.

3.1.7. Are any superfluous constructs included: The issue of religious beliefs?

In developing a new measure of paranormal belief, it would also seem rational to consider not only whether current measures have neglected certain facets of the paranormal, but in addition, whether there are certain phenomena included in current scales which appear unnecessary. Fundamental to paranormal development is the continuing debate concerning paranormal beliefs and religious beliefs. It appears that both religiosity and paranormal belief imply a belief in the existence of anomalous phenomena not explained by science

(Hergovich et al., 2005). Hence, once a person subscribes to one set of paranormal beliefs, it is seen as easy to subscribe to another set (e.g., whether this is belief in psi or belief in life after death) (Rice, 2003). Consequently, this suggests that religious belief plays an important part in paranormal belief. Specifically, sharing variance with belief in the paranormal. Empirical evidence provides support that a positive relationship exists between the two constructs. For example, Thalbourne and Houtkooper (2003) found a correlation of .54 between the Australian sheep-goat scale and belief in religiosity. Other researchers have also established that a positive relationship among certain religious and classic paranormal beliefs exists (e.g., Goode, 2000; Irwin, 1985; Orestein, 2002).

Conversely, a conflicting view exists concerning the relationship between belief in the paranormal and religiosity. Specifically, those who lie outside of mainstream religions will be those most in need of an alternative set of ideas that address the same kind of ideas produced by belief in religion (Emmons and Sobal, 1981; Tobacyk and Wilkinson, 1990). Emmons and Sobal, (1981) suggest classic paranormal belief functions as a religious substitute for people who are outside mainstream religions. To complicate matters, further empirical work appears to support the notion of an inverse relationship exists between the religious belief and classic paranormal phenomena (e.g., Bainbridge and Stark, 1980; Emmons and Sobal, 1981; Tobacyk and Wilkinson, 1990).

Thalbourne and O'Brien (1999) propose further explanation of this relationship where a paranormal and religious measurement tools develop through quantitative research. However, they point out that reports are difficult to elucidate. For example, while using the Australian sheep-goat scale, the authors obtained a significant negative correlation with the Religion-Puritanism Scale from the Wilson-Patterson Attitude Scale (Wilson, 1975), a correlation close to zero with traditional religious beliefs subscale from the PBS and a significant positive correlation with the Haraldsson (1981) religiosity scale. Such findings illustrate that the relationship between religiosity and paranormal belief has been, by no means, easy to explain.

Research that is more recent has examined the relationship between paranormal belief and religiosity (Hergovich et al., 2005). They suggest that religion, like paranormal belief, is a multidimensional construct. A positive correlation exists between paranormal belief and that both intrinsic religiosity and self-reported religiosity exists (Hergovich et al., 2005). However, there were no associations found between paranormal belief and extrinsic religiosity. This takes into account differing aspects of religious belief (intrinsic and

extrinsic). Furthermore, comparing religious affiliations produces a positive relationship between paranormal belief and religiosity for those without religious affiliation. Whilst, a small positive relationship exists between the two constructs amongst Catholics, a negative correlation exists between religiosity and paranormal belief amongst Protestants. This research validates the multidimensional nature of both constructs, suggesting there is no simple answer of the relationship between religiosity and paranormal belief (Hergovich et al., 2005).

In summary, to date research concerning the relationship between religiosity and paranormal belief remains somewhat inconclusive. The assumption that religious belief is an important facet of paranormal belief rests on dubious and uncertain foundations. Consequently, researcher's intent on developing new measures of paranormal belief must remain mindful of this ongoing issue and wary of including religious items in a new (paranormal/supernatural) scale without further evidence to suggest, that religiosity is indeed not a fundamental facet of paranormal belief (see Schofield et al., 2016).

3.1.8. Conclusion

Examination into the nature of paranormal belief is only as good as the devices used to measure it (Lawrence, 1995a, 1995b). Indeed, Lawrence et al. (1997) contend the nature and correlates of paranormal belief i.e., in terms of the status of such scales, should have been further developed (Irwin, 2006). The current appraisal has demonstrated that despite considerable endorsement, the most popular and widely used measure of paranormal belief, the Paranormal Belief Scale (Tobacyk and Milford, 1983; Tobacyk, 1988) is perhaps, less than satisfactory for this purpose. It has been criticised on the grounds that it possesses inadequate subscales, contains ambiguous items, fails to cover important components of parapsychology and includes religious belief items (Roe, 1995, 1999). Furthermore, in consideration of the more recently developed measures, some appear limited in their coverage of paranormal phenomena, whereas others such as the AEI, could be regarded a somewhat diluted measure of paranormal belief due to its inclusion of anomalous as opposed to strictly paranormal beliefs.

The current thesis outlines what is required by way of development of a new measure of paranormal belief (MMUpbs). This is in line with Wiseman and Watt (2004, 2006) aphorism where there is a need for the development and pervasive utilization of a more reliable, valid and fine-grained measure of paranormal belief. The current doctoral thesis

should assist in answering some of the unsolved ambiguities associated with current measures, item design, and the formation and maintenance of such beliefs.

This process hopes to advance research and knowledge concerning the nature, correlates and implications of belief in the paranormal whilst utilising both existing and new anomalous/paranormal items. Chapter 4 of this PhD doctoral thesis evaluates further measurement tools and both contemporary parapsychological researchers and enquiry. Implications for research appear below.

3.2 Current Research in paranormal belief

3.2.1. Contemporary research in paranormal belief

Paranormal phenomena has been reported in various forms for many years exploring biblical tales of extraordinary powers, phantom airplanes in the skies and ghostly comrades seen during World War II. According to Bader et al. (2010) manuscript 'Paranormal America' they explain that it is not that specific encounters/experiences are not real; rather, it is how these phenomena subsequently change in appearance during interpretation. For example, confabulation, visual substitutions or even formant noise and hallucinations caused by magnetic fields simply affect explanations. In addition, remarkable narratives seek to provide answers to the type of people who believe in the paranormal. It asks most importantly about the believers themselves and seeks to unearth the social correlates and factors that underpin paranormal believers (Bader et al., 2010).

Here Bader et al. (2010) explores a whole range of studies/surveys (meta-analysis) that tap into paranormal beliefs and experiences across America and as such, point the way that research must be conducted in order to full appreciate the numerous demographic, religious, paranormal, lifestyle factors that make up a general population sample. Other recent studies have sought to explain experiences of anomalous connectedness (telepathy) between twins (Brusewitz et al., 2010; Parker, 2010) in order to further our understanding of such psychological and physiological events. Additionally, to explain paranormal beliefs, development of more suitable measures, needs to tap into the main stream populous and ask pertinent questions about paranormal belief. Critical exploration of known laws, principles within science does help explain anomalous and paranormal experiences/events. Consequently, if a logical answer presents itself, then no further explanation is required. However, critical exploration of paranormal belief, relates to the experient's perception of presumed phenomena (experiences relative to the percipient) has to be rationalised and

further understood, whilst belief in paranormal phenomena needs separation and greater clarification (Shermer, 2011).

Scientific understanding enables us to make some sense of the world around us, and through investigative hypothesis testing and logical reasoning, we are able to contemplate and explain most of the anomalous phenomena. However, when known scientific laws and principals are exceeded parapsychology research is required, to try to explain the unexplainable. Making sense of paranormal experiences involves several aspects of psychology (i.e., thinking, reasoning, deduction, perception, memory and problem solving). In this context, several sophisticated cognitive mechanisms allow formulation, evaluation, re-evaluation and further development of an apposite paranormal belief proposition (Tobacyk and Milford, 1983). However, perceptual distortions and a structural modelling approach led to a more affective and cognitive dynamic of experient's interpretation of all things ambiguous (Lange and Houran, 1998), whilst further stimuli examination leads to further established attributional models of delusion (Lange and Houran, 1998).

Thus, contemporary research already outlined, provides a suitable systematic methodology with which to assist elucidation of belief in the paranormal. Pertinent research and researchers important in terms of direction for the current doctoral thesis help inform and demonstrate the importance of contemporary research/researchers. Whilst this is not an exhaustive list, it does help establish those who have been important to the research writing process.

An extensive literature review identified paranormal belief measures. All of the literature and research contained within this doctoral thesis guided, informed and facilitated both statistical design and method if analysis. The research to date has allowed exploratory and confirmatory factor analysis whilst directing subsequent research towards further validity tests against an external construct. This allowed detailed exploration of the nature and composition of the paranormal belief facets. Conversely, whilst all of the literature has certainly assisted and shaped this thesis, several authors and their work are more prominent in terms of forming a functioning framework that assisted thesis development (i.e., Dagnall, Irwin, Thalbourne, Houran and Lange, and Jinks and Storm).

3.2.2. The research of Dagnall (2007-2015)

Previous research conducted by Dagnall et al. between (2007) and (2015) was an important contributing factor helping to not only outline the basic premise for a paranormal research

project, but also supported the design and structure of the first two research studies of this thesis. The plan was to draw a complete set of items from several current paranormal measures and by so doing, construct an expansive and more complete set of facets/items. In line with Dagnall et al. (2007), the current sample of items drawn from an array of potential items, represented the construct (paranormality) under examination (Ghiselli et al., 1981). This established a method that generated well-articulated theoretical foundation that would indicate the content domain for the new measure, whilst demonstrating adequate content validity (Hinkin, 1998). Consequently, factor analysis allowed development of a more extensive paranormal belief measure, improving facet composition and item content.

Four papers proved to be extremely beneficial and important guides for this PhD thesis. The first of these papers, paranormal belief and reasoning (Dagnall et al., 2007) clearly delineated how believers in the paranormal experienced what they perceived as genuine paranormal phenomena whilst proposing that this may be due to probabilistic reasoning bias. Specifically, they hypothesised that it was either because of a function of faulty probabilistic reasoning or symptomatic of a more widespread weakness in cognitive ability (Dagnall et al., 2007). Whilst probabilistic reasoning was not part of the initial factor analysis phase of this thesis, subsequent validity testing allowed comparison/validation of the new measure alongside probabilistic reasoning measurement items to determine whether performance varies differentially as a function of belief in the paranormal.

This research suggests belief in the paranormal may arise from a specific weakness in reasoning; perception of randomness, which is independent of general probabilistic reasoning abilities (Dagnall et al., 2007). Thus, the initial phase required item improvement and facet extension in order to generate a more comprehensive scale, which allowed validity testing. Secondly, research, which explores common paranormal belief dimensions (Dagnall et al., 2010b), helped to outline current dimensions of Paranormality, whilst motivating further analysis and literature enquiry. This research certainly informed the current thesis by exploring further the nature and structure of paranormal beliefs. Both exploratory factor analysis and principal components analysis produced a nine-factor structure. However, whilst this work produced much needed purification of collective items (including the RPBS, ASGS etc.) it was not without issues; some original items failed to load on any of the nine factors, directing further analysis and the addition of supplementary belief items and clusters (Lange, Irwin and Houran, 2000).

Consequently, the current PhD thesis addresses additional analysis and extends the purification process by expanding upon current understanding of belief in the paranormal. Moreover, in line with Dagnall et al. (2010b) it was envisaged that an amalgamated and broader measure would permit further exploration of conceptual overlap between established belief measures (RPBS, ASGS etc.). This also guided further examination of the association between paranormal belief dimensions such as PK and ESP (leading to a single independent psi factor where variance was shared) as well as dimensions previously studied independently (e.g., haunting and alien life). Finally, it was envisaged that further assessment of the inter-scale dimensionality of paranormal belief and common factors established from combinations of individual scale items, would help identify additional factors of belief not currently measured by established scales (Diaz-Vilela and Alvarez-Gonzalez, 2004).

The Dagnall et al. (2010b) research outlined nine factors that provided important groundwork to the current thesis: extending item design e.g. commonality between extra-terrestrial and paranormal beliefs outlined by Chequers et al. (1997); Lange et al. (2000) and; Tobacyk (1988). Therefore, this research improved item breadth by combining extra-terrestrial life and UFO-related factors significantly (Chequers et al., 1997), but also left the way open to the current PhD thesis to further extend item and factor breadth and inter scale dimensionality.

Eight additional items were developed assessing beliefs in the existence of life elsewhere in the universe, abductions are occurring on earth and alien life forms have influence over the earth (Dagnall et al., 2010b). The development of new items was important as this guided the development of new items for less well-configured facets such as, astrology and witchcraft. The method of pooling items, conducting factorial analysis allowed further reduction/interface across items sharing variance. The extra-terrestrial measure formed two factors (following Principal Component Analysis - PCA) one assessed belief in the existence of life on other planets (6-items) and the other assessed belief in extra-terrestrial visitations to earth (8-items). Results from this essential paper pointed to respondents who endorse the alien/extra-terrestrial items having a general propensity to endorse other paranormal beliefs. In this context, it was important to continue with item development within the current research.

Recent developments have included research that takes into account relationships between paranormal beliefs (Dagnall et al., 2007), reality testing (RT) (Dagnall et al., 2010d, 2014) and reasoning bias (Dagnall et al., 2010b).

3.2.3. The research of Irwin (1993-2015)

Paranormal research conducted by Dr Harvey Irwin (who for well over 35 years has been a leading mainstream psychologist exploring psychological themes as well as those considered paranormal) has greatly influenced the design and construction of this doctoral thesis. From early literature that explored both traditional psychological and later the more paranormal areas including out-of-body experiences (OBEs), near-death experiences (NDEs), lucid dreams etc. important background material was assessed (Irwin and Bramwell, 1988). Such research has received critical appraisal; Irwin is considered by his peers to be a pioneer in research exploring out of body experience (Alvarado, 2012), as well as tackling paranormal belief interpretation, fostering a greater appreciation and understanding of the paranormal. Some pertinent examples are presented (see research outlining the following areas: Out of Body experience, Irwin, 1980, 1981, 1985; Irwin and Bramwell, 1988; Belief in the Paranormal, Irwin, 1993, 1999, 2004, 2009, and more recently; Parapsychological experience and cognitive processes, Irwin et al., 2012a, 2012b, 2013, 2014). While later articles investigate the relationship between intensity of conspiracy beliefs, proneness to belief incoherency or “doublethink”¹² (Irwin et al., 2015), as well as specific cognitive processes, it is important to note that these works have assisted in clarifying interpretation and have provided excellent grounding for delimiting boundaries of the paranormal (Irwin et al., 2013).

Additionally, certain textbooks have also shaped this doctoral thesis principally through providing clarity of factor structure, item/measure development and shaping the thorough analysis of anomalous/paranormal measures. Such research forms an important literature focus and context for paranormal correlates. The background material has provided a detailed and accurate explanation guiding development, validity and design of the current measure (MMUpbs) across all phases of this doctoral thesis. Two pivotal textbooks are worthy of mention, are highly praised and widely used. The first textbook titled ‘An Introduction to Parapsychology’ (Fifth Edition), co-authored by Dr Harvey Irwin and Dr

¹² In this context, George Orwell, (1946) offers an explanation: it is the power of holding two simultaneous beliefs; each cancelling each other out, whilst the ability to ignore certain irrefutable facts that are obvious and unchangeable that need to be confronted.

Caroline Watt presents a detailed explanation of the correlates of paranormal belief. It examines anomalous and paranormal phenomena, and clearly demarcates the origins of research in this area. This introductory textbook shapes investigations, theoretical approaches and comprehensively discusses the concept of paranormality and parapsychology. It explores domains of parapsychology (e.g., extra-sensory perception, psychokinesis), assesses the degree to which paranormal experience is perceived as authentic, while presenting a balanced approach to the complex nature of psychological processes, the underlying principles and phenomenology (Irwin and Watt, 2009).

Secondly, 'The Psychology of Paranormal Belief: A Researcher's Handbook' (Irwin, 2013) with a comprehensive framework of fifteen of the most important paranormal questionnaires, has proved to be an invaluable resource, providing fundamental background measurement information (reverse scoring, rasch scaling requirements) critical to initial questionnaire formation and subsequent re appraisals. The summary below remains important in terms of guiding this doctoral thesis write up:

'In the final analysis what fairly can be said of parapsychology? As far as spontaneous cases are concerned, it seems likely that there are numerous instances of self-deception, delusion, and even fraud. Some of the empirical literature likewise might be attributable to shoddy experimental procedures and to fraudulent manipulation of data. Nevertheless, there is sound phenomenological evidence of parapsychological experiences and experimental evidence of anomalous events too, and to this extent, behavioural scientists ethically are obliged to encourage the investigation of these phenomena rather than dismissing them out of hand. If all of the phenomena do prove to be explicable within conventional principles of mainstream psychology surely that is something worth knowing...; and if just one of the phenomena should be found to demand a revision or an expansion of contemporary psychological principles, how enriched behavioural science would be'. (Irwin, 1999, p. 319).

Such paranormal textbooks provide important introductions to parapsychologists' efforts to discover meaning in the anomalous. They have helped to elucidate paranormal phenomena and authenticate claims and findings. The current doctoral thesis has benefited from the

comprehensive origins of parapsychological research contained within these textbooks. Critical reviews from investigations of extra-sensory perception, psychokinesis, poltergeist phenomena, near-death and out-of-body experiences, and the evaluation of parapsychology have helped shaped the background to this thesis and assisted in improving the scientific approach to paranormal research (Irwin, 2009; Irwin and Bramwell, 1988). Namely, they outline meaningful accounts and explanations of the underlying psychological processes, measurement tools utilised that both extrapolate the human experience (from an experient's point of view) and quantify phenomenology effectively.

3.2.4. *The research of Thalbourne, Houran and Lange (1985-2012)*

The work of Thalbourne, Houran and Lange are also extremely important within the context of this doctoral thesis. I shall highlight a brief summary of the important aspects that inform this current research referring to pivotal papers. Initially, a book entitled *Parapsychology in the twenty-first century* (Thalbourne and Storm, 2005) both a comprehensive text and contemporary presentation providing exposition and development of paranormal beliefs. This provided important background to the paranormal belief research by substantiating degrees of conviction, as well as levels of endorsement that exists within the current wider population.

Michael Thalbourne, a prolific psi researcher in Australia, extensively developed research that explored ESP and PK (Thalbourne, 2000; Thalbourne and Storm, 2005a). While researching psi, Thalbourne developed and produced several noticeable additions to the paranormal lexis, for example, his theory of psychopraxia (Thalbourne, 2004) as well as the ASGS (Australian Sheep Goat Scale) a widely used measure of paranormal belief (Thalbourne, 2005, 2010). Such research helped establish the ASGS as a reliable measure of paranormal belief, where further improvement of the ASGS, through analysis of empirical findings and correlates allowed refinement and consolidation. Importantly, this measure was one of the two established scales used alongside the current MMUpbs development.

Houran and Lange were also important in terms of research output (see Houran and Lange, 2000, 2001, 2010, 2013) as well their influence for Rasch scaling (Lange and Thalbourne, 2002; Bradley et al., 2010). For instance, the procedure places paranormal belief and experience within a framework of the semantics of the ASGS (Lange and Thalbourne, 2002). This method is a standard employed during development of scales; one that corrects distortions for averaged group scores (Bradley et al., 2010). This doctoral thesis utilised the

rasch scale procedure to inform development of new and existing items (Refinement of 64-items following the factor analyses within phases I and II), which assisted with the suitability, item fit and item function determining which items should be used. Lange and Thalbourne (2002) demonstrate the effectiveness of the Rasch scale procedure to detect item bias and dimension distortions in order to quantify their effects. The current MMUpbs measure has applied this procedure. A recent discussion with Dr Lange at the (2014) BIAL conference, Porto, provided a further explanation of the Rasch scale procedure and the merits of accounting for skew, kurtosis and distribution of data. This proved to be an important meeting/discussion where further understanding and verification of the use of Rasch scaling, became available from the paper that developed Rasch scale refinement (Houran and Lange, 2000).

In addition, Houran and Lange's important work (*Hauntings and Poltergeists: Multidisciplinary Perspectives*) compiles a range of works examining psychosocial, cultural, psychological and physiological. It provides a background for 'things that go bump in the night' specifically bringing together many leading researchers, establishing a thoroughly comprehensive understanding of ghost/haunting/poltergeist perspectives. The book not only outlines pertinent background research but also delivers a series of thought provoking discussions and analyses. For example, the socio-psychological and physiological perspective involving interaction between percipient and environment can lead to a mistaken belief (false belief) created and maintained to regulate anxiety related ambiguous stimuli (Houran and Lange, 2001). Discussion also draws upon the notion that ambiguous stimuli are not ignored and those who perceive such occurrences as paranormal are allaying fears about the unknown (Houran and Lange, 2001). This clearly is an important work and establishes material and motivation for the current thesis offering ideas for extending items that are suitable for paranormal measurement. This text has been an invaluable source of information establishing important concepts and narratives that explore haunting, ghosts and poltergeists. This comprehensively outlines extensive background to the psychosomatic, socio-cultural, and multidisciplinary perspectives allowing a better understanding of paranormal phenomena.

3.2.5. The research of Jinks and Storm (2010-2017)

Finally, research conducted by Dr Tony Jinks and Dr Lance Storm guided this doctoral thesis. Their work challenges prevailing approaches to the measurement of paranormal belief, and advocates an alternative method, which offers new insights (Storm and Rock, 2015). Particularly, previous work may not accurately represent the socio-psychological tendencies and traits of strong believers (Jinks, 2012a; Storm et al., 2017). Specifically, two papers written by Tony Jinks (2012a, 2012b) indicate that differences exist between informed and uninformed believers. To this end, Jinks explored the division between those who endorsed primary items whilst contesting secondary items. Informed believers possess greater knowledge about paranormal phenomena. Correspondingly, they respond affirmatively to presented primary items (e.g., “Some places are haunted by the ghosts of dead people”) and related secondary item(s) (e.g., “When people die, part of them still remains on earth in another form”) (Jinks, 2012a). Those who respond affirmatively to just primary items are quasi-believers. Contrastingly, uninformed believers possess only superficial understanding of the paranormal. This approach has not received universal approval, some researchers have criticised the lack of refinement and clarity, meaning that further classification/typology of paranormal believers needs further research (Lange and Houran, 2012). Interestingly, they do give merit to this research, which generates interesting debate about believer(s) types and the nature and function of paranormal belief.

Interestingly, findings also suggest previous measures/scales do not clarify nor discriminate between different informed believers (sheep) or informed sceptics (goat) namely, those who complete questionnaires appear classified as different in terms of their beliefs. The first paper considers these quasi-beliefs for both believers and sceptics, and examines the specific item content across Paranormal Belief measures. This raises important questions regarding primary and secondary belief endorsement and measure design and accuracy, important to consider within the current doctoral thesis.

Jinks questions the validity of existing scales and raises concerns over the well-established multidimensional nature of beliefs (Johnston et al., 1994) suggesting that there are differences between paranormal facets, spiritualism, magical thinking and supernatural (Lindeman and Svedholm, 2012). This main enquiry arises from the exclusion of items, based on responses to questions. Differential item functioning (Houran and Lange, 2001; Lange et al., 2000) outlines secondary traits (age or gender) that perhaps play more of a role in belief formation and level of belief. Thus, respondents express equivalent ‘levels’ of

paranormal belief while personal item scores differ across various secondary traits, leading to a potential biased conclusion regarding the factor structure of belief (Jinks, 2012a). Jinks also raises another important point, that paranormal beliefs enumerated by paranormal measures (and items within) are stable concepts, where the analyses of scales produces a reliable measure we trust (Tobacyk and Milford, 1983; Storm and Thalbourne, 2005a).

He supposes that respondents might even believe in concepts they do not actually understand leading to measures that only touch the surface of paranormal belief understanding. This is important, as respondents require measures that are accessibly constructed, so they are in a position to understand questions asked (respond accordingly) while allowing researchers to investigate beliefs differentiating between both informed and uninformed believers alongside sceptics.

Importantly, by way of response, Houran and Lange (2013) outlined what we know about interval/paranormal measures currently:

1. That they are both reliable and valid as they are measured on an interval scale (Lange et al., 2000, 2001; Lange and Thalbourne, 2002), and these measures account for age and gender differences and are thought to be unbiased.
2. Secondly, they are on a continuum rather than “all or nothing” scales. According to Houran and Lange, (2010), and Houran et al. (2002), for example paranormal experiences and beliefs form both stable and statistical hierarchies.
3. Finally, paranormal beliefs are robust variables within parapsychological research for they reliably predict parapsychological and psychological outcomes (Irwin and Watt, 2007).

Subsequently, a more recent work by Lance Storm explored respondents who express strong belief in primary items while contesting secondary items (Storm et al., 2017). Storm et al. (2017) found scoring differences between primary and secondary items might indicate certain types of paranormal believer, allowing deeper analyses of paranormal belief (PB) and its putative relationships with deficits and dysfunctions. This extended the debate surrounding both nature and diversity of paranormal beliefs, specifically qualitative vs. quantitative, specifically, which beliefs are held and maintained (Jinks, 2012a; Storm et al., 2017). Whilst this research also outlines the notion of primary vs. secondary items, it is also important for development of a new measure (paranormal belief informedness scale - PBIS). This certainly supported the current thesis (similarly where measures were combined and

factorial analysis was employed) and at the same time helped to establish emergent differences between paranormal believers between responses and predictor variables, revealing level of informedness (Storm et al., 2017).

So, where does this leave the debate? Certainly, the current doctoral thesis began by attempting to address several limitations of scale design; it aims to increase the number of items for specific facets (astrology, witchcraft, extra-terrestrials etc.), increase breadth of facets/items and extend the range of item/measure design. More questions proposed by Storm and Jinks established a need for additional differentiation to explore the type of believer and disbeliever. Nevertheless, predominant themes have raised important points about paranormal believers/sceptics alike, suggesting research should explore differing types or level of belief, informing and extending item design.

3.3. Anomalous beliefs

3.3.1. Urban legends

In addition, there are several possible paranormal/conspiracist events that appear frequently conveyed by proportionately elaborate explanations (sharing belief correlates) that may extend/enhance item design and development (Bethall, 1975). In this context, anomalous beliefs (urban legends, reality testing and conspiracies) are extremely important to the current doctoral thesis since they are developed/maintained in the same way as paranormal beliefs. For instance, respondents share a need to understand both causation and consequences of important events/experiences (Donovan et al., 2001; Knight, 2006). Individuals who believe more in unconventional elucidations (paranormal) are more inclined to believe in myths, urban legends and conspiracies (Ramsey, 2006). Hence, these correlates are important for item design within the current thesis.

Urban legends or myths, typically defined as fictional, folk narratives, do persist over time (Fox Tree and Weldon, 2007). Characteristically thought of as urban myths, urban belief 'tales' or contemporary legends share features common with migratory legends. Recurrent tales are tailored to fit individual events or accounts (e.g., place names and/or topographical details are adapted to particular locations) and are related to the more modern phenomenon of campus legends (Dagnall et al., 2010d). They also typically contain overly long stories; the legend contains a story plot; attention is gained with horror (shock) or scandal; new or novel content is evident; the story may be humorous; and the tale is unusual or unexpected (Guerin, 2003, 2004; Rosnow et al., 1986). Despite covering myriad topics,

urban legends are characterised by a number of common and consistent features. Particularly, they contain a stratagem, are of general interest to most listeners, maintain interest in the reader through horror or scandal, and have unusual or unexpected outcomes (Rosnow et al., 1986). They are of particular importance when connected with people's belief in the paranormal.

Folklorist Jan Harold Brunvand introduced the term 'Urban Legend' in 1968. He explored folklore and urban myths by postulating that both were not co dependant and do not generally occur in what we understand to be traditional or primitive societies (Brunvand, 1981). It is interesting to note that he also coined the phrase 'vector' for someone who passes on the urban myth, legend or tale.

Countless urban legends (vectors) convey a sense of mystery or intrigue. Typically, these take the form of narratives, passed from person to person, typically outlining incredible and mysterious events. Urban legends and myths defined in terms of rumours generated provide an unproven proposition of belief have some topical relevance for persons actively involved in its dissemination (Rosnow and Kimmel, 2000). While not a myth per say, this kind of characterization may help to illuminate the position of Urban Legends/myths and help explain how they are justified by one's knowledge of them. Conjectures regarding rumours, and indeed legends appear when a group is attempting to make sense of ambiguous, uncertain, or confusing situations (Shibutani, 1966; Brunvand, 1981). Thus, sense-making activities produce tentative attributions of cause that may affect perception of an event, as well as one's ability to remember/understand later ambiguities, distortions and exaggeration. Exploration of reality testing articulates several working definitions:

1. The ability to distinguish internal distortion and fantasy from accurate representation of external events. (Younger, 2013).
2. Alternatively, reality testing involves techniques that adjust perceptions that do not conform to realities of the situation (Bell et al., 1985) or those that provide conflict resolution (Yarn, 1999).
3. "Reality testing" defined as the process through which the psyche gauges the difference between the internal and external worlds. (Freud first defined this process as founded on perception and motility, but as he progressively elaborated his theory of the ego, reality testing became one of the functions of the ego (Freud, 1911b).

More recently, Irwin, (2004) outlined the causal connection between paranormal belief and reality testing: suggesting that psychodynamic literature generates an evaluative processes termed ‘reality testing’ that comprised “a set of perceptual, cognitive and sensor motor acts that enables one to determine one’s relationship with the external physical and social environments” (Reber, 1995, p.640). Thus, reality-testing measurement assesses a person’s application of physical and social environments, in terms of generalized belief about the nature of reality (Irwin, 2004, 2009). Irwin (2004) points out that such a belief is usually subject to ongoing critical revision when additional relevant information becomes available.

3.3.2. Reality testing

The difference between internal and external worlds appears as a process of reality testing. According to Moseby’s medical dictionary (2009), one’s external reality or inner imaginative world (behave in a manner that exhibits an awareness of daily, accepted norms and customs) necessitates differentiation, which implies one’s psyche or belief in reality. Impairment of reality testing is indicative of a disturbance in ego functioning that may lead to psychosis. Freud first developed this idea from the development of his work involving the ego where the idea for reality testing became one of the fundamental functions of the ego (Freud, 1916-1917f (1915)). An experience beyond the norm may lead to hallucinations, delusions, faulty thinking and direct individual psychosis, or shape an altered sense of reality (Sidgwick et al., 1894). In this context, individual’s communication and behaviour may directly affect perceived level of incoherence.

For the current thesis, reality testing is important because it represents a unidimensional, self-report measure (Lenzenweger et al., 2001) one that determines capacity of a percipient to differentiate self from non-self, intrapsychic from external stimuli, while maintaining empathy with a sense of reality, and the ordinary (Bell et al., 1985; Kernberg, 1996). The IPO-RT (Reality Testing subscale of the Inventory of Personality Organization (Lenzenweger et al., 2001) makes no reference to specific belief in the paranormal, while highlights a variety of aspects of reality testing. The IPO-RT specifically focuses on reality testing in the context of information processing style rather than a diagnostic tool, neither for psychosis nor as a description for psychotic predisposition. Nevertheless, in this context of the current thesis it is a worthwhile addition, providing supplementary belief explanation.

3.3.3. *Conspiracy theories*

Paranormal Belief, in terms of what one understands/believes explains what may or may not be true (Summers, 1999). Irwin, (2004) postulates that many 'paranormal belief interpretations lack analytical-rational processing and are likely to facilitate the generation of non-conventional 'paranormal' explanations. Paranormal hypotheses once advanced are not subject to critical evaluation. Such critical appraisal applies to Conspiracy theories, where evidence of an experience, situation or event becomes the truth. Conspiratorial beliefs, in the same way a failure is explained in reality testing, may explain how percipients form and maintain beliefs about a conspiracy because individuals will fail to rigorously test self-generated explanations of the world (Irwin, 2004, 2009).

Conspiracy theories from the Latin means literally, 'breathing together' a number of conspirators, at night, conspiring collectively towards some criminal deed (Summers, 1998). This is explained in terms of an alternative explanation to an established understanding of a historical or current event (Whalen, 2006). Endorsement often occurs when there is no absolute or defined account, or where official reports are inaccurate (Aaronovitch, 2009). Approval of conspiracy theories shapes one's own belief system (Goertzel, 1994). Alternatively, conspiratorial thinking directly relate/are attributed to one's belief projection, actual beliefs, motivations or actions of others (Douglas and Sutton, 2011). This forms part of a social cognitive mechanism allowing the experient to make sense of their social environment, whilst trying to understand better people's behaviours (Ames, 2004). They hypothesise that people may use projection to comprehend further alternative conspiracy theory (Douglas and Sutton, 2011). Comprehension of conspiracy endorsement may reveal more about conspiracy and, those accused of conspiring or manipulating. Whilst generating a positive outcome or goal (generate money, bring about government change, and discredit those in power etc.) (Goertzel, 1994; Hargrove and Stemple HI, 2006; King, 1997) it may simply demonstrate willingness to conspire. In this context, a strong relationship exists between personal motivation to conspire and subsequent endorsement of conspiracy theories (Douglas and Sutton, 2011).

Conspiracies share many of the same facets of both myths and urban legends. For example, Fox Tree and Whelden, (2007) propose that urban legends (usually by word of mouth or via email) are defined as enduring, apocryphal folk narratives that have reached a wide audience. Circulation of conspiracy theories occurs in the same way. Evidence may suggest that certain theories or events can be considered 'myth theory' for example, the idea

that Jesus of Nazareth was not an historical person, but was simply a fictional/mythological character created for the Christianity movement.

Alternatively, conspiracy theories may arise from thought disorder, hallucination or from perceived faulty beliefs. So, how do we, decide what is fact or fiction, and how do we make sense of the world we live in; decide what to believe? Abalakina-Paap et al. (1999) conducted a study examining attitudes towards existing conspiracy theories and belief in conspiracy theories. They found that high levels of external locus of control and hostility plus low levels of trust related to specific attitudes to conspiracy theories. They also found that high levels of powerlessness, authoritarianism, anomie and low levels of self-esteem correlated with a belief in specific conspiracy theories. They state that feelings of powerlessness, alienation, and hostility taken from a perceived disadvantaged group are factors that support belief in conspiracy theories. Hofstadter, (1966) suggests conspiracy theories provide an outlet for the expression of negative feelings helping people make sense of the world, where evil forces appear to control certain individuals. Conversely, belief in conspiracy theories may arise in part from an inability of individuals to exercise critical judgments (Bale, 2007), and therefore reality testing deficits would predict belief in conspiracy theories.

Zonis and Joseph (1994) explain that conspiracy theories offer a more narrowed, and altogether distorted and over simplified view of the social and political world. Unlike Hofstadter (1966), who suggests conspiracy theories offer a more coherent description of an event. Gentzkow and Shapiro (2004) found that a reporting in a conspiracy theory is not restricted to the western world. Results show that 80% of those interviewed did not believe that the 9/11 attacks were committed by Arabs, and that they were carried out by the western governments (Swami and Cole, 2010). A further study conducted by Drinkwater et al. (2012) explored the connection/correlation between belief in a conspiracy theory, reality testing and paranormal belief. This facilitated new developmental items, explaining potential generation and modification of both conspiracies and paranormal beliefs. The failure to test reality (Irwin, 2009; Drinkwater et al., 2012) affects interpretation of respondent's experiences, where deficits occur during analysis/interpretation of paranormal and anomalous events.

The succeeding chapters present four phases of research, where a global measure is tested and developed. The first two phases produce a quantifiable measure following EFA and CFA. Phase III, assesses the performance and validity of the MMUpbs, examining its relationship alongside common correlates (schizotypy, transliminality and reality testing)

and by comparing probabilistic reasoning with belief. Finally, phase IV investigates the psychometric performance of the new scale (MMUpbs), which is assessed in conjunction with a real world measure (MTQ48) establishing both validity and reliability of the new measure.

Finally, potential item design and factorial enhancements establish a global scale, which functioned as a measure of overall paranormal belief, developing individual facets that act as discrete, individual measures (haunting, extra-terrestrials, astrology etc.). A discussion of the relationship between correlates of paranormal belief, an investigation of the incidence/prevalence of paranormal experiences and the association to paranormal belief/individual facets follows in Chapter 4.

Chapter 4 – Developing a new paranormal belief measure (MMUpbs)

4. Overview of the analytical process

4.1. General overview

Data collection and analysis progressed through four distinct studies (or phases).

Phase I explored the nature and composition of paranormal belief and evaluated the relationship between paranormal and anomalous beliefs. Its purpose was to develop a new paranormal measure (MMUpbs) incorporating new items, and examined potential correlates. This included investigation of the incidence/prevalence of paranormal experiences and their relationship to paranormal belief. Phase II performed a confirmatory factor analysis (CFA) and re-examined the factorial structure of the emerging measure (MMUpbs, 50-items). Phase III, examined paranormal belief correlates in relation to probabilistic reasoning and reality testing deficits. Phase IV, investigated the emergent scale alongside real world measures.

4.1.1. Specific phase objectives

Specific phase I aims were:

- Perform an exploratory factor analysis (EFA) to examine the nature and structure of paranormal belief.
- Explore the relationship between belief in the paranormal and paranormal experience(s), and,
- Investigate the association between paranormal and anomalous beliefs (i.e., urban legends, reality testing and conspiracist beliefs).

Followed by;

Phase II extended scale development and the findings of Phase I in a further two ways:

- Perform a confirmatory factor analysis (CFA) to assess the current measure (50-items).
- Addition of three single/item-global measures (statements) to explore the relationship between singular item function, a full scale scores (MMUpbs) and the emergent subscales.

Phase III assesses scale validity:

- The emerging paranormal measure further examined where belief in the paranormal and reality-testing deficits extends to include reasoning bias, examining correlates and the correctness of paranormal item function.

Phase IV assessed the emergent 50-item MMUpbs measure:

- Alongside an external, construct of Mental Toughness (MTQ48).
- This demonstrates validity and reliability of the newly constructed MMUpbs.

4.2. Phase I – Exploring the nature and structure of paranormal belief using exploratory factor analysis (EFA)

4.2.1. Introduction and background to phase I

According to Blackmore, (1997) belief in the paranormal is prevalent in society, and as such, has been measured and defined using methods such as self-report measures (Dagnall et al., 2010a). Exploration is usually questionnaire based through one of several recognised measures; Paranormal Belief Scale (PBS) (Tobyack and Milford, 1983) was compiled to measure both religiosity and belief in the paranormal and was later updated; Revised Paranormal Belief Scale (RPBS) (Tobyack, 1988). This explores a range of paranormal happenings/phenomena ranging from traditional religious beliefs to psi, superstition and clairvoyance. The Australian Sheep-Goat Scale (ASGS) (Thalbourne and Delin, 1993) which assesses a more select group of psi beliefs (sheep-goat effect, Thalbourne, 1983) connected with paranormal belief which measures what is traditionally thought of to be the core components of paranormal belief (mainly ESP) and parapsychological research (Wiseman and Watt, 2006; Dagnall et al., 2010).

Phase I explored the composition of belief in the paranormal using existing self-report measures and the developing new paranormal belief measure (MMUpbs) alongside frequency and type of paranormal experiences. The rationale for the current thesis follows on from the research conducted by Dagnall et al. (2007) who explored common factors of paranormal belief. The aim, was to extend the work of both Dagnall et al and the more recent research conducted by Dagnall et al. (2010a) (Common Paranormal Belief Dimensions) in order to develop a new potential paranormal belief measure.

Phase I further explored the nature and structure of paranormal belief specifically the shared variance (commonality) between different (often-disparate) paranormal scales in order to develop this new paranormal measure. Initial development began by tapping into the common characteristics (shared factors) inherent within several prominent measures of paranormal related beliefs and extending an already partially developed measure: Manchester Metropolitan University Scale of Paranormal Belief (MMUSPB, Foster, 2001, an unpublished scale). These are as follows:

- Revised Paranormal Belief Scale (RPBS) (Tobacyk and Milford, 1983; Tobacyk, 1988; Lange, Irwin, and Houran, 2000)
- Australian Sheep-Goat Scale (ASGS) (Thalbourne and Delin, 1993)
- Paranormal Short Inventory (PSI) (Randall, 1997)

- MMUSPB (Foster, 2001, unpublished scale)
- Superstition Scale (Wiseman and Watt, 2004)
- Poltergeists and Hauntings Scale (Kumar and Pekala, 2001)
- Extra-terrestrial Life and UFO-Related Belief items
- MMUpbs (version 1 of a new measure of paranormal belief 64-items). Developed from an amalgamation of new items/questions, and those items loosely based on the existing items from within the (MMUSPB) (Foster, 2001).

In the case of the MMUpbs, supplemental items allowed exploration in broader areas of witchcraft, haunting experiences, and extra-terrestrial visitation and sightings. Construct relevance and face validity was assured because of the development of these items was in accordance with existing scales and measures that are standardised and already in use.

Combining the existing items/questions produced a 64-item composite measure. Distributed in both paper form and electronically, via the Internet mediated research (IMR - British Psychological Society, 2013; Kamel Boulos and Wheeler, 2007). In total 1217 respondents completed the measure; 1093 participants (90%) completed a paper format questionnaire, whilst 122 (10%) completed an online version¹³. Exploratory factor analysis, principal components, produced an 8-factor solution. This contained item clusters measuring belief in: Hauntings, belief in extra-terrestrials, superstition, religious belief, extra-sensory perception (ESP), psychokinesis (PK), astrology, and witchcraft.

Scrutiny of the emergent factors indicated that item clusters were conceptually coherent; composed of individual items clearly related to each of the factor labels (face validity). Each factor also demonstrated good internal reliability. All of the factors demonstrated moderate to high inter-correlation, representing general belief in the paranormal¹⁴.

The findings of the Dagnall et al. (2010) study suggested that the RPBS despite its good validity and moderate breadth failed to incorporate important facets of paranormal

¹³ Two participants were removed from the final batch of 1217 as these measures were incomplete and not suitable for inclusion within data analysis.

¹⁴ Previously, Belief in the existence of life on other planets as per the study carried out by Dagnall et al. (2010), showed only weak associations, and it was deemed not an important by product of the development of paranormal belief, was not considered to be a core element of paranormal belief and therefore removed from the new measure.

belief, such as (haunting, alien visitation and witchcraft sufficiently), which it was felt should be assessed alongside traditional facets of paranormal belief (ESP, PK, etc.). Additionally, Dagnall et al. (2010) advocate the development of a much more extensive measure of paranormal belief¹⁵. To this end, the current research aims to fill this gap in scale development/design by assessing the 64-item measure (MMUpbs).

The primary aim of phase I was to develop a new measure of paranormal belief. The current research would further extend previous research carried out by Dagnall et al. (2010a, 2010b) by including new items. Principally, to refine the extracted paranormal subscale measures and to create a series of stand-alone factors (8-items per factor) that could be used as separate scales when investigating specific facets of the paranormal. Initial assessment of each question/item provided a platform to examine content and clarity whilst discovering repetitions, in order to remove redundant and overlapping items. Additionally, factors emerging from principal component analysis were composed of differing item numbers: Hauntings, 8; Superstition, 7; Religious Belief, 6; Alien Visitation, 8; ESP, 7; PK, 6; Astrology, 7; and Witchcraft, 3 (52-items in total). Secondly, in order to produce a more representative balanced set of subscales and more complete measure a further literature review was undertaken; the intention is to enhance, extend item breadth of the subscales containing fewer than 8-items.

A number of relevant measures were found and these were considered alongside existing subscale items (astrology; Chico and Lorenzo-Seva, 2006; afterlife; Osarchuk and Tatz, 1973; superstition; Nixon, 1925; Luck; Drake and Freedman, 1997, Gilliland, 1930; ESP, Bhadra, 1966; belief in life after death; Thalbourne, 1996; death transcendence; Vande Creek and Nye, 1993, witchcraft; Howe, 2005; etc.). As part of the subscale development process, assessment for extensiveness of scale coverage and item function allowed (where appropriate) for items to be reversed, countering potential response bias. A final number of items were established (64-items) producing a balanced and more complete measure.

The product of these modifications established a 64-item measure of paranormal belief. The modified scale contained 8 distinct subscales; each possessing 8-items with both positively and negatively (reversed) phrased statements. In phase I, to evaluate performance of the measure (convergent validity) comparison occurred with both the Revised Paranormal

¹⁵ Dagnall et al. (2010) believed that belief in extra-terrestrial life was not considered to be a robust assessment of paranormal beliefs as only the more extreme beliefs were associated with paranormal belief dimensions, and as such were not included in the measure design nor the current research project.

Belief Scale (RPBS) (Tobacyk and Milford, 1983; Tobacyk, 1988; Lange et al., 2000) and the Australian Sheep-Goat Scale (ASGS) (Thalbourne and Delin, 1993).

In addition to examining the nature and structure of paranormal belief, phase I also investigated the relationship between paranormal experience(s) and belief. This is an important area of study, historically under researched within psychology and parapsychology; the majority of research has concentrated on belief to the exclusion of experience. Indeed, researchers outside the paranormal domain (for example, sociologists and journalists) have commenced many projects examining psychic experiences and beliefs, since 1970. Whilst, these studies have employed large representative samples, been conducted across a number of countries, and have produced informative data (Haraldsson and Houtkooper, 1991), there have been issues restricting their effectiveness. Firstly, studies have frequently used the terms belief and experience interchangeably. Secondly, experience studies have typically been purely descriptive. Finally, the current research will discuss potential for item enhancement, measure development, indexing of the current measures etc. along with elements that include potential measure improvement using experiential data.

How beliefs are shaped presents a narrative for the current thesis, whilst evidence of how significant personal experiences are, and while not the purpose of this thesis, suggests that a person's experiences, religiosity and media clearly influence belief formation and development (Clarke, 1995; Roe, 1998; Irwin, 2009). The current research allows further examination of specific beliefs, experience and encounters in more depth, while broadening research in the area of paranormal measurement adding to the wealth of research that examines why large numbers of the population believe in the paranormal.

Additionally, paranormal beliefs may arise directly from personal experience, but percipients may be predisposed to the reported experiences of others (French and Wilson, 2006). Whilst, it is intuitive and sensible to suggest that experience(s) influence level of belief, believers are just as likely to label anomalous experiences as paranormal (Irwin, 2004). Importantly, Blackmore (1984) notes that it is the closeness of paranormal experience and belief that have demonstrated many positive correlations between these two constructs. As such, the relationship that exists between the two constructs requires additional discussion and elucidation.

In this context, studies have often failed to consider fully the association between belief and specific paranormal experience(s). Important differences exist between 'what is known' to be a 'belief' and an 'experience' but problems exist where researchers have

frequently used such words interchangeably (French and Wilson, 2006). Confusion arises from a lack of semantic clarity, which has obscured the potentially important role that paranormal experience(s) plays in the development and maintenance of paranormal beliefs. Other related (anomalous) beliefs could be associated with paranormal beliefs (e.g., Religious beliefs, conspiracy theories, and the endorsement of myths/urban legends). These of course may arise from the same cognitive processes and share several important features with paranormal beliefs (cf., Irwin's, 2009 definition of paranormality), such notions/theories/ideas are: generated within the non-scientific community, rarely subjected to scientific scrutiny, and frequently endorsed by people, who might normally be expected by their society to be capable of rational thought (Irwin, 2009).

This is important in the context of paranormal belief and anomalistic psychology, for in order to bridge this gap, more investigative research is required. Thus, scientific models explain the unexplained/more bizarre accounts; usually described in terms of the current scientific and psychological factors. Of course, the term paranormal experience refers to alleged experiences, which lie outside the understanding of our known science. Much of the confusion arises because extraordinary phenomena within the paranormal domain, does not fully explain all strange experiences, whilst not all considered paranormal. Consequently, the first part of this thesis (phase I) will examine the relationship between paranormal experiences, belief in the paranormal and anomalous beliefs whilst establishing item clarification, purification through the development of a usable paranormal measure.

4.3. Method

4.3.1. Respondents

In total, 1217 respondents completed the questionnaire.¹⁶ Ages ranged from 16 to 70 years, with a mean (M) of 25.13 and a standard deviation (SD) of 9.41; 75.7% (920) were female and 24.3% (295) were male. Female ages ranged from 16 – 67 years, $M = 24.43$, $SD = 8.87$; Males ages ranged from 17 – 70 years, $M = 27.33$ years, $SD = 10.64$. Of the total number of participants, 1093 participants (90%) completed the questionnaire in a paper-pencil form, whilst 122 (10%) completed a web-based version of the questionnaire. Recruitment of respondents involved a range of sources: undergraduate and postgraduate psychology classes, other undergraduate and postgraduate classes, through contacts at local colleges, and the wider population. Respondents took part in the research following advertisement via emails to staff and students at the university and via posters placed around the university campus. Participation was voluntary and respondents could terminate their participation at any time during the study.

4.3.2. Materials

4.3.3. Extracted paranormal belief factors

A 64-item scale (MMUpbs) based on the eight paranormal factors extracted by Dagnall et al. (2007, 2010a, 2010b) (see description in background for more detail): Hauntings, superstitions, religious belief, alien visitation, ESP, PK, astrology and witchcraft formed the basis for the current questionnaire. Each subscale comprised 8-items and contained a mixture of positively phrased and negatively (reversed) phrased items. Items were presented as statements (e.g., “There is a devil” and “poltergeists exist”), which are measured on a seven point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The original subscales were conceptually coherent: possessed good face validity; composed of individual items that clearly related to the assigned factor label. In addition, factors possessed good to external reliability. (see Appendix A. Phase I Booklet, Section 2: Belief, pp. 269-275)

¹⁶ 2 outliers (information collected was incomplete) were removed from these data to improve factor analytic results (Comrey, 1985)

4.3.4. Revised Paranormal Belief Scale (RPBS) (Tobacyk and Milford, 1983; Tobacyk, 1988; Lange et al., 2000)

This is a modified version of Tobacyk and Milford's (1983) paranormal belief scale. The RPBS is a self-report measure, which contains 26 questions measuring belief in seven facets of paranormal belief: Traditional religious belief, psi belief, witchcraft, spiritualism, superstition, extraordinary life forms, and precognition. RPBS items are presented as statements (e.g., "I believe in God" and "black magic really exists"), which are measured on a seven point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). These scores were converted to 0-6 prior to analysis, in line with Irwin (2009); Lange et al. (2000) and, Thalbourne and Lange, (2002). Thus, final scores range from 0 to 156, with higher scores reflecting greater belief in the paranormal. As well as producing an overall score, the RPBS produced individual scores for each of its seven facets. Additionally, Lange et al. (2000) proposed an alternative two-factor solution comprising NAP and TPB. NAP contains 11-items measuring belief in psi, reincarnation, altered states, and astrology, whilst the TPB assesses belief in concepts, such as the devil and witchcraft (Irwin, 2004). This factorial solution arose from a purification of the scale to correct for differential item functioning (age and gender bias). Recoding the scores consistent with the rasch scaling procedure (Andrich, 1988a; Lange et al., 2000) produces scores ranging from 6.85 to 47.72 on NAP and 11.16 to 43.24 on TPB.

The two factors measure new age philosophy (NAP; psi, reincarnation, astrology) and traditional paranormal beliefs (TPB; the devil, heaven and hell, witchcraft). NAP related beliefs, instil a sense of control over external events on an individual level and may be reinforced by personal experience (Irwin, 1992; Lawrence et al., 1995). Whereas, TPB associated beliefs maintain control over external events on a social level, these beliefs are culturally reinforced (Ember and Ember, 1988; Goode, 2000).

Although, there has been debate about the nature and number of belief dimensions contained within the RPBS (Lawrence, 1995a, 1995b; Lawrence et al. 1997; Tobacyk, 1995a, 1995b; Tobacyk and Thomas, 1997), the measure performs conceptually and psychometrically satisfactory (Tobacyk, 2004). The RPBS possesses adequate validity (Tobacyk, 1995a, 1995b, 2004) and has good test-retest reliability (Tobacyk, 2004).

4.3.5. *Australian Sheep-Goat Scale (ASGS) (Thalbourne and Delin, 1993)*

The ASGS measures belief in, and alleged experience of, the paranormal by focusing on the subset of core beliefs studied by parapsychology: extra-sensory perception, psychokinesis, and life after death (Wiseman and Watt, 2006). The ASGS contains 18-items and participants are asked to respond in one of three ways: “False” (scored as 0), “Do not know” (scored as 1), and “True” (scored as 2). The ASGS has been Rasch scaled in accordance with Lange and Thalbourne’s (2002) recommendation, establishing moderate to excellent reliability and validity (Thalbourne, 1995a).

4.3.6. *Anomalous beliefs (Drinkwater et al., 2012)*

Anomalous beliefs consisted of urban legends and conspiracist beliefs.

Initially, assessment was carried out on 5-items measuring belief in urban legends. Item scoring, using the same 7-point Likert scale as the RPBS. Two of the items were reversed scored (e.g., “when I hear urban legends I feel that they are untrue”). These questions derived from Dagnall et al. (2010d) and Fox Tree and Wheldon, (2007) demonstrated good internal reliability (Dagnall et al., 2010d).

Assessment of general belief in the veracity of conspiracy theories was via five questions. These evaluated the degree to which respondents believe that conspiracy theories accurately depict real-life events and contain truthful information. Responses were again measured on a 7-point Likert scale (1 indicated “strongly disagree” and 7 “strongly agree”). Low scores on these two scales would suggest support for conspiracist beliefs, whilst a high score on these scales would indicate endorsement of established accounts. Reversal of items 3 and 4 controlled for response bias (Schriesheim et al., 1989; van Sonderen et al., 2013). This measure has previously shown satisfactory to good internal reliability (Drinkwater et al., 2012). (see Section 4: Anomalous beliefs, pp. 276-281).

4.3.7. *Paranormal experiences (Drinkwater et al., 2012; Dagnall et al., 2016)*

An 18-item scale measured paranormal experiences (Dagnall et al., 2016). Respondents were asked (using ‘yes’ or ‘no’) to indicate whether they “believe they have had a genuine paranormal experience”. If they responded yes they then moved on to question two where a number of experiences were indicated (ESP, PK, witchcraft, OBE/NDE, haunting, contact/communication with dead, UFO visitation, UFO sighting, astrological prediction, or other (where respondents are asked to indicate the type of experience). (see Appendix A. Phase I

Booklet, Section 1, Experiences, pp. 283-284). Respondents who reported no experiences simply moved on to the next section of the questionnaire.

For each experience type, respondents indicated yes or no. If respondents reported having had a particular experience they were asked to specify the frequency of occurrence, using a three point scale, where 1 = single incident, 2 = occurred between two and five times and 3 = occurred more than five times. The final question asked whether respondents believed in the paranormal because of their experience(s). Responses were measured on a 5 point Likert scale (1 = definitely not, 2 = probably not, 3 = unsure, 4 = probably, and 5 = definitely).

4.3.8. Procedure

Instructions at the beginning of the questionnaire booklet informed respondents that the study was concerned with exploring anomalous experiences and belief. Instructions informed respondents that there was no time limit for completing the questionnaire. For those who completed the online version, all items were mandatory; participants could not move onto the next section without responding to every item on the page. Prior to participating potential respondents read background information. This stated the nature of the research and outlined ethical procedures. Respondents agreeing to participate indicated informed consent and received the materials booklet. Instructions requested respondents to carefully read questions, answer all questions, take their time and complete items in an open and honest manner. The order of questionnaires typically rotated across sections; counterbalancing of item order within questionnaire booklets controlled for response bias. Respondents provided demographic information (preferred gender, age, etc.). At the end of the questionnaire, respondents who had had one or more paranormal experience and wished to recount their experience could leave an email address. This enabled the researcher to arrange a suitable time/location to talk about specific experience(s) (This facilitated research data that will inform qualitative research papers). The only exclusion criterion was that participants had to be at least 18 years of age to take part. The study conformed to Manchester Metropolitan university ethical requirements (see further details below).

4.3.9. Ethics

All studies within this doctoral thesis obtained full University ethical approval. This involves completing the ethics form, checklist and participant information sheets whilst completing

the following: participant consent form, participant information sheet, full protocol, advertising details, NHS approval letter (where appropriate) and other evidence of ethical approval (for example, another University Ethics Committee approval).

Specifically the procedure involves, completing a checklist and form as part of researcher/student registration (RD1 approval). Then, this is considered by the Research Degree Committee (via review), where a proposal is sent out to an experienced member of the academic staff. The Research Degree Committee then considers the report (and if appropriate recommends approval and finally, the Head of the Research Centre (RIHSC) confirms ethical clearance.

Ethical procedures typically treat questionnaires as routine; hence, additional ethical scrutiny is not required.

MMU ethics, governance and procedures can be assessed on the following web links below:

General Overview

<http://www2.mmu.ac.uk/research/our-research/ethics-and-governance/ethics/>

And;

Processes and Procedures

<http://www2.mmu.ac.uk/media/mmuacuk/content/documents/research/MMU-Ethics-Processes.pdf>

The processes and procedures include obtaining written consent for participants, whilst providing written confirmation assuring that their participation was voluntary and that upon providing a unique identifier that they were able to withdraw from the studies at any time, and have their data destroyed. Anonymised data collection took place within all four studies. Data was stored securely where access to raw data was only available to the supervisory team and PhD student.

4.4. Results

4.4.1. Paranormal experience

The percentage of respondents reporting a paranormal experience was calculated, where 42% of respondents reported having a paranormal experience. The most frequently reported experience was ESP 23% and the least frequently reported was UFO visitation 1% (see Table 1).

Table 1: Frequency of respondents reporting paranormal experience(s)

	<i>Experience</i>		<i>ESP</i>		<i>PK</i>		<i>Witchcraft</i>		<i>OBE/NDE</i>		<i>Haunting</i>		<i>Contact Dead</i>		<i>UFO/Visit</i>		<i>UFO/Sighting</i>		<i>Astrology</i>		<i>Other</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Yes	506	42	281	23	46	4	46	4	111	9	167	14	156	13	16	1	60	5	185	15	54	4
No	709	58	934	77	1169	96	1169	96	1104	91	1048	86	1059	87	1199	99	1155	95	1030	85	1161	96

(Key: *Experience* = Level of experience, *ESP* = Extra-sensory perception, *PK* = Psychokinesis, *Witchcraft* = Witchcraft, *OBE/NDE* = Out of body experiences/Near death experiences, *Haunting* = Haunting, *Contact Dead* = Contact with the dead, *UFO/Visit* = Unidentified flying objects/visitations, *UFO/Sight* = Unidentified flying objects/sightings, *Astrology* = Astrology, and *Other* = other experiences (regarded as paranormal that do not appear within the other categories).

Looking at the reported frequency of experiences the majority of respondents indicating ESP (73%), witchcraft (67%) and hauntings (69%) experiences claimed to have more than one experience. Reporting of PK (46% vs. 54%), contact with the dead (46% vs. 54%), and astrology (46% vs. 54%), was more balanced with roughly equal proportions reporting single vs. multiple experiences. The majority of respondents reporting OBE/NDE (63%), UFO visitation (63%) and UFO sightings (75%) reported only a single incidence (see Table 2).

Table 2: Frequency of paranormal experience(s) (single, 2-5 and more than 5)

	ESP		PK		Witchcraft		OBE/NDE		Haunting		Contact Dead		UFO/Visit		UFO/Sighting		Astrology		Other	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Single Incident	77	6.3	21	1.7	15	1.2	70	5.8	52	4.3	71	5.8	10	0.8	45	3.7	82	6.7	25	2.1
Between 2-5	131	10.8	13	1.1	18	1.5	30	2.5	83	6.8	61	5.0	3	0.2	10	0.8	67	5.5	16	1.3
More than 5	73	6.0	12	1.0	13	1.1	11	0.9	32	2.6	24	2.0	3	0.2	5	0.4	36	3.0	13	1.1

(Key: ESP = Extra-Sensory Perception, PK = Psychokinesis, Witchcraft = Witchcraft, OBE/NDE = Out of body experiences/Near death experiences, Haunting = Haunting, Contact Dead = Contact with the dead, UFO/Visit = Unidentified Flying Objects/visitations, UFO/Sight = Unidentified flying objects/sightings, Astrology = Astrology, and Other = Other experiences/see table 1 for full description).

Of the respondents claiming to have had an experience ($n = 506$), 43% report one experience ($n = 218$), whilst 57% report more than one experience. Within the multiple experience group ($n = 288$), 94% ($n = 270$) identify between 2-5 experiences. Only 6% ($n = 18$) reported more than five experiences.

In conclusion, a Pearson's Product Moment correlation conducted on the number of experiences reported and endorsed the question "Do you believe in the paranormal because of your experience/s?" It was found that the number of experiences was positively correlated with endorsement of the question, $r = .308$, $n = 506$, $p < .001$; the higher the number of experiences the more respondents believed they informed their belief in the paranormal.

4.4.2. Gender and paranormal experience

A similar proportion of males and females believed they had had a paranormal experience (males 41% vs. females 42%), chi-square test revealed there to be no significant association between the reporting of paranormal experiences and gender, $\chi^2 = 0.102$, $df = 1$, $p = .749$. Similarly, males ($M = 0.92$, $SD = 1.48$) and females ($M = 0.93$, $SD = 1.44$) were found to report similar numbers of experiences, $t(1213) = -0.112$, $p = .911$. A final analysis comparing the number of experiences reported by male ($M = 2.25$, $SD = 1.54$) and female ($M = 2.21$, $SD = 1.46$) experiencers also revealed no gender difference, $t(1213) = 0.277$, $p = .782$.

The next series of analyses examined whether there were gender differences within experience types. Gender differences were on psychokinesis (PK), UFO sightings and

astrology. A higher proportion of males reported PK experiences (6.1% vs. 3%), $\chi^2 = 4.928$, $df = 1$, $p = .026$; and UFO sighting (8.5% vs. 3.8%), $\chi^2 = 9.407$, $df = 1$, $p = .002$ than females. Females reported a higher proportion astrological experiences (17% vs. 9.8%) than males, $\chi^2 = 8.244$, $df = 1$, $p = .004$.

Analysis revealed no significant associations between gender and reporting of experiences (see Table 3). Specifically, extra-sensory perception (ESP), $\chi^2 = 0.270$, $df = 1$, $p = .549$; witchcraft, $\chi^2 = 0.055$, $df = 1$, $p = .682$; OBE/NDE, $\chi^2 = 0.129$, $df = 1$, $p = .634$; haunting, $\chi^2 = 0.041$, $df = 1$, $p = .764$; contact with dead, $\chi^2 = 3.517$, $df = 1$, $p = .061$; UFO Visitation, $\chi^2 = 0.899$, $df = 1$, $p = .343$ and, other $\chi^2 = 0.016$, $df = 1$, $p = .773$.

Table 3: Frequency of respondents reporting paranormal experience(s) by gender

	Experience		ESP		PK		Witchcraft		OBE/NDE		Haunting		Contact Dead		UFO/Visit		UFO/Sighting		Astrology		Other	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Male	120	41	72	24	18	6	10	3	29	10	39	13	6	2	25	8	25	8	29	10	14	5
Female	386	42	209	23	28	3	36	4	82	9	128	14	128	14	10	1	35	4	156	17	40	4
Total	506	42	281	23	46	4	46	4	111	9	167	14	156	13	16	1	60	5	185	15	54	4

(Key: Experience = frequency of experience, ESP = Extra-Sensory Perception experiences, PK = Psychokinesis, Witchcraft = Witchcraft experiences, OBE/NDE = Out of body experiences/Near death experiences, Haunting = Haunting experiences, Contact Dead = Contact with the dead experiences, UFO/Visit = Unidentified flying objects/visitations, UFO/Sight = Unidentified flying objects/sightings, Astrology = Astrological experiences, and Other = Other experiences/see table 1 for full description).

A further series of chi-square tests examined whether there was an association between gender and the reporting of multiple experiences.

Table 4: Frequency of respondents reporting paranormal experience(s) across experience type for gender

	Male Experiencers		Female Experiencers		χ^2	df	Sig
	Single	Multiple	Single	Multiple			
ESP	26%	74%	28%	72%	0.01	1	.944
PK	33%	67%	54%	46%	1.09	1	.298
Witchcraft	10%	90%	39%	61%	1.80	1	.179
OBE/NDE	52%	48%	67%	33%	1.56	1	.212
Hauntings	36%	64%	30%	70%	0.29	1	.592
Contact with the dead	57%	43%	43%	57%	1.33	1	.248
UFO visitations	33%	67%	80%	20%	1.78	1	.182
UFO Sightings	60%	40%	86%	14%	3.86	1	.049
Astrology	41%	59%	45%	55%	0.02	1	.885
Other	71%	29%	38%	62%	3.53	1	.060

(Key: ESP = Extra-Sensory Perception incidents, PK = Psychokinesis incidents, Witchcraft = Witchcraft incidents, OBE/NDE = Out of body experiences/Near death experiences, Haunting = Haunting incidents, Contact Dead = Contact with the dead incidents, UFO/Visit = Unidentified flying objects/visitations, UFO/Sight = Unidentified flying objects/sightings, Astrology = Astrology incidents, and Other = Other experiences/see table 1 for full description).

Only 16 respondents reported having a UFO/Visitation experience (6 male vs. 10 female), whilst the result for UFO/Sightings was significant, using the standard alpha level it falls short of the required value after correcting for multiple comparisons. There are no significant differences between gender types. Overall, the proportion of single vs. multiple experiencers was similar for male (42.5% vs. 57.5%) and females (43% vs. 57%), $\chi^2 = 0.002$, $df = 1$, $p = .966$. There was no significant difference observed across experience type (single vs. multiple experiencers) (see Table 5).

Table 5: Frequency of paranormal experience(s) (single, 2-5 and more than 5) by gender

	ESP				PK				Witchcraft				OBE/NDE				Haunting			
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Single Incident	19	26	58	28	6	33	15	54	1	10	14	39	15	52	55	67	14	36	38	30
Between 2-5	31	43	100	48	8	44	5	18	6	60	12	33	10	34	20	24	19	49	64	50
More than 5	22	31	51	24	4	22	8	29	3	30	10	28	4	14	7	9	6	15	26	20

	Contact Dead				UFO/Visit				Sighting				Astrology				Other			
	Male		Female		Male		Female		Male		Female		Astrology		Astrology		Other		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Single Incident	16	57	55	43	2	33	8	80	15	60	30	86	12	41	70	45	10	71	15	38
Between 2-5	10	36	51	40	2	33	1	10	7	28	3	9	12	41	55	35	1	7	15	38
More than 5	2	7	22	17	2	33	1	10	3	12	2	6	5	17	31	20	3	21	10	25

(Key: ESP = Extra-Sensory Perception incidents, PK = Psychokinesis incidents, Witchcraft = Witchcraft incidents, OBE/NDE = Out of body experiences/Near death experiences, Haunting = Haunting incidents, Contact Dead = Contact with the dead incidents, UFO/Visit = Unidentified flying objects/visitations, UFO/Sight = Unidentified flying objects/sightings, Astrology = Astrology incidents, and Other = Other experiences/see table 1 for full description).

Finally, males ($M = 3.14$, $SD = 1.15$) and females ($M = 3.29$, $SD = 1.16$) endorsed the question “Do you believe in the paranormal because of your experience/s?” similarly, $t(504) = -1.244$, $p = .214$.

4.4.3. Exploratory Factor Analysis

4.4.4. Exploration of the adapted paranormal belief measure structure

4.4.5. Preliminary analysis

Prior to conducting principal components analysis (PCA) the correctness of data was established: the Kaiser-Meyer-Olkin value (.966) exceeded the recommended value of .6 (Kaiser, 1970, 1974); Bartlett's Test of Sphericity (Bartlett, 1954) was significant (Chi-square, $\chi^2 = 45871.755$, $df = 2016$, $p < .001$), and the correlation matrix contained numerous coefficients of .3 or above.

Exploratory factor analysis (EFA) allowed the reduction of the observed variables (the original 64 item paranormal measure) into a smaller set of variables (see Appendix A. Phase I Booklet, Section 2, Beliefs, pp. 283-289 for the original 64-item scale). In line with (Guadagnoli and Velicer, 1988) a more parsimonious representation of the original dataset meant that suitable observations provided evidence of construct validity.

Principal components analysis (PCA) explored underlying item structure. Expectation that emergent factors would correlate allowed preliminary analysis to employ oblique rotation. In such circumstances oblique rotation methods (e.g., direct oblimin, quartimin and promax) render a more accurate, reproducible solution (Costello and Osborne, 2005); There is no widely preferred method of oblique rotation; all methods produce similar results (Fabrigar et al., 1999). Therefore, direct oblimin rotation was the method employed.

The initial PCA identified ten factors with eigenvalues greater than 1; accounting for 61.16% of the total variance. Inspection of the pattern matrix revealed that factors 9 and 10 lacked conceptual coherence and had several items loading above .3 on other factors.

Whilst eigenvalues are a useful tool for identifying factors, they appear to be one of the least accurate methods for selecting the number of factors to retain (Velicer and Jackson, 1990). Therefore, further appraisal of the factorial structure was required; examination of the scree slope and a Monte Carlo analysis indicated that an eight-factor solution was most apposite.

Further examination of the eight factors allowed for removal of several items possessing: low-loading, cross-loading or freestanding items. These data revealed inter-item correlations of the variables, and any variable that correlates at less than .4 with all other variables deleted from the analysis (Kim and Mueller, 1978). According to Comrey and Lee, (1992) selecting an item loading cut-off value of .45 provides a good measure of a factor and

produces a clean solution.¹⁷ In line with Churchill's (1979) recommendation, removal of items presenting with subsequent low correlations ensued, because this predicts some items not drawn from an appropriate domain while producing error/unreliability (Comrey, 1978; Comrey and Lee, 1992).

4.4.6. Main analysis

Responses to the remaining 47-items were analysed further by means of a second PCA (with oblique direct oblimin rotation): Kaiser-Mayer-Okin value (.957) exceeded the recommended value of .6 (Kaiser, 1970, 1974); and Bartlett's Test of Sphericity (Barlett, 1954) was significant (Chi-square, $\chi^2 = 33050.227$, $df = 1035$, $p < .001$).

This PCA restricted the solution to 8-factors. It is suggested that Eigenvalues of greater than 1 (Kaiser Criterion) and a scree test of the percentage of variance are used to support theoretical distinctions (Cattell, 1979). The PCA accounted for 63.45% of the total variance. All emergent factors had eigenvalues exceeding 1 meaning that the Kaiser and scree criteria equalled the number of scales (8) developed. EFA employed orthogonal rotation to ensure that scales remained reasonably independent of one another (Hinkin, 1998). (see Table 6).

Factor 1 (Haunt - Haunting) was comprised of 8-items measuring belief in hauntings and communication with the dead; eigenvalue 15.55, accounted for 33.09% of the variance.

Factor 2 (ET - Extra-terrestrial)¹⁸ contained 7-items assessing belief in extra-terrestrial visitations to earth including aliens landing on earth and abducting human beings (ET); eigenvalue of 3.58, accounted for 7.62% of the variance.

Factor 3 (Super - Superstition) was composed of 5-items measuring superstitious beliefs; eigenvalue 3.09, accounted for 6.57% of the variance.

Factor 4 (PK - Psychokinesis) consisted of 5-items evaluating belief in psychokinesis; eigenvalue of 2.08, accounted for 4.43% of the variance.

¹⁷ Equally, a .40 criterion level may judge factor loadings as meaningful (see Ford et al., 1986).

¹⁸ From this point forward, ET – Extra-terrestrial refers to alien visitation: refers to the notion that extra-terrestrial life forms visit earth, conduct experimentations and abduct people.

Factor 5 (RB - Religious belief) included, 7-items tapping into religious beliefs; eigenvalue of 1.79, accounting for 3.81% of the variance.

Factor 6 (Astro - Astrology) contained 5-items assessing belief in Astrology; eigenvalue of 1.54, accounted for 3.27% of the variance.

Factor 7 (ESP – Extra-sensory perception) comprised 5-items measuring belief in extra-sensory perception; eigenvalue of 1.15, accounted for 2.44% of the variance.

Factor 8 (Witch - Witchcraft) the final factor, was composed of 5-items evaluating belief in witchcraft; eigenvalue of 1.05, accounted for 2.23% of the variance.

Table 6: Principal components and factor loadings for the new paranormal belief measure

Q. Factor item and number	Communalities	Component							
		1	2	3	4	5	6	7	8
No. Haunting (Factor 1)									
41 People have genuinely seen "ghosts" or "apparitions"	.704	0.71							
49 Poltergeists exist	.729	0.66							
33 Contrary to scientific belief, some people can make contact with the dead	.701	0.64							
Ghosts/poltergeists can cause objects to move, appear (materialisation) or	.714								
57 disappear (dematerialisation)		0.64							
17 Some places are haunted by the souls of people now dead	.727	0.64							
9 Spirits of the dead can be seen by the living	.687	0.61							
25 It is not possible to communicate with the spirit world	.584	0.57							
1 Ghosts do not exist	.308	0.51							
Extra Terrestrial (Factor 2)									
48 Alien crafts regularly visit earth	.774		-0.83						
40 Alien spaceships have not crash landed on earth	.642		-0.80						
16 Extra-terrestrials have visited earth throughout history	.671		-0.78						
Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial	.664								
8 life form has approached the surface of the Earth			-0.78						
56 People have been taken on board alien spaceships	.698		-0.76						
24 Alien intelligence is responsible for some UFO sightings	.696		-0.76						
64 Aliens are abducting human beings	.688		-0.73						
Superstition (Factor 3)									
26 I do say 'touch wood' or actually touch wood to promote good luck	.647			0.80					
34 I do say 'fingers crossed' or actually cross my fingers to promote good luck	.642			0.78					
10 If you break a mirror, you will have bad luck	.681			0.76					
2 I have avoided walking under a ladder because it is associated with bad luck	.589			0.75					
18 The number "13" is unlucky	.546			0.66					
Pk (Factor 4)									
45 A person's thoughts can influence the movement of a physical object	.711				0.82				
People are able to bend metal objects simply by thinking about it	.588								
13 (psychokinesis)					0.74				
In spite of the laws of science, some people can use their psychic powers to	.722								
61 levitate objects	.630				0.73				
I believe in the existence of psychokinesis, that is, the direct influence of mind									
53 on a physical system, without the mediation of any known physical energy					0.66				
The mind can be used to control the outcome of a random process (e.g., dice	.600								
21 rolling or coin tossing)					0.62				

Religious Belief (Factor 5)			
11	There is a heaven and a hell	.806	0.89
3	I believe in God	.712	0.85
19	There is a devil	.741	0.82
35	There is no such thing as an afterlife	.653	0.56
43	The soul continues to exist after the death of the body	.658	0.55
51	We will never be reunited with deceased friends and relatives	.515	0.52
59	Earthly existence is the only existence we have.	.491	0.47
Astrology (Factor 6)			
30	A person's future has nothing to do with their zodiac sign	.648	0.73
54	Astrology can not be used to accurately predict the future	.523	0.64
38	It is not possible for planetary forces to control personality traits	.559	0.64
14	Astrological predictions, which come true are the result of coincidence	.573	0.63
62	Horoscopes prepared by qualified experts can accurately predict the future	.592	0.42
ESP (Factor 7)			
4	It is possible for people to know about the outcome of an event before it happens	.573	0.63
20	Some people have visions of the future which come true	.678	0.60
44	People have hunches that come true and are not just coincidences	.570	0.53
12	When dreams seem to foretell the future, it is just a coincidence	.509	0.52
28	Telepathy (mental communication) between two people is not possible	.461	0.48
Witchcraft (Factor 8)			
23	Witches/warlocks can actually curse/cast spells	.711	0.75
47	There are actual cases of witchcraft	.695	0.72
55	Black magic really exists and should be dealt with in a serious manner	.659	0.67
39	Witches/warlocks who can perform genuine acts of magic exist outside the realm of imagination	.468	0.64
63	Through the use of mysterious formulas and incantations it is possible to cast spells.	.682	0.60

(Nb: Bolded items represent values loaded onto particular factors.)

Each of the factors was coherent, possessed conceptual clarity and possessed good to excellent internal reliability. The communality statistics determine the proportion of variance from within the variable, and each of the items. Consequently, all items with higher communalities (greater than .6) would remain, whilst those below .6 removed during additional rounds of analysis. (For example, Extra-Terrestrial Factor 2: item 48, ‘alien crafts regularly visit earth’, communality = .774; whereas PK Factor 4: item 13 ‘people are able to bend metal objects simply by thinking about it’, communality = .558). (see Table 6 above).

Table 7: Descriptive statistics paranormal belief factors (new measure – phase I)

Factor	Mean	SD	α
Haunt	3.95	1.51	.91
ET	2.92	1.35	.91
Super	3.93	1.58	.83
PK	2.63	1.28	.87
RB	4.28	1.50	.88
Astro	3.11	1.33	.81
ESP	4.27	1.29	.79
Witch	2.90	1.38	.85
MMUpbs	3.54	1.01	.95

(Key: *Haunt* = Hauntings, *ET* = Extra-Terrestrials, *Super* = Superstition, *PK* = Psychokinesis, *RB* = Religious Beliefs, *Astro* = Astrology, *ESP* = Extra-Sensory Perception, *Witch* = Witchcraft, and *MMUpbs* = Manchester Metropolitan University Paranormal Belief Scale).

Prior to the main analysis, Cronbach’s alpha (α) assessed the internal reliability of the subscale measures (facets). All facets of the MMUpbs proved psychometrically acceptable: Hauntings ($\alpha = .91$) and Extra-Terrestrial ($\alpha = .91$) demonstrated excellent internal reliability. Superstition ($\alpha = .83$), Psychokinesis ($\alpha = .87$), Religious Belief ($\alpha = .88$), Astrology ($\alpha = .81$) and Witchcraft ($\alpha = .85$) produced alpha coefficients in the good range, whilst Extra-Sensory Perception ($\alpha = .79$) demonstrated a moderate to acceptable range. The overall scale (MMUpbs, $\alpha = .95$) demonstrated excellent internal reliability. Scale descriptive statistics appear in Table 7 above.

Table 8: Inter-factor correlations

	1.	2.	3.	4.	5.	6.	7.	8.
1 . Haunt								
2 . ET	.51**							
3 . Super	.40**	.20**						
4 . PK	.58**	.50**	.25**					
5 . RB	.53**	.23**	.18**	.39**				
6 . Astro	.57**	.39**	.41**	.57**	.40**			
7 . ESP	.68**	.41**	.30**	.57**	.51**	.56**		
8 . Witch	.58**	.48**	.17**	.64**	.48**	.47**	.52**	

**correlation significant at $p < .01$ (one-tailed).

(Key: Haunt = Hauntings, ET = Extra-Terrestrials, Super = Superstition, PK = Psychokinesis, RB = Religious Beliefs, Astro = Astrology, ESP = Extra-Sensory Perception and Witch = Witchcraft).

Pearson's product moment correlation revealed significant inter-factor correlations. The majority of correlations appear to be in the moderate to high category .4 to .6. Weaker correlations exist between superstition and extra-terrestrial ($r = .20^{**}$), religious belief and extra-terrestrial ($r = .23^{**}$), and PK and superstition ($r = .25^{**}$) and were considered to be in the low range .20 to .29. Overall, this suggests a single paranormal belief factor, underpinned by eight related paranormal belief subscales. (see Table 8).

4.5. Factors and Gender

4.5.1. Tests of difference

A one-way, between-group multivariate analyses of variance (MANOVAs) performed on gender differences across paranormal factors (haunting, ET, superstition, PK, religious belief, astrology, ESP and witchcraft) produced the following observable effects:

A significant difference was observed for gender overall, $F(8, 1206) = 18.479$, $p < .001$; Wilks' Lambda = .891; $\eta p^2 = 1.09$. Females ($M = 3.63$, $SD = 0.98$) scored higher on the paranormal belief scale than males ($M = 3.24$, $SD = 1.07$). This revealed significant difference on each of the dependent variables (see Table 9).

Females scored higher on the following subscales, haunting ($M = 4.13, SD = 1.46$ vs. $M = 3.41, SD = 1.51$), superstition ($M = 4.12, SD = 1.59$ vs. $M = 3.33, SD = 1.42$), PK ($M = 2.68, SD = 1.25$ vs. $M = 2.47, SD = 1.34$), religious belief ($M = 4.40, SD = 1.45$ vs. $M = 3.89, SD = 1.60$), astrology ($M = 3.21, SD = 1.30$ vs. $M = 2.81, SD = 1.35$), ESP ($M = 4.37, SD = 1.25$ vs. $M = 3.96, SD = 1.36$), and witchcraft ($M = 2.98, SD = 1.35$ vs. $M = 2.62, SD = 1.42$). Males scored higher on ET belief than females ($M = 3.09, SD = 1.45$ vs. $M = 2.87, SD = 1.31$).

Table 9: Gender differences on paranormal belief subscales

Factor	Gender				<i>F</i>	<i>df</i>	<i>p</i>	ηp^2
	Male		Female					
	<i>M</i> (<i>n</i> = 295)	<i>SD</i>	<i>M</i> (<i>n</i> = 920)	<i>SD</i>				
Haunt	3.41	1.51	4.13	1.46	53.18	1, 1213	<.001	.04
ET	3.09	1.45	2.87	1.31	6.27	1, 1213	=.012	.01
Super	3.33	1.42	4.12	1.59	58.26	1, 1213	<.001	.05
PK	2.47	1.34	2.68	1.25	6.11	1, 1213	=.014	.01
RB	3.89	1.60	4.40	1.45	26.26	1, 1213	<.001	.02
Astro	2.81	1.35	3.21	1.30	21.29	1, 1213	<.001	.02
ESP	3.96	1.36	4.37	1.25	22.87	1, 1213	<.001	.02
Witch	2.62	1.42	2.98	1.35	15.56	1, 1213	<.001	.01

(Key: *Haunt* = Hauntings, *ET* = Extra-Terrestrials, *Super* = Superstition, *PK* = Psychokinesis, *RB* = Religious Beliefs, *Astro* = Astrology, *ESP* = Extra-Sensory Perception and *Witch* = Witchcraft).

Cohen (1988) suggested that partial eta-squared (ηp^2) interpretation employs the following rule of thumb: values between .01 and .06 reflect a small effect size; values within the .06 to .13 specify a medium effect size and a value of .14 or higher indicates a large effect.

4.5.2. *Relationship between new scale, existing scales, anomalistic beliefs and paranormal experience*

Prior to analysis, Cronbach’s alpha assessed scale reliability. All measures possess good to excellent internal reliability. Cronbach’s alpha (α) assessed the internal reliability of established paranormal belief measures (RPBS and ASGS) and anomalous belief scales (Conspiracies and Urban Legends). All measures demonstrated good (approximately .8 to .9) to excellent (.9 and above) internal reliability (see Table 10).

Table 10: Descriptive of experience, paranormal belief measures and anomalous beliefs

Factor	Mean	SD	α
Experience	0.92	1.45	
MMUpbs	166.22	47.65	.90
RPBS	55.15	28.48	.78
NAP	21.58	5.17	.87
TPB	22.49	5.15	.81
ASGS	9.07	7.08	.96
Urban Legends	20.94	6.30	.95
Conspiracies	18.69	5.52	.89

(Key: Experience = Level of experience, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, RPBS = Revised Paranormal Belief Scale, NAP = New Age Philosophy, TPB = Traditional Paranormal Beliefs, ASGS = Australian Sheep-Goat Scale, Urban Legends = Anomalous Beliefs and Conspiracies = Belief in Conspiracy).

Table 11: Inter-correlations experience, established paranormal belief measures and anomalous beliefs

	1	2	3	4	5	6	7	8
Experience								
MMUpbs	.43**							
RPBS	.39**	.88**						
NAP	.34**	.80**	.87**					
TPB	.31**	.75**	.83**	.72**				
ASGS	.53**	.68**	.68**	.65**	.54**			
Urban Legends	.21**	.43**	.43**	.38**	.37**	.35**		
Conspiracies	.21**	.48**	.44**	.44**	.39**	.36**	.37**	

**correlation significant at $p < .01$ (one-tailed).

(Key: Experience = Paranormal Experience, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale (MMUpbs), RPBS = Revised Paranormal Belief Scale, NAP = New Age Philosophy, TPB = Traditional Paranormal Belief, ASGS = Australian Sheep-Goat Scale, Urban Legends = Anomalous Beliefs and, Conspiracies = Belief in Conspiracy).

Pearson's Product Moment correlations explored relationships between variables. Number of experiences correlated with level of paranormal belief (MMUpbs, RPBS and ASGS) and endorsement of anomalous beliefs (conspiracies and urban legends). Additionally, there was a positive correlation between the anomalous belief measures conspiracies and urban legends. MMUpbs correlated significantly with all established measures of paranormal belief: RPBS (NAP and TPB) and ASGS (see Table 11).

Table 12: Correlations between the eight facets of the MMUpbs and established paranormal belief measures

	RPBS	NAP	TBP	ASGS
Haunt	.72**	.67**	.58**	.58**
ET	.52**	.46**	.38**	.44**
Super	.41**	.35**	.23**	.24**
PK	.71**	.68**	.56**	.64**
RB	.67**	.52**	.74**	.37**
Astro	.66**	.64**	.49**	.52**
ESP	.67**	.68**	.60**	.67**
Witch	.73**	.62**	.72**	.53**

**correlation significant at $p < .01$ (one-tailed).

(Key: *Haunt* = *Hauntings*, *ET* = *Extra-Terrestrials*, *Super* = *Superstition*, *PK* = *Psychokinesis*, *RB* = *Religious Beliefs*, *Astro* = *Astrology*, *ESP* = *Extra-Sensory Perception* and *Witch* = *Witchcraft*).

Table 13: Correlations between the MMUpbs and anomalous belief measures

	Conspiracies	Urban Legends
Haunt	.41**	.34**
ET	.37**	.26**
Super	.16**	.24**
PK	.32**	.33**
RB	.33**	.29**
Astro	.40**	.40**
ESP	.39**	.33**
Witch	.38**	.34**

**correlation significant at $p < .01$ (one-tailed).

(Key: *Haunt* = *Hauntings*, *ET* = *Extra-Terrestrials*, *Super* = *Superstition*, *PK* = *Psychokinesis*, *RB* = *Religious Beliefs*, *Astro* = *Astrology*, *ESP* = *Extra-Sensory Perception* and *Witch* = *Witchcraft*).

Similarly, MMUpbs subscales correlated with anomalous beliefs (conspiracies and urban legends) (see Table 13).

4.5.3. Scale relationships

All measures possessed moderate to excellent internal reliability: MMUpbs (new paranormal measure), RPBS, ASGS, and anomalous belief (urban legends and conspiracist beliefs). Significant positive correlations exist between the MMUpbs, RPBS, and ASGS; and between the subscales of the MMUpbs, RPBS, and ASGS. This revealed moderate positive correlations between MMUpbs Paranormal subscales and the two Rasch scaled factors of the RPBS. Anomalous beliefs moderately positively correlated with the measures of paranormal belief. The MMUpbs demonstrated excellent concurrent validity.

4.5.4. Preliminary analysis of factor structure

All items remained following PCA (Principal Components Analysis). Table 14 shows the infit and outfit statistics for the 47-items. The rotation method used orthogonal (varimax). Entry items 2 and 21 show suitable variance and whilst they fell outside the outfit recommended statistic or (+ or - 2) were within tolerance for a suitable infit condition (item 2 = 2.69 and item 21 = 2.25 respectively).

Table 14. Rasch scale development: fit/misfit order for 47-item solution

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL		INFIT		OUTFIT		PT-MEASURE		EXACT OBS%	MATCH EXP%	ITEM	G
				SE	MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.					
2	4885	1215	-0.19	0.02	1.58	9.9	2.69	9.9	A 0.33	0.56	15.7	21.6	BELIEF2	0	
21	5950	1215	-0.49	0.02	1.69	9.9	2.25	9.9	B 0.35	0.59	18.7	23.6	BELIEF26	0	
25	5943	1215	-0.49	0.02	1.62	9.9	1.93	9.9	C 0.37	0.59	21.5	25	BELIEF34	0	
3	4975	1215	-0.28	0.02	1.46	9.9	1.6	9.9	D 0.38	0.56	15.5	20.3	BELIEF3	0	
29	3886	1215	0.1	0.02	1.17	4.5	1.49	9.9	E 0.41	0.5	25.6	24.6	BELIEF40	0	
1	4827	1215	-0.19	0.02	1.25	6.3	1.41	9.5	F 0.42	0.54	25.9	25.2	BELIEF1	0	
15	4346	1215	-0.1	0.02	1.26	6.8	1.32	6.7	G 0.44	0.53	24	21.9	BELIEF19	0	
8	4785	1215	-0.22	0.02	1.27	7.1	1.29	6.6	H 0.44	0.55	21.3	22.8	BELIEF11	0	
7	3724	1215	0.16	0.02	1.19	5	1.29	5.4	I 0.43	0.5	22.9	22.6	BELIEF10	0	
28	3659	1215	0.21	0.02	1.11	2.9	1.28	5.7	J 0.44	0.49	28.1	24.4	BELIEF39	0	
23	3684	1215	0.18	0.02	1.06	1.5	1.24	4.8	K 0.47	0.49	27	23.1	BELIEF30	0	
39	3905	1215	0.11	0.02	1.09	2.4	1.22	5	L 0.47	0.5	27.5	24.5	BELIEF54	0	
22	4877	1215	-0.22	0.02	1.17	4.4	1.22	5.1	M 0.47	0.54	24.8	25.3	BELIEF28	0	
14	3364	1215	0.3	0.02	1.17	4.5	1.19	3.5	N 0.41	0.48	24.6	23.6	BELIEF18	0	
41	2878	1215	0.51	0.02	0.96	-1.1	1.15	2.7	O 0.46	0.43	28.5	25.6	BELIEF56	0	
37	5398	1215	-0.41	0.02	1.1	2.6	1.13	3.1	P 0.52	0.56	24	23	BELIEF51	0	
43	5391	1215	-0.45	0.02	1.04	1.2	1.1	2.6	Q 0.54	0.56	23.6	23.6	BELIEF59	0	
18	3076	1215	0.37	0.02	0.85	-4	1.1	1.9	R 0.54	0.45	32.1	25.2	BELIEF23	0	
40	3883	1215	0.08	0.02	0.95	-1.2	1.07	1.7	S 0.53	0.5	29.1	24.2	BELIEF55	0	
12	4277	1215	0.04	0.02	1.03	0.8	1.06	1.4	T 0.5	0.51	28.4	29	BELIEF16	0	
5	4257	1215	0.04	0.02	1.03	0.8	1.05	1.2	U 0.5	0.52	25.7	26.6	BELIEF8	0	
9	4829	1215	-0.22	0.02	1.03	0.7	1.03	0.9	V 0.52	0.53	25.1	25.8	BELIEF12	0	
4	4988	1215	-0.2	0.02	1.01	0.2	1.02	0.5	W 0.54	0.54	28.5	28.6	BELIEF4	0	
11	4250	1215	0	0.02	1	-0.1	1.02	0.4	X 0.52	0.51	30.6	27.6	BELIEF14	0	
27	3808	1215	0.17	0.02	0.99	-0.2	1	0.1	w 0.51	0.49	30.3	25.6	BELIEF38	0	
26	5768	1215	-0.54	0.02	0.96	-1	0.96	-1	v 0.59	0.57	23.3	21.9	BELIEF35	0	
31	5724	1215	-0.5	0.02	0.96	-1	0.93	-1.8	u 0.6	0.57	24.3	23.2	BELIEF43	0	
32	5779	1215	-0.54	0.02	0.96	-1.1	0.93	-1.7	t 0.6	0.56	30.9	28.9	BELIEF44	0	
38	3533	1215	0.32	0.02	0.83	-4.8	0.95	-1.1	s 0.56	0.47	29.4	24.9	BELIEF53	0	
35	3129	1215	0.42	0.02	0.91	-2.5	0.94	-1.3	r 0.5	0.45	25.3	23.7	BELIEF48	0	
47	2678	1215	0.58	0.02	0.94	-1.5	0.91	-1.5	q 0.46	0.42	29.4	27.2	BELIEF64	0	
10	2835	1215	0.57	0.02	0.93	-1.7	0.88	-2.5	p 0.48	0.43	30.8	27.2	BELIEF13	0	
33	3058	1215	0.46	0.02	0.89	-3	0.93	-1.5	o 0.51	0.44	31	25.5	BELIEF45	0	
19	3743	1215	0.24	0.02	0.9	-2.9	0.93	-1.7	n 0.54	0.49	29.4	25.7	BELIEF24	0	
20	5178	1215	-0.31	0.02	0.92	-2.1	0.92	-2	m 0.6	0.56	26.9	23.7	BELIEF25	0	
34	3889	1215	0.15	0.02	0.87	-3.9	0.92	-2	l 0.57	0.5	30.3	24.9	BELIEF47	0	
16	5478	1215	-0.39	0.02	0.86	-3.7	0.82	-4.3	k 0.64	0.56	30.9	28.9	BELIEF20	0	
17	3361	1215	0.38	0.02	0.83	-4.9	0.85	-3.5	j 0.55	0.47	26.2	23.9	BELIEF21	0	
30	5575	1215	-0.43	0.02	0.83	-4.6	0.82	-4.5	i 0.65	0.57	28.8	24.5	BELIEF41	0	
46	3087	1215	0.39	0.02	0.82	-4.9	0.78	-4.9	h 0.55	0.45	30.4	24.7	BELIEF63	0	
45	3266	1215	0.42	0.02	0.8	-5.9	0.77	-5.6	g 0.57	0.46	29.6	24.5	BELIEF62	0	
44	3193	1215	0.42	0.02	0.8	-5.8	0.76	-6	f 0.57	0.45	28.5	24.4	BELIEF61	0	
24	4708	1215	-0.14	0.02	0.74	-8	0.73	-7.1	e 0.66	0.54	27.2	24.2	BELIEF33	0	
6	4783	1215	-0.14	0.02	0.73	-8.2	0.73	-7.3	d 0.67	0.54	27.6	25.2	BELIEF9	0	
42	4094	1215	0.04	0.02	0.71	-9	0.68	-8.1	c 0.65	0.52	28.7	23.3	BELIEF57	0	
36	4155	1215	0.05	0.02	0.71	-9	0.68	-8.4	b 0.65	0.52	30.5	25.6	BELIEF49	0	
13	5097	1215	-0.24	0.02	0.71	-8.7	0.71	-7.5	a 0.69	0.56	29.4	25.3	BELIEF17	0	
MEAN	4296.9	1215	0	0.02	1.01	-0.3	1.1	0.7			26.8	24.8			
S.D.	935.6	0	0.33	0	0.23	5.2	0.38	5.3			3.8	1.9			

The initial exploratory factor analysis (EFA) revealed a 47-item (nine factor solution) thus satisfying the required infit and outfit model. These items were assessed for goodness of fit during subsequent confirmatory factor analysis (CFA). CFA reduced the original 64-items to 47. Those deemed to be outside the range for and acceptable fit (+2 and -2) were removed from the final version of items.

(see Table 15 below for the original items that informed the current scale/measure)

Following the Rasch scale procedure, an evaluation of the infit and outfit statistics performed on the original 124-item measure. Items deemed to be outside the range for and

acceptable fit (+2 and -2) were removed from the final version of items. The remaining item clusters are grouped into factors that they represent (e.g., life after death = 26-items).

Table 15. Preliminary analysis of factor structure

Factor	Label	No. of items loading onto factor (loadings > .4)	Item numbers
1	Life after death	26	84, 77, 62, 61, 36, 4, 96, 111, 1, 21, 58, 6, 50, 63, 13, 49, 73, 124, 32, 31, 90, 80, 65, 108, 33, 115
2	Alien visitations to earth	12	34, 35, 53, 106, 82, 121, 70, 112, 41, 83, 64, 116,
3	ESP (precognition, telepathy, clairvoyance)	16	29, 68, 102, 81, 56, 23, 100, 25, 59, 91, 88, 122, 57, 72, 120, 98,
4	Astrology	11	93, 40, 48, 54, 10, 114, 19, 2, 26, 67, 11,
5	Superstition	9	89, 87, 12, 66, 113, 110, 16, 30, 22,
6	Existence of life on other planets	7	20, 76, 109, 118, 119, 8, 43
7	PK	6	18, 52, 94, 69, 46, 1010
8	Religious belief	6	38, 92, 28, 123, 117, 17
9	Witchcraft	6	5, 14, 105, 42, 24, 103
10	Alternative explanations of paranormal phenomena	5	27, 60, 79, 44, 3
11	One's own PK ability/experience	4	85, 107, 47, 74
12	Extraordinary life forms	3	99, 75, 55
13	Faith healing	2	78, 51
14	Anomalous phenomena	2	9, 45

Those items that are greater than .4 are loaded onto each factor above.

4.6. Phase I Discussion

4.6.1. General Discussion

The paranormal belief composite measure comprised the following scales; RPBS, ASGS, PSI, and MMUpbs (MMU Paranormal Belief Scale). Following factor analysis, a nine-factor solution emerged. The factors comprised haunting, other life, superstition, religious belief, alien visitation, ESP, PK, astrology, and witchcraft. Each of the factors demonstrated good internal reliability, and were examined using exploratory factor analysis (EFA) and they showed that item clusters were conceptually coherent; all factors possessed good face validity where items were related to an assigned factor (e.g., witchcraft). These findings support the work of Chequers et al. (1997), where a core set of elements appears to explain paranormal belief. Thus, the super scale produced eight usable factors that demonstrated moderate to high degrees of inter-correlation forming a composite measure. Belief in the existence of life on other planets, demonstrated only weak associations.

Phase (I) suggests that a much broader measure of paranormal belief is possible and new/additional items were included. The new MMUpbs measure developed in line with existing belief clusters (RPBS and ASGS) would have the advantage of assessing under-researched related beliefs (e.g., ghosts/haunting, alien visitation and belief in the existence of extra-terrestrials) alongside the more traditional paranormal beliefs.

Extending the research of Dagnall et al. (2010) phase (I) of this doctoral thesis generated a revision of the original 64 item paranormal belief measure (MMUpbs), which allowed development of a more comprehensive set of belief items. As outlined by Dagnall et al. (2010) further refinement of existing items/measures should produce a more global measure whilst allowing the smaller individual core facets of belief in the paranormal (e.g., belief in haunting) should be more succinct, concise and user-friendly. The final general discussion (chapter 8, p.195) of this doctoral thesis outlines a more inclusive discussion.

4.7. Conclusion

The new paranormal measure (MMUpbs) performed promisingly. A Further analysis is required (CFA) which will involve theoretically driven CFA on each of the selected subscales of the MMUpbs to allow further refinement of the items, item loadings and select those items suitable for inclusion within the final measure. Phases III and IV will

allow continued exploration of items relating to anomalous items and conjunction problems, demonstrating development of this thesis. These data will be further analysed allowing room for additional development of the global scale and independent factors whilst exploring models for standard conjunctions, problem types and paranormal problems that will assess the legitimacy of the MMUpbs subscales respectively. This will further inform the new paranormal measure (MMUpbs).

Chapter 5. Phase II – Confirmatory Factor Analysis and further enhancement of the MMUpbs (additional single item measures)

5.1. General overview of phase II

Phase II extended the exploratory factor analysis (EFA) from phase I by conducting a confirmatory factor analysis (CFA). Additionally, further items were included; this process consolidated existing items and increased subscale breadth. These amendments facilitated further development of the paranormal belief measure (see Appendix A. Phase II booklet, Section 1, pp 300-304 for MMUpbs 50-item measure). Specifically, it allowed re-examination of the nine-factor solution, proposed by (Dagnall et al., 2010) and extended the correlational/factor analyses conducted in phase I.

In summary, phase II further assessed the factorial structure of the emerging belief measure, and evaluated whether conceptual dimensions functioned effectively as independent subscales. Principally, subdivision of the psi factor from previous iterations into separate factors (astrology and precognition) enhanced subscale coherence. The subsequent CFA produced a theoretically sound, parsimonious eight-factor solution. Consideration of subscales using both single items and full-scale paranormal belief measures revealed the suitability of item function/categories. Finally, phase II generated important improvements in terms of the item refinement, verified reliability and validity of the factors while directly comparing performance of the emergent global measure (MMUpbs).

5.1.1. Re-examination of the nine-factor solution

For completeness, it is important to note that the original 9-factor solution identified by Dagnall et al. (2010) contained the following paranormal subscales: ghosts, other life forms, superstition, religion, alien visitation, psychokinesis (PK), ESP, astrology and witchcraft. Work in phase I and II, which considered factorial structure and conceptual content, advocated a superior 8-factor solution: Hauntings, superstition, religiosity, psychokinesis (PK), ESP, extra-terrestrial, astrology and witchcraft. Enhancements involved haunting/ghost related items. Significant changes involved the haunting/ghost, other life forms, extra-terrestrial/alien visitation, and religious belief subscales. Particularly, the label hauntings was preferred because it embraced both traditional ghost and poltergeist activity. Removal of items referring to other life forms occurred because

the factor did not relate strongly to paranormal belief. Relatedly, adoption of the term extra-terrestrial covered all aspects of alien visitation.

5.1.2. Introduction and background to phase II

Primarily, the design of an alternative measure involved the compilation/generation of suitable questions that would examine a comprehensive range of paranormal aspects, anomalous beliefs and specific thoughts (Dagnall et al., 2007; Irwin et al., 2012). Irwin et al. (2012) suggests that it is important to examine how a person's thoughts relate to any beliefs they hold. Therefore, following on from Irwin et al. (2012) guidance, further literature review and research allowed the exploration of several scales, which explored individual differences across a range of facets. Firstly, the CI 14-item questionnaire (Rassin, 2009) is a 14-item version of the original 10-item index that examines confirmation bias; e.g. 'I only need a little information to reach a good decision' and, 'once I have made a decision, I do not change it'. Secondly, the ICQ-EV (Aardema et al., 2010) an expanded 30-item measure developed by Aardema et al. (2005), investigates inferential confusion and includes items such as "My imagination can make me lose confidence in what I actually perceive". Finally, the MCQ 30-item measure (Wells and Cartwright-Hatton, 2004) explores cognitive confidence, specifically "individual differences in a selection of meta-cognitive-beliefs, judgments and monitoring tendencies considered important in the meta-cognitive model of psychological disorders" (Wells and Cartwright-Hatton, 2004, p. 385). The MCQ is comprised of the following five subscales: Positive beliefs (beliefs that worrying is actually beneficial), cognitive self-consciousness (the tendency to focus attention on thought processes), uncontrollability and danger (negative beliefs about thoughts concerning uncontrollability and danger), and need to control thoughts (negative beliefs concerning the consequences of not controlling thoughts) (Irwin et al., 2012, p. 112).

These important scales have helped to shed light on the nature of belief formation and maintenance of such beliefs and have guided the formation of the subscales within the current doctoral thesis. A follow up study further explored the nature and diversity of such belief generation. It explored anomalous experiences, thought processes (Irwin et al., 2012), and examined how a person's anomalous or seemingly inexplicable experiences relate to aspects of their everyday thought processes. In this context, the current research further explored thought processes, paranormal belief ideation through the processes

underpinning thinking/reasoning, paranormal belief and anomalous experiences, in order to authenticate specific item choice, arrangement and develop further a robust questionnaire.

In addition to paranormal beliefs and thought generation, single item functioning is of significance within the current research. The research conducted by Glickson (1990) and Jinks et al. (2012) outline the importance because they both expedite questionnaire design and evaluation whilst employ appropriate paranormal frameworks. They not only allow scope for further experiential approaches to be included alongside existing paranormal items/measures (an idea for future research and development of the current thesis) but also further consideration of items/text, narrative and wording designed in future scales. Pertinently, this allows a certain amount of autonomy for item development whilst allowing scope for potential enhancement by increasing variety of global items based on personal experience (percipients paranormal beliefs/experiences). To this end, Irwin (1985b) posits that updated/newer items need integration, either directly with the paranormal or alongside altered state of consciousness (ASC) (Holt et al., 2004). The current research may help shape new item design and improve veracity and variety. Jinks et al. (2012) further examined whether complementary and alternative medical (CAM) beliefs, and other anomalous beliefs, exhibit characteristics of quasi-beliefs¹⁹. This is where respondents express stronger beliefs in a *primary* level of belief (the Bermuda triangle ‘mystery’) but differ in a so-called *secondary* level regarding the original subject ‘there is a logical explanation for that missing boat’. This is important within the current thesis for three reasons. Firstly, it helps to inform and explain potential problems with item/question design. Secondly, it provides some support for the over reliance on questionnaires vs. interpretation of results. Finally, it helps to further alternatives open to percipients (in principal) two or more alternative choices/views regarding certain aspects of any given paranormal question (Irwin, 2013).

To appreciate the diverse nature of measures and item functionality further examination of existing measures/scales is required to determine if these allow clarification of not only belief, but also the type of believer (Jinks, 2012).

¹⁹ According to Sperber (1985), belief and quasi-belief appear as two divergent attitudes towards specific representations or are two varieties of 'acceptance'.

The current research phase II consolidates several measures, including additional global items to generate a new measure of paranormality, providing individual scores and a composite measure. There are two advantages of the current measure: it allows access to measure the facets individually and adequately, providing both a global and an individual subscale structure. The current research extends phase I by reassessing the factorial structure of the MMUpbs measure alongside existing measures and three global items. Phase II below, delineates current findings, proposes adjustment for scale design, and discusses item functioning.

5.2. Method

5.2.1. Respondents

In total, 562 respondents completed phase II of the research. Ages ranged from 18 to 69 years, with a mean (M) of 25.03 and a standard deviation (SD) of 10.36; 77.6% (436) were female and 22.4% (126) were male. Female ages ranged from 18 – 69 years, $M = 24.37$, $SD = 9.83$; Males ages ranged from 18 – 67 years, $M = 27.33$ years, $SD = 11.76$. All of the 562 participants (100%) completed the questionnaire in a paper-pencil form. Recruitment of respondents began with an invitation to participate (and distributed) via the Manchester Metropolitan University internal email system. Enlisting participants was also through a range of sources: emails to staff and students at the university, undergraduate and postgraduate psychology classes, through contacts at local colleges, via posters placed around the university campus and the wider population. Participation was voluntary and respondents could terminate their participation at any time during the study.

5.2.2. Materials

5.2.3. Several measures used in phase II

5.2.4. Extracted paranormal belief factors (MMUpbs new measure of paranormal belief)

These initially were comprised of a 50-item scale based on the 8 paranormal factors extracted from phase I. Both phases have extended the research of the Dagnall et al. (2010a, 2010b) (see description in background for more detail). They consist of a total of 48-items within the following facets; Ghosts (8-items), ET (8-items), superstition (5-Items), PK (6-Items), religion (7-items), astrology (5-items), witchcraft (5-items) and precognition (4-items) (see Table 2 below). Each subscale originally contains a mixture of positively phrased and negatively phrased (reversed) items. Following factor analysis, only

positive items remained for three of the factors: witchcraft, ET and astrology. Those items remaining are positive statements (e.g., “There is a devil” and “poltergeists exist”), and are measured on a seven point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The original subscales were conceptually coherent: possessed good face validity; composed of individual items that clearly related to the assigned factor label. In addition to this, factors possessed good to excellent external reliability.

Additional consideration of previously extracted factors revealed an imbalanced number of items across subscales. To address this issue, a further literature review was undertaken and supplementary items generated (see Appendix C. pp. 383-387 for complete lists of generated items C.1. and the first iteration of 64-items C.2.). The addition of further questions increased subscale breadth and balanced subscale item numbers (e.g., the 47-item total increased to 64-items. This subsequently reduced to 48-items). Previous academic research established the adequacy of subscale breadth (e.g., alien visitation, 8-items) (Dagnall et al., 2010b; Dagnall et al., 2011).

5.2.5. Revised Paranormal Belief Scale (RPBS) (Tobacyk and Milford, 1983; Tobacyk, 1988; Lange et al., 2000)

This is a modified version of Tobacyk and Milford’s (1983) paranormal belief scale, scored using the rasch scale procedure (Lange and Thalbourne, 2002). (For further details of the convention required for this measure, see phase I p.103.).

5.2.6. Australian Sheep-Goat Scale (ASGS) (Thalbourne and Delin, 1993; Thalbourne, 2001)

The ASGS (an 18-item scale) that measures belief in, and alleged experience of, the paranormal, by focusing on the subset of core paranormal beliefs: Extra-sensory perception, psychokinesis, and life after death (Wiseman and Watt, 2006). Scoring of the ASGS requires using the rasch scale procedure (Lange and Thalbourne, 2002). (For further details of the convention required for this measure, see phase I p.103).

5.2.7. Global items (beliefs)

Three single/global items were introduced to the new version of the questionnaire in order to assess further the veracity of a multidimensional scale vs. a single item measure (paranormal statements that ask respondents to endorse or refute belief in the paranormal;

measured on a 7-point Likert scale where 1 is strongly disagree and 7 strongly agree). Recent/current literature enabled the generation of global items. They were developed and based on several important definitions: 1) Broad's (1949/1978) definition of paranormality, which delineates paranormal phenomena as those that, if genuine, would violate the basic limiting principles of science. 2) Irwin's (1993) definition proposes that paranormal beliefs are a hypothesized process, which in principle are physically impossible or outside the realm of human capabilities, presently conceived by conventional scientists, and 3), that while people who have had an experience that they cannot explain, or are deemed outside the realm of what is known/science (Thalbourne, 1982). (see Appendix A. Section 3, Global Questions of Paranormal belief for further details of 3 Global items, pp 309-310).

5.2.8. Procedure

The respondents were required to complete a new questionnaire as part of the ongoing measure development for this study. This comprised the following measures: MMUpbs, RPBS, ASGS and paranormal global items. Instructions within the test booklets asked consenting respondents to complete all questions. The researcher collected the completed questionnaires and debriefed the participants. All aspects of the study adhered to the ethical guidelines specified by Manchester Metropolitan University ethics board. The procedure and ethics followed the same one outlined in phase I of this research (see subsection 4.3.8. procedure, p. 105 and 4.3.9. Ethics, p. 105-106 for further details).

5.3. Results

5.3.1. Scale Reliability

The paranormal belief measures: Australian sheep-goat scale, ASGS ($\alpha = .89$), revised paranormal belief scale, RPBS ($\alpha = .94$), and MMUpbs ($\alpha = .93$) demonstrated good/excellent internal reliability (George and Malley, 2003). Similarly, the RPBS subscales: TPB ($\alpha = .83$) and NAP ($\alpha = .89$) possessed good internal reliability.

Table 1 contains the scale descriptive statistics, rasch scaled scores for ASGS and the RPBS subscales (NAP and TPB); MMUpbs, RPBS overall mean totals.

Table 1. Scale descriptive statistics (phase II)

	<i>α</i>	Mean	SD	Min	Max
MMUpbs	.93	160.48	51.52	48.00	296.00
GHOSTtot	.93	30.25	12.78	8.00	56.00
ETtot	.93	21.29	10.72	8.00	55.00
SUPERTtot	.84	18.40	7.95	5.00	35.00
PKtot	.86	15.66	7.35	6.00	39.00
RELTot	.90	28.89	11.70	7.00	49.00
ASTROtot	.80	14.92	6.66	5.00	35.00
WITCHtot	.86	14.13	8.51	5.00	78.00
PRECOGtot	.75	16.96	5.20	4.00	28.00
NAPrasch	.89	21.18	5.36	6.85	37.02
TPBrasch	.83	25.82	1.68	19.84	35.40
RPBStot	.94	52.03	29.83	0.00	146.00
ASGSrasch	.89	8.56	6.93	8.13	39.55

(Key: MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, GHOSTStot = Ghosts, ETtot = Extra-Terrestrials, SUPERTtot = Superstition, PKtot = Psychokinesis, RELtot = Religious Beliefs, ASTROtot = Astrology, WITCHtot = Witchcraft, PRECOGtot = Precognition, NAPrasch = New Age Philosophy, TPBrasch = Traditional Paranormal Belief, RPBStot = Revised Paranormal Belief Scale and, the ASGSrasch = Australian Sheep-Goat Scale).

Each of the factors was coherent, possessed conceptual clarity and possessed good/excellent internal reliability. The MMUpbs demonstrated excellent internal consistency (.93). Considering all the subscales of the MMUpbs, ghosts (.93), ET (.93), superstition (.84), psychokinesis (.86), religion (.90), astrology (.80), witchcraft (.86) possessed good to excellent internal consistency, while precognition (.75) possessed good internal consistency. The RPBS demonstrated excellent consistency (.94), while the subscales, NAPrasch (.89) and TPBrasch (.83) demonstrated good internal consistency. The ASGSrasch (.89) also demonstrated good internal reliability.

Table 2. Breakdown of factors: Positively and negatively (reversed) worded items

Ghosts	ET	Superstiton	PK	Religion	Astrology	Witchcraft	PreCognition
42	41	21	33	8	23REV	34	4
36	47	25	44	3	27REV	18	16
6	35	2	10	13	39REV	40	32
24	5	7	49	37REV	11REV	28	9REV
13	12	14	17	26REV	45	46	
30	19		38	31			
1REV	48			43REV			
20REV	29REV						
8	8	5	6	7	5	5	4

(Total numbers of items per factor shown above)

The total items for each factor appear in table 2 above. These items are not generally cross-loaded nor do they share significant amounts of variance. Initial items totalled 64 and included both positively and negatively (reversed) worded items for all facets. (NB: items with the letters REV after the item number signify reversal of that item)

5.3.2. Inter-measure correlations

Pearson product moment correlations examined relationships between measures (see Table 3).

Table 3. Inter-measure correlations

	1	2	3	4	5	6	7	8
ASGSRasch								
RPBStot	.65**							
NAPrasch	.67**	.86**						
TPBrasch	.18**	.48**	.30**					
Global 1	-.02	-.06	-.06	-.03				
Global 2	.56**	.68**	.65**	.31**	.06			
Global 3	.06	.04	.06	.03	.41**	.17**		
MMUpbs	.68**	.93**	.84**	.43**	-.06	.73**	.05	

**correlation significant at $p < .01$ (one-tailed).

(Key: ASGSrasch = Australian Sheep-Goat Scale rasch scaled, RPBS_{tot} = Revised Paranormal Belief Scale Total, NAPrasch = New Age Philosophy rasch scaled, TPBrasch = Traditional Paranormal Belief rasch scaled, Global 1 = Global measure of paranormality 1, Global 2 = Global measure paranormality 2, Global 3 = Global measure paranormality 3, and the MMUpbs = Manchester Metropolitan University Paranormal Belief Measure).

Consideration of paranormal belief measures revealed a series of significant positive correlations between ASGS; RPBS; MMUpbs; RPBS subscales, TPBrasch and NAPrasch. Correlations between paranormal measures (MMUpbs, RPBS_{tot} and NAPrasch) were in the high range (above .5), whilst, (TPBrasch) were found to be between the low to mid-range (.18 to .47) (Cohen, 1988, 1992). In addition, significant positive correlations exist between global item 2 and all of the other paranormal belief measures: ASGSrasch .56**, RPBS_{tot} .68**, NAPrasch .65**, TPBrasch .31** and MMUpbs .73**.

Pearson's product moment correlation revealed significant inter-factor correlations (see Table 4). The majority of correlations were in the moderate to strong category (.30 to .72). Correlations between superstition and ET ($r = .24$), and religious belief and ET ($r = .26$) were in the weak range .20 to .29. Negligible correlations were observed between witchcraft and superstition ($r = .17$) and religious belief and superstition ($r = .18$).

Table 4. Inter-factor correlations

	1	2	3	4	5	6	7	8	9	10
Ghosts										
Extra Terrestrial	.47**									
Superstition	.43**	.24**								
Psychokinesis	.56**	.55**	.30**							
Religion	.60**	.26**	.23**	.43**						
Astrology	.57**	.36**	.44**	.52**	.43**					
Witchcraft	.61**	.45**	.17**	.60**	.54**	.43**				
Precognition	.67**	.40**	.34**	.58**	.53**	.52**	.53**			
NAPrasch	.72**	.50**	.41**	.69**	.63**	.64**	.63**	.66**		
TPBrasch	.36**	.26**	.19**	.34**	.41**	.22**	.35**	.28**	.30**	
ASGSrasch	.60**	.41**	.31**	.64**	.42**	.49**	.48**	.67**	.67**	.18**

**correlation significant at $p < .01$ (one-tailed).

(Key: Ghosts = Belief in Ghosts, Extra-Terrestrial = Extra-Terrestrial belief, Superstition = Superstitious Belief, Psychokinesis = Psychokinesis, Religion = Religious Belief, Astrology = Belief in Astrology, Witchcraft = Belief in Witchcraft, Precognition = Belief in Precognition, NAPrasch = New Age Philosophy rasch scaled, TPBrasch = Traditional Paranormal Belief rasch scaled and ASGSrasch = Australian Sheep-Goat Scale rasch scaled).

Correlations between paranormal subscales (ghosts, psychokinesis, religion, astrology, witchcraft and precognition) were in the high range (above .5), whilst, (TPBrasch) was found to be between the mid-range (.18 to .47). Correlations for NAPrasch were all well within the high range (above .5). Negligible correlations were observed between TPBrasch and superstition ($r = .19$), and between ASGSrasch and TPBrasch ($r = .18$) (Cohen, 1988, 1992).

5.3.3. Scale relationships

All measures were internally reliable: MMUpbs, RPBS, and ASGS. Relationships between the full scale MMUpbs, RPBS, ASGS and the MMUpbs subscales revealed significant positive correlations. Global item 2 correlates significantly at the .01% level with all of the full measures and all subscale scores of MMUpbs. In line with Cohen (1988), correlations

are defined as small ($r = .10$), moderate/medium ($r = .30$) and large ($r = .50$) respectively (p. 185). Consequently, Global measure 2 produced correlations that are considered high, (MMUpbs $r = .73^{**}$, ghosts $r = .75^{**}$, religion $r = .55^{**}$, witchcraft $r = .56^{**}$, precognition $r = .52^{**}$, psychokinesis $r = .51^{**}$, RPBS $r = .68^{**}$, NAPrasch $r = .65$ and ASGS $r = .60^{**}$); medium, (extra-terrestrial $r = .47^{**}$, astrology $r = .45^{**}$, TPBrasch $r = .31^{**}$) and; small, (superstition $r = .25^{**}$).

Table 5. Correlation of global, full and subscale measures

	Global 1	Global 2	Global 3
MMUpbs	-.05	.73**	.05
Ghosts	-.05	.75**	.05
Witchcraft	.02	.56**	.10*
Religion	-.06	.55**	.01
Precognition	-.05	.52**	.06
Psychokinesis	-.05	.51**	.06
Extra-Terrestrial	.01	.47**	.10*
Astrology	-.17**	.45**	-.10*
Superstition	-.06	.25**	-.03
RPBS	-.06	.68**	.04
NAPrasch	-.06	.65**	.06
TPBrasch	-.03	.31**	.03
ASGS	-.04	.60**	.06

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

Most significant is ghosts (.75**), while superstition (.25**) possesses the lowest correlation at the .01% level. Global item 1 only correlates negatively with astrology (-.17**), while Global item 3 correlates with ET (.10*), astrology (-.10*) and witchcraft (.10*) (see Appendix A. Section 3, for further details of 3 Global items, pp 309-310).

5.4. Preliminary analysis

5.4.1. Exploration of the MMUpbs (new paranormal belief measure structure)

Prior to conducting principal components analysis (PCA) correctness of data was established: Kaiser-Mayer-Okin value (.953) exceeded the recommended value of .6 (Kaiser, 1970, 1974); Bartlett's test of sphericity (Barlett, 1954) was significant (Chi-square, $\chi^2 = 19717.804$, $df = 1225$, $p < .001$), and the correlation matrix contained numerous coefficients of .3 or above.

Principal components analysis (PCA) assessed MMUpbs item fit. Analysis in line with previous research employed oblique rotation (direct oblimin; Fabrigar et al., 1999) (see phase I on p. 111 for further explanation).

This final PCA identified 9 factors with eigenvalues greater than 1; accounting for 67.51% of the total variance. Inspection of the pattern matrix revealed that the factors lacked conceptual coherence and had several items loading above .3 on other factors. (see phase I for further details regarding eigenvalues, scree slope examination and the use of Monte Carlo analysis). In line with scree slope examination, removal of items produced an 8-factor solution. The remaining 8 factors (50-items) were examined further: two low-loading, cross-loading or freestanding items were removed (Item 9REV; PRECOG/PSI and Item 50; ASTRO). An item loading cut-off value of .45 was selected producing a clean solution and in order to deliver a good measure of a factor (Comrey and Lee, 1992).

5.4.2. Main Analysis

Responses to the remaining 48-items were analysed further by means of a second PCA (with oblique direct oblimin rotation): Kaiser-Mayer-Okin value (.957) exceeded the recommended value of .6 (Kaiser, 1970, 1974); and Bartlett's test of sphericity (Barlett, 1954) was significant (Chi-square, $\chi^2 = 33050.227$, $df = 1035$, $p < .001$). This PCA restricted the solution to a 7-factor solution. Repetition of analysis, revealed a factor structure matrix that explains a high percentage of the total item variance. The PCA accounted for 64.20% of the total variance. All emergent factors had eigenvalues exceeding 1 and was in line with Churchill's (1979) recommendation for removal of items presenting with subsequent low correlations (see phase I: subsection 4.3.5. Preliminary analysis found on p106-111, which specifies details of removal of items) (see Table 6 below).

Factor 1 (Ghosts) was comprised of 8-items measuring belief in ghosts, hauntings and communication with the dead; eigenvalue 16.72, accounted for 34.83% of the variance.

Factor 2 (ET - Extra-terrestrial) contained 8-items assessing belief in extra-terrestrial visitations to earth including; aliens landing on earth and alien abduction; eigenvalue of 4.11, accounted for 8.56% of the variance.

Factor 3 (Superstition) was composed of 5-items measuring superstitious beliefs; eigenvalue 3.23, accounted for 6.72% of the variance.

Factor 4 (Precognition and Psychokinesis or PK) consisted of 10-items evaluating belief in psychokinesis and precognitive ability; eigenvalue of 2.04, accounted for 4.26% of the variance.

Factor 5 (Religion) included 7-items evaluating religious beliefs; eigenvalue of 1.83, accounting for 3.81% of the variance.

Factor 6 (Witchcraft) contained 5-items assessing belief in witchcraft and black magic; eigenvalue of 1.50, accounted for 3.12% of the variance.

Factor 7 (Astrology) comprised 5-items measuring belief in prediction and extra-sensory perception; eigenvalue of 1.40, accounted for 2.91% of the variance.

(see Table 6 below)

Table 6. Confirmatory factor analysis

Q. Factor item and number	Communalities	Component						
		1	2	3	4	5	6	7
No. Haunting and Ghosts (Factor 1)								
6 Spirits of the dead can be seen by the living	.735	.628						
42 Ghosts/poltergeists can cause objects to appear (materialise) or disappear (dematerialisation)	.745	.620						
30 People have genuinely seen "ghosts" or "apparitions"	.723	.620						
13 Some places are haunted by spirits or souls of people now dead	.777	.604						
1 Ghosts do <u>not</u> exist	.424	.599						
36 Poltergeists exist	.728	.586						
24 Contrary to scientific belief, some people can make contact with the dead	.710	.581						
20 It is possible to communicate with the spirit world	.626	.547						
Extra-Terrestrial (Factor 2)								
41 People have been taken on board spaceships	.788							-.888
47 Aliens are abducting human beings	.770							-.868
35 Alien crafts regularly visit earth	.765							-.828
5 Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has	.665							-.806
48 Aliens (Extra terrestrial life forms) have implanted objects into people.	.692							-.801
12 Extra-terrestrials have visited earth throughout history	.695							-.788
19 Alien intelligence is responsible for some UFO sightings	.698							-.778
29 Alien spaceships have <u>not</u> crash landed on earth	.623							-.759
Superstition (Factor 3)								
2 I have avoided walking under a ladder because it is associated with bad luck	.619							.790
7 If you break a mirror, you will have bad luck	.694							.747
14 The number "13" is unlucky	.629							.679
21 I do say 'touch wood' or actually touch wood to promote good luck	.658							.780
25 I do say 'fingers crossed' or actually cross my fingers to promote good luck	.632							.767

PSI (Factor 4)			
49	Mental communication between two people is possible	.599	.808
33	A person's thoughts can influence the movement of a physical object	.678	.711
22	Telepathy (mental communication) between two people is <u>not</u> possible	.479	.595
4	It is possible for people to know about the outcome of an event before it happens	.406	.543
17	The mind can be used to control the outcome of a random process (e.g., dice rolling or coin tossing)	.518	.540
10	People are able to bend metal objects simply by thinking about it (psychokinesis)	.417	.538
38	without the mediation of any known physical energy	.533	.523
44	In spite of the laws of science, some people can use their psychic powers to levitate objects	.674	.522
16	Some people have visions of the future, which come true	.558	.495
32	People have feelings/hunches that come true and are not just coincidences	.473	.475
Religion (Factor 5)			
3	I believe in God	.782	.902
8	There is a heaven and a hell	.846	.906
15	There is a devil	.777	.766
37	We will never be reunited with deceased friends or relatives	.574	.645
26	There is no such thing as an afterlife	.733	.667
31	The soul continues to exist after the death of the body	.742	.663
43	Earthly existence (life) is the only existence we have	.489	.538
Witchcraft (Factor 6)			
18	Witches/Warlocks can actually curse/cast spells	.719	-.625
40	Black magic really exists and should be dealt with in a serious manner	.731	-.606
28	Witches/Warlocks who can perform genuine acts of magic, exist outside the realm of imagination	.605	-.570
34	There are actual cases of witchcraft	.487	-.567
46	Through the use of mysterious formulas and incantations it is possible to cast spells	.740	-.559
Astrology (Factor 7)			
23	A person's future has nothing to do with their zodiac sign	.628	-.733
39	Astrology can not be used to accurately predict the future	.572	-.717
27	It is not possible for planetary forces to control personality traits	.545	-.708
11	Astrological predictions, which come true, are merely the result of coincidence	.497	-.639
45	Horoscopes prepared by qualified experts can accurately predict the future	.614	-.544

(NB: Bolded items represent items loaded on particular factors)

Each of the factors was coherent, possessed conceptual clarity and possessed good/excellent internal reliability (see Table 8).

Table 7. Descriptive statistics paranormal belief (new measure – phase II)

Factor	Mean	SD	α
GHOSTtot	30.25	12.78	.93
ETtot	21.29	10.72	.93
SUPERtot	18.40	7.95	.84
PKtot	15.66	7.35	.86
RELTot	28.89	11.70	.90
ASTROtot	14.92	6.66	.80
WITCHtot	14.13	8.51	.86
PRECOGtot	16.96	5.20	.75
NAPrasch	21.18	5.36	.89
TPBtot	25.82	1.68	.83
ASGSrasch	19.30	6.48	.89
RPBStot	52.03	29.83	.94

(Key: *GHOSTStot* = Ghosts, *ETtot* = Extra-Terrestrials, *SUPERtot* = Superstition, *PKtot* = Psychokinesis, *RELTot* = Religious Beliefs, *ASTROtot* = Astrology, *WITCHtot* = Witchcraft, *PRECOGtot* = Precognition, *NAPrasch* = New Age Philosophy, *TPBrasch* = Traditional Paranormal Belief, *ASGSrasch* = Australian Sheep-Goat Scale and *RPBStot* = Revised Paranormal Belief Scale).

5.4.3. PCA (Principal component analysis)

Phase II of this thesis employs PCA (principal component analysis) in order to re-examine these data and so by doing reduce items that share variance: producing a more meaningful and robust set of measures. In this context, PCA categorises the principal direction in which the data varies, and is concerned with variance and covariance of the variables (Shlens, 2005). To this end, PCA is utilised as a reduction tool where the larger data set is concentrated into a more meaningful data set. It is a standard tool in modern data analysis,

as it is a simple, non-parametric method for extracting relevant information from confusing data sets (Johnson and Wichem, 1982; Wold et al., 1987).

5.4.4. CFA (*Confirmatory factor analysis*)

CFA (confirmatory factor analysis) further analysed these data. The major advantage of CFA is its ability to test statistically the goodness of fit on a suitably sized set of data (Velicer and Jackson, 1990; Tabachnick and Fidell, 1996, 2001). According to Suhr, (2009) confirmatory factor analysis (CFA) is a statistical technique used to verify the factorial construction of observable variables. CFA allows a researcher to test the hypothesis between underlying latent constructs and the observed variables (Joreskog, 1969). For the current research, CFA was conducted using the item variance-covariance matrix and established analysis of correlations were appropriately standardized to a common variance (see Harvey et al., 1985). CFA assessed the quality of the factor structure demonstrating good construct validity of the new measure (MMUpbs).

CFA revealed a more robust measure of goodness of fit and provided a more suitable solution. However, the report of the CFA supports a more balanced 8-factor solution but does not demonstrate the combining of PK and precognition into psi distinct factor. The development of a 7-factor solution in principle seemed to be the best fit, however, the 8-factor solution proved more desirable. CFA advocated an 8-factor solution.

5.5. Phase II Discussion

The present research employed an approach that combined several extant measures of paranormal belief (an initial 124-item super measure). Factorial analysis allowed removal of items that shared covariance whilst supplementing with additional items. Following on from phase I (64-items), where omissions were recognised, new items were constructed and added during phase II. This developed further the MMUpbs measure. The current phase (II) demonstrated that MMUpbs was strongly correlated across all existing measures and sub-measures (ASGS; RPBS, TPB and NAP). As predicted, positive correlations occurred between paranormal belief measures: ASGS; RPBS; MMUpbs; RPBS subscales, TPBrasch and NAPrasch. Examination of each subsequent factor highlighted that each possessed good face validity and each had good internal reliability.

The MMUpbs (.93) was comparable in terms of reliability with existing measures RPBS (.94) and ASGS (.89). This revealed positive inter-measure correlations between the

existing paranormal belief measures (RPBS and ASGS) and the new factors. MMUpbs correlated with the subscales of the established measures of paranormal belief RPBS (NAP and TPB) as well as the global items introduced to extend item development (see Table 3. Inter-measure correlations, p.129).

Phase II, employed a 50-item version of the MMUpbs. This was composed of the 47 remaining items extracted from phase I plus three accompanying items designed to increase subscale coherence and breadth. Following further literature review the astrology, extra-terrestrial and ESP subscales each received an extra item. The MMUpbs performed equally well, demonstrating excellent internal reliability, concurrent validity and convergent validity. This revealed high positive correlations between the MMUpbs and established paranormal measures (ASGS and RPBS). There were also, positive correlations observed between the MMUpbs and other study variables (e.g., RT, Dagnall et al., 2010d) and three global questions (Drinkwater et al., 2012), which were equivalent to those obtained with the ASGS and RPBS.

Similarly, when used in multiple regression and median split analysis findings aligned closely with those produced using established paranormal measures. Subscales demonstrated good to excellent internal reliability. Justification for regression and median splits was to aid a more meaningful comparison between first, second and third phases through the examination of existing literature (Irwin, 1993; Thalbourne and Lange, 2000; Dagnall et al., 2007), which has used these methods interchangeably. Finally, the MMUpbs subscales of phase II produced a similar factorial pattern as phase I.

Conversely, there are differences realized in phase II of this thesis with regard to correlational analysis of specific global items 1, 2 and 3 and the full and subscale measures. Whilst important to ask a respondent whether he/she believes in the existence of the paranormal, assessing the veracity of multi-faceted measures compared alongside individual/global items proved useful. It is important to examine standalone and individual item measures in the context of item design, because of individual item composition new item design. Evidence suggests that the question physiognomies²⁰ and respondent characteristics may affect the reliability of responses in surveys (Krosnick, 1991; Krosnick and Fabrigar, 1997). The use of such global single items may need further development

²⁰ Physiognomies: This relates to an anomalous happening which may fall beyond the realm of the ordinary life (Werner, 2004).

and the complexity of items (1 and 3) may have played a part in the miscomprehension of such items (see Jinks, 2012a; Houran and Lange, 2012). In this context, there is a need to consider the correlational differences between Global item 2 and both the subscales of the RPBS (NAP and TPB) but to investigate item design for future measures.

In this context, Lange et al. (2000) proposed that an alternative two-factor solution comprising New Age Philosophy (NAP) and Traditional Paranormal Belief (TPB). As NAP contains 11-items measuring belief in psi, reincarnation, altered states, and astrology, while TPB assesses belief in concepts, such as the devil and witchcraft (Irwin, 2004) we can already see that there is a distinct difference in the composition of both factors. Global item 2 simply states 'do you believe in the paranormal' and as such correlates more significantly with NAP (.65) than TPB (.31). Maybe the difference is simply a sense of control over external stimuli on an individual level (within these elements of the NAP subscale items), reinforced by personal experience (Irwin, 1992; Lawrence et al., 1995). Whereas, lower level correlation with TPB may be of a consequence of associated beliefs maintaining control over the more external aspects on a social level (from TPB type items), and beliefs are culturally reinforced (Ember and Ember, 1988, Goode, 2000).

The results of phase (II) produced 48-items and allowed for a 7-factor solution of paranormal belief. This new measure indicated possesses psychometric properties comparable to the existing, already established measures of paranormal belief (ASGS and RPBS). The MMUpbs has some important advantages. First, it contains some reversed items and therefore is less prone to response bias; although, as noted in the phase I discussion, the use of reversed/negative worded items can be problematic. Second, it is composed of several component subscales (7 in total), which can stand as independent measures of paranormal belief. These subscales may be of value to researchers wishing to distillate the individual facets of belief in the paranormal. What seems important is the amount of distillation or reduction that takes place when accounting for factor analysis (variance shared) and the items and measures within a common core.

The potential to further paranormal belief understanding within those relationships, to the extrapolated factors, remains the purpose of this research. As it stands, the 7 distinct factors now allow measurement of belief in a sub-range of paranormal beliefs, astrological, ghosts etc. which points to a more diverse measure. Whilst, composition of the MMUpbs potentially enhances paranormal belief investigation, further research needs to approve and assess the current measure. In addition, respondents holding more consistent and informed

beliefs about the paranormal may reveal more about belief. In this context, psychometric measures produce a generalised overview of belief (homogenised) derived from individual perspectives. Jinks et al. (2013) suggests that investigation of the correlates/beliefs held by these exceptional believers compared to current existing believers needs further consideration within item/measure design.

The final point is one that will be further explored in the overall discussion, but needs inclusion briefly here; the potential for two differing types of measures (1 item per factor with two forced choice answers agree vs. disagree). This kind of answer polarity may form the basis of a more reductionist approach, but allows discussion and development to extend future studies.

5.6. Conclusion

In conclusion, the present research adds to the existing research regarding item measurement and design, but raises some important questions of the legitimacy of the items used within both paranormal and anomalous belief questionnaires, and what these responses represent. For example, Krosnick, (1991) raises concerns about reliability of responses, and how perception of items differs across respondents. Clearly, there is an affect from how specific questions appear and ultimately perceived (Krosnick, 1991). In this context, Jinks et al. (2013) believes that questionnaires are not all necessarily homogenous devices successfully extracting ‘informed beliefs’ possessing a rational basis. The idea that a measure exactly classifies believers into distinct groups is something that needs further investigation, and is why only superficial knowledge gained from multifaceted and unidentified conclusions reached by the measures professing to deliver a more encompassing level of belief (Jinks et al., 2013).

Importantly, a question remains as to how many sub-factors (between 7 and 8-factors) best represent a measure of paranormal belief, and whether (like the RPBS) the current MMUpbs functions as a multidimensional/general paranormal measure (see Irwin, 2009; Tobacyk and Milford, 1983). Furthermore, research frequently employs total RPBS scores alongside individual factors (e.g., Aarnio and Lindeman, 2005; Darwin et al., 2011; Hergovich, 2003; Wolfradt, 1997) and conceptualise paranormal belief as a latent factor (Darwin et al., 2011; Hergovich et al., 2008).

Consequently, previous phases have included additional items, individual scores and a composite measure. This endorsed adequate measurement of individual facets, and produced both a global and individual subscale structure.

Chapter 6. Phase III - Refining the MMUpbs (validation of current MMUpbs)

6.1. Phase III - Refining the MMUpbs (general overview)

Phase III had three principal aims. 1. To refine/examine the new composite paranormal measure (MMUpbs), 2. Evaluate the degree to which belief in the paranormal belief can be explained by reality testing deficits (Irwin, 2004) and, 3. Examine the relationship between paranormal belief, reality testing, and reasoning bias (Dagnall et al., 2007, Dagnall et al., 2014; Rogers et al., 2009, Rogers et al., 2011).

6.1.1. Introduction and background to phase III

Many research studies have been conducted exploring reasoning bias (Bressan, 2002; Brugger and Taylor, 2003) and the relationship with belief in the paranormal (Bressan, 2002; Stanovich, 2000, 2004). Reasoning deficits therefore, are important because they may help to explain general psi and paranormal belief paradigms (Stanovich, 2000). Belief in psi consequently may arise from misjudgements' of probability and reasoning, where believers (sheep) make more errors compared with sceptics (goats) (Blackmore and Troscianko, 1985). In this context, many of the studies conducted point out that several of the occurrences and events explored are incompatible with modern scientific theories (Musch and Ehrenberg, 2002).

In order to explain the problem a more orthodox approach needs to explicate potential deficits, for example, misinterpretation of randomness and misunderstanding of reasoning bias (Houran and Lange, 1996; Lange and Houran, 1997). Specifically, two important research groups have explored this approach and extended probabilistic reasoning research: Dagnall et al. (2007); Dagnall et al. (2014) and; Rogers et al. (2009), Rogers et al. (2011). See below for further explanation.

6.1.2. Dagnall et al. (2007, 2014)

Dagnall et al. (2007, 2014) noted a limited number of the types of probabilistic reasoning problems such as, judgements of randomness, or appreciation of the impact of sample size on distribution of cases to categories (e.g., Kahneman and Tversky's, 1972). They utilised problems such as the maternity ward problem (representative heuristic) in order to assess if a primary or a secondary sense of representativeness exists within an equivalent population sample. Dagnall et al. (2007) also examined misrepresentation of chance (perception of randomness), rather than a general weakness in probabilistic reasoning was linked to a

belief in the paranormal. Their study presented respondents with a 17-item test assessing a range of probabilistic reasoning questions and perception of randomness (Kahneman et al., 1982).

Dagnall et al. (2014) found that perception of randomness predicted level of paranormal belief. Likewise, respondents who scored above the median (belief on the paranormal) performed worse on the perception of randomness problems. Subsequently, the authors concluded that belief in the paranormal did not arise from a general weakness in probabilistic reasoning, but was associated with a specific deficit related to the misrepresentation of chance (misperception of randomness). They also found that controlling for several factors (gender and qualifications) demonstrated believers made more conjunction errors than non-believers where no effects were observed for event type (paranormal vs. non-paranormal).

6.1.3. Rogers et al. (2009, 2011)

Rogers et al. (2009) extended research by considering if believers were more susceptible to conjunction fallacy, the misperception that co-occurring events (conjunction) are rated more likely than constituent events (Tversky and Kahneman, 1983). Specifically, they simultaneously presented co-occurring [P(A&B)] events to see if they are more likely to occur than single P(A) or P(B) (constituent) events. They found that a formal fallacy might appear to be a valid logical argument because it contains at least one true premise; the defect in reasoning arises from the erroneously formed conclusion. Rogers et al. (2009, 2011) compared standard vs. paranormal event types; which involved presenting conjunction problems as either standard (everyday occurrences) or paranormal (precognition) events. They found that believers made more conjunction errors than non-believers did for both event types, and fewer for paranormal than standard event types.

Rogers et al. (2009) also constructed a scenario judgements questionnaire (SJQ) in order to examine possible susceptibility to conjunction fallacy. The SJQ featured 16 conjunction vignettes, each approximately 40 words in length, divided into vs. non-paranormal events. Importantly, Rogers found that believers in the paranormal made more conjunction errors which implied that belief in the paranormal was associated with susceptibility to conjunction fallacy, and thus to probabilistic reasoning biases (e.g., Blackmore and Troscianko, 1985; Brugger and Taylor, 2003). They also found that both believers and non-believers made fewer conjunction errors for paranormal type events.

Additionally, it appeared that believers are more likely to view coincidences (coinciding random events) as meaningful (casual and related) (Brugger and Taylor, 2003). Thus, it may be that believers define randomness less rigorously, and their perceptions of chance appear influenced by factors, such as salience of a potential cause. Paranormal beliefs appear as non-psychotic delusions; suggesting that potential delusions/beliefs appear endorsed while deprived of sufficient justificatory evidence (Coltheart et al., 2010; Cella et al., 2012; Irwin et al., 2012b). In this context, beliefs may serve an adaptive function, that is, act as a coping mechanism (Irwin et al., 2012b). Current research will confirm conjunction bias findings in line with Rogers et al. (2009, 2011). The current research also advances the research in this area by incorporating five types of reasoning problems (20 in total) into the new questionnaire: probabilistic reasoning, base rate, conjunction fallacy (paranormal), conjunction fallacy (non-paranormal) and probability.

Both Dagnall et al. (2007, 2014) and Rogers et al. (2009, 2011) have extended probabilistic reasoning research within the paranormal and have helped to explain why believers might generate more meaning from less causal factors. These data concur with Irwin, (2004, 2009) who posits that subjective interpretations are likely to facilitate possible nonconventional (paranormal) descriptions, facilitating and reinforcing pre-existing paranormal beliefs. In the same way, reality-testing deficits also bias individuals away from analytical/rational processing towards intuitive-experiential interpretations of anomalous events (Irwin, 2004). Importantly, there appears a failure by believers to subject subsequent evidence to further scrutiny when generating their own hypotheses. In this context, paranormal beliefs are formed/maintained because individuals fail to test rigorously self-generated explanations of the world (Irwin, 2004, 2009).

Typically, believers in the paranormal are susceptible to specific biases in reasoning (Tversky and Kahneman, 1982, 1983). It appears that misperceptions of randomness (Hardman, 2009) and the representativeness biases (Kahneman and Tversky, 1972) may lead to faulty reasoning e.g. pseudoscientific beliefs (Gilovich and Savitsky, 1996); and probability of co-occurring (conjunction) events (Rogers et al., 2009, 2011).

Phase III therefore, extends work on paranormal belief and reasoning bias (i.e., errors in reasoning and conjunction fallacy) by considering reasoning performance across different measures of paranormal belief: RPBS, ASGS and the MMUpbs scale. Phase III will use a larger, more diverse (heterogeneous) sample, one that embraces a breadth of abilities and academic disciplines. Findings suggest errors in reasoning will be the best

predictor of paranormal belief, where typically believers in the paranormal will make more errors than non-believers posed with a reasoning type problem (Dagnall et al., 2007; Rogers et al., 2011). Consequently, fewer errors occur for paranormal event types. Phase III re-examines the new measure alongside the existing paranormal measures (ASGS and RPBS).

6.1.4. Summary

The present study will present the IPO-RT (Lenzenweger et al., 2001), a measure of reality testing, alongside the other measures to investigate further the potential proneness to reality testing deficits, which is positively associated with belief in the paranormal. In this context, subjective experiential explanations appear to facilitate nonconventional (paranormal) elucidations and as such, influence reasoning ability. Likewise, a reality-testing deficit may bias individuals away from the more analytical/rational processing leading to intuitive-experiential interpretations of atypical happenings (Irwin, 2004). In this way, emotion-based reasoning (EBR) predicted level of paranormal belief (Irwin et al., 2012a). In addition, respondents appear to endorse paranormal beliefs when they affecting their rational appeal (Sappington, 1990). These data may demonstrate reasoning bias exists where believers in the paranormal are more prone to subjective, less critical/analytical appraisals of events.

In this context, all people are capable of thinking in different ways, with the predominant way of thinking in a paranormal framework based on more intuitive processing. This may allow some believers to make connections whilst preferring to use a cognitive style that biases them towards certain sorts of errors, for example, reality-testing deficits and reasoning bias (Irwin et al., 2012a; Pennycook et al., 2012). Therefore, the current research expects that reality-testing scores will positively correlate with paranormality and errors in reasoning. The relationship between reality testing and other problem solving tasks is less certain.

6.2. Method

6.2.1. Respondents

An opportunity sample of 264 participants (56 male, 21%; and 208 female, 79%) completed the study. Mean participant age was 22.64, $SD = 7.91$; ages ranged from 18-65. Male mean was 24.5, $SD = 10.41$, range 18-65. Female mean was 22.13, $SD = 7.03$, range

18-60. Participants' recruitment occurred via undergraduate and postgraduate health care programs at Manchester Metropolitan University, emails to all university staff and students, local vocational/sports and leisure classes, and through small businesses in and around Greater Manchester. Participation was voluntary and participants could terminate their involvement at any point.

6.2.2. Materials

6.2.3. Paranormal belief factors

Phase III presented a factorial structure similar to the one identified by Dagnall et al. (2010): Hauntings, extra-terrestrial visitations, superstitions, PK, religious beliefs, astrology, ESP, and witchcraft. Phase III employed the measure constructed in phase I and phase II where item refinement followed on from Rasch scaling: A 50-item²¹ scale (MMUpbs) based on the 8 paranormal factors extracted by Dagnall et al. (2007, 2010a, 2010b) was produced. Each subscale ranged between 5 and 8 items, and contained a mixture of positively phrased and negatively (reversed) items. As per phase I, items were presented as statements (e.g., “there is a devil” and “poltergeists exist”), which are measured on a seven point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Original subscales were conceptually coherent: possessed good face validity; composed of individual items that relate to the assigned factor label. In addition to this, factors possessed good to external reliability. (For further details, see phase I p.101 and phase II p.130 for refinement method and results).

6.2.4. Reality Testing

Reality testing was assessed using the IPO-RT (Lenzenweger et al., 2001), a unidimensional self-report measure designed to measure “the capacity to differentiate self from non-self, intrapsychic from external stimuli, and to maintain empathy with ordinary social criteria of reality” (Kernberg, 1996, p.120) (see Appendix A. Phase III Booklet, Section 4, Reality testing questions, pp. 323-325). It emphasises processing style as the cause of belief generation (Langdon and Coltheart, 2000) rather than psychotic symptomology (e.g., “I have heard or seen things when there is no apparent reason for it”).

²¹ This was refined following EFA on the original 64-item scale (phase I: 8 factors containing 8-items per factor). Factor analysis revealed an 8-factor solution containing 47-items. Three new items (in total) were added to the astrology and witchcraft factors prior to phase II CFA.

The IPO-RT (20-items), has responses recorded on a 5-point Likert scale (1 “never true” to 5 “always true”); where scores ranged between 20 and 100, with low scores indicating high levels of reality-testing. The IPO-RT has demonstrated good psychometric integrity, is internally consistent, temporally stable with nonclinical populations, and possesses construct validity and good retest reliability ($r = .73$; Lenzenweger et al., 2001).

6.3. Probabilistic reasoning tasks

This subsection comprised 20 probabilistic reasoning questions (see Appendix A. Phase III Booklet, Reasoning Problems, pp. 325-332). Problems were organised into four sections containing five problem types: perception of randomness, base rate, conjunction fallacy, paranormal conjunction fallacy, and probability.

6.3.1. Perception of randomness

The perception of randomness problems asked participants to make judgements about the likelihood of a particular set of strings occurring (e.g., “Imagine a coin was tossed six times. Which pattern of results do you think is most likely?” “(a) HHHHHH, (b) HHHTTT, (c) HTHHTT, (d) All equally likely”).

6.3.2. Base rate

For problems of base rate, participants were asked to evaluate the likelihood of an outcome using both the base rate evidence that relates to the outcome (e.g., “You go to a party where there are 100 men, 70 of the men are psychologists and 30 are engineers. Before being introduced to each of the men, you are given a short personality description of him – What is the probability that Dick is an engineer?” (a) 70%, (b) 30%, (c) 50%).

6.3.3. Conjunction fallacy

Conjunction problems present participants with a number of alternatives and asking them to select the alternative with the highest ‘true’ likelihood rating (e.g., ‘two football teams (Team A and Team B) are playing in a local derby. What is the most likely outcome of the game?’ (a) Team A score first, (b) Team A score first and win, (c) Team A score first and lose, (d) Team A score first and the game is drawn.).

6.3.4. Paranormal conjunction fallacy

Alternatively, the paranormal conjunction fallacy problems also presented participants with a number of alternatives whilst in a paranormal context. This asked respondents to select the alternative with the highest likelihood of being true (e.g., “Andrew often sits by the telephone at work. Just as he is thinking about his friend, she rings. Which of the following is most likely?” (a) Elaine rang because Andrew was thinking about her, (b) Andrew was thinking about Elaine because she was about to ring, (c) Elaine rang.). These problems were included because previous research suggested that believers in the paranormal might be prone to conjunction fallacy when embedded within in a paranormal context.

6.3.5. Probability

In their 2007 study, Dagnall et al. used expected value problems. Performance on these items across conditions was low; respondents found the problems difficult to comprehend. For the purpose of this project, these items were replaced with probability questions These provided participants with a scenario containing information and asked them to select the correct probability of success from four alternatives (e.g., “Melissa shuffled a deck of numbered cards containing 5 each of the numbers 2, 4, 6, 7. If Rona selects a 4 from the deck and does not return it, what is the probability that she will select a 4 on her next draw?” (a) 3/20 (.15), (b) 4/5 (.80), (c) 4/19 (.21), (d) 1/4 (.25). To control for potential order effects problem type was counterbalanced.

6.3.6. Procedure and ethics

The researcher distributed questionnaire booklets to participants. The study brief stated that the research was concerned with belief in paranormal and probabilistic reasoning tasks and required respondents to make judgements and evaluate likely outcomes. Further instructions stated there was no time limit and that participants should complete all questions. Participants provided informed consent, were advised clearly that participation was voluntary, and that respondents could terminate their participation at any time without being penalised. The researcher collected completed questionnaires and then debriefed each respondent. All aspects of the study adhered to the British Psychological Society code of ethics, and approved by the Manchester Metropolitan University ethical board/guidelines (see subsection 4.3.8. procedure p. 105 and 4.3.9. Ethics, on pp. 105-106 for further details).

6.4. Results

6.4.1. Scale reliability

Prior to the main analysis, Cronbach's alpha (α) assessed the internal reliability of each of the paranormal belief measures; Australian sheep-goat scale, ASGS ($\alpha = .88$); Revised paranormal belief scale, RPBS ($\alpha = .92$), and MMUpbs (new paranormal measure) ($\alpha = .95$) demonstrated good/excellent internal reliability (George and Malley, 2003). Similarly, the RPBS subscales; TPB ($\alpha = .79$) and NAP ($\alpha = .87$) possessed good internal reliability. The reality testing (RTtotal) also displayed excellent internal reliability ($\alpha = .90$). (see Table 1. below).

6.4.2. Rasch scale scoring

Table 1 contains the rasch scaled mean scores for the following scales; ASGS ($M = 5.42$, $SD = 19.28$) and the RPBS ($M = 26.65$, $SD = 49.40$). It also contains the subscales of the RPBS; NAPrasch ($M = 5.25$, $SD = 21.05$) and TPBrasch ($M = 5.32$, $SD = 21.85$), IPO-RT ($M = 12.10$, $SD = 40.86$) and the MMUpbs total. The MMUpbs total measure revealed a range of total scores from 50 –339 ($M = 50.60$, and $SD = 161.48$) respectively (see Table 1 below).

Table 1. Scale descriptive statistics (phase III)

	Mean	SD	α	Min	Max
ASGSrasch	5.42	19.28	.88	8.13	37.08
TPBrasch	5.32	21.85	.79	11.16	43.24
NAPrasch	5.25	21.05	.87	6.85	47.72
RPBStot	26.65	49.40	.92	0	141
RTtot	12.10	40.86	.90	20	79
MMUpbs	50.60	161.48	.95	50	339

(Key: ASGS = Australian Sheep-Goat Scale, TPB = Traditional Paranormal Beliefs, NAP = New Age Philosophy, RPBS = Revised Paranormal Belief Scale, RT = Reality Testing IPO-RT, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale)

6.4.3. Inter-measure correlations

Pearson product moment inter-measure correlations examined relationships between paranormal measures. These are presented in table 2 below.

Table 2. Inter-measure correlations

	1	2	3	4	5	6
ASGSrasch						
TPBrasch	.76**					
NAPrasch	.79**	.75**				
RPBStot	.87**	.86**	.86**			
RTtot	.47**	.42**	.47**	.49**		
MMUpbs	.84**	.78**	.82**	.91**	.48**	

**correlation significant at $p < .01$ (one-tailed).

(Key: ASGSrasch = Australian Sheep-Goat Scale, TPBrasch = Traditional Paranormal Beliefs, NAPrasch = New Age Philosophy, RPBStot = Revised Paranormal Belief Scale, RTtotal = Reality Testing IPO-RT, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale)

This revealed significant positive correlations between all paranormal belief measures. Correlations between paranormal measures and the MMUpbs were in the high range (above .7), except with RTtotal, which was within the mid-range (between .3 and .5) (Cohen, 1988, 1992).

6.4.4. Probabilistic reasoning errors

Mean score and proportion for each problem type (Base Rate, $M = 1.12$, $SD = 0.68$, conjunction fallacy, $M = 1.15$, $SD = 0.98$, probability, $M = 2.03$, $SD = 1.20$, perception of randomness, $M = 2.52$, $SD = 0.96$, and paranormal conjunction, $M = 2.60$, $SD = 0.70$) was calculated. Table 3 contains; problem type scores, overall problem (reasoning performance) and number of paranormal conjunctions.

Table 3. Problem type descriptive statistics

Problem Type	Total		Proportion	
	Mean	<i>SD</i>	Mean	<i>SD</i>
Base Rate	1.12	0.86	0.28	0.22
Conjunction Fallacy	1.15	0.98	0.29	0.25
Probability	2.03	1.20	0.51	0.30
Perception Of Randomness	2.52	0.96	0.63	0.24
Overall Problem	1.71	1.00		
Paranormal Conjunction	2.60	0.70	0.65	0.18

Table 4. Problem type correlations

	1	2	3	4	5
Probability					
Perception of Randomness	.10*				
Paranormal Conjunction	.11*	.26**			
Conjunction	.15**	.29**	.11*		
Base Rate	.17**	.05	.14*	.11*	

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

Pearson product moment correlations examined relationships between problem types (see Table 4). These revealed significant positive correlations between:

Base rate and probability, $r = .17$, $df = 303$, $p = .002$;
 Conjunction fallacy and probability, $r = .15$, $df = 303$, $p = .005$;
 Perception of randomness and conjunction fallacy, $r = .29$, $df = 303$, $p < .001$; and,
 Perception of randomness and probability, $r = .10$, $df = 303$, $p = .035$.

Correlations between paranormal belief measures (type) and overall problem solving measures (reasoning scores) revealed negative correlations. No significant relationship exists between overall reasoning and reality testing (see Table 5 below).

Table 5. Correlations between belief measure type and overall problem solving

Belief Measure	Overall Response
ASGSrasch	-.21**
RPBStot	-.17**
NAPrasch	-.20**
TPBrasch	-.23**
RTtot	-.07
MMUpbs	-.22**

**correlation significant at $p < .01$ (one-tailed).

(Key: ASGSrasch = Australian Sheep-Goat Scale, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, RPBStot = Revised Paranormal Belief Scale, NAPrasch = New Age Philosophy, TPBrasch = Traditional Paranormal Beliefs, RTtot = Reality Testing IPO-RT)

6.4.5. Further analysis of reasoning and belief in the paranormal

The relationship between belief in the paranormal and reasoning was examined further using multiple regressions. The main problem types (probability, perception of randomness, conjunction fallacy, and base rate) entered as predictors of paranormal belief

and reality testing. Separate multiple regressions performed for ASGS, MMUpbs, RPBS, and RTtot (see Table 6).

Using the enter method; significant models emerged for paranormal belief revealing a similar pattern of results for each of the paranormal measures:

ASGS, $F(4, 259) = 4.377, p = .002, R^2 = .06$, adjusted $R^2 = .05$. Perception of randomness was found to predict paranormal belief as measured by the ASGS ($b = -.18, p = .004$); MMUpbs, $F(4, 259) = 3.895, p = .004, R^2 = .06$, adjusted $R^2 = .04$. Perception of randomness was found to predict paranormal belief as measured by the MMUpbs ($b = -.16, p = .011$); and RPBS, $F(4, 259) = 2.894, p = .023, R^2 = .04$, adjusted $R^2 = .03$. Perception of randomness was found to predict paranormal belief as measured by the MMUpbs ($b = -.17, p = .008$).

The RT model was not found to be significant, $F(4, 259) = 1.127, p > .034, R^2 = .02$, adjusted $R^2 = .002$. However, perception of randomness was found to predict reality testing deficits ($b = -.13, p = .04$). Performance on probability, conjunction fallacy and base rate did not predict RT scores.

Table 6. Multiple regression problem type and paranormal belief and reality testing

Variable	B	SE	Beta (b)	t	p	F	R	R ²	Adj. R ²
ASGS									
(Constant)	23.41	1.08		21.76	>.001	4.38	.25	.06	.049
Base Rate	-.70	.39	-.11	-1.80	.074				
Conjunction Fallacy	.25	.35	.05	.72	.471				
Probability	-.51	.28	-.11	-1.81	.072				
Perception of Randomness	-1.04	.36	-.18	-2.92	.004*				
MMUpbs									
(Constant)	199.03	10.08		19.75	>.001	3.90	.24	.06	.042
Base Rate	-5.96	3.63	-.101	-1.64	.102				
Conjunction Fallacy	-.97	3.30	-.019	-0.29	.770				
Probability	-4.02	2.62	-.095	-1.53	.127				
Perception of Randomness	-8.58	3.33	-.163	-2.58	.011*				
RPBS									
(Constant)	66.57	5.35		21.76	>.001	2.89	.21	.04	.028
Base Rate	-2.14	1.93	-0.07	-1.11	.268				
Conjunction Fallacy	.42	1.75	0.02	.24	.809				
Probability	-1.63	1.39	-0.07	-1.18	.241				
Perception of Randomness	-4.74	1.77	-0.17	-2.68	.008*				
RT									
(Constant)	45.09	2.46		18.33	>.001	1.13	.13	.02	.002
Base Rate	-0.09	.89	-.01	-.10	.921				
Conjunction Fallacy	.34	.81	.03	.42	.678				
Probability	-.13	.64	-.01	-.20	.841				
Perception of Randomness	-1.69	.81	-.13	-2.08	.039*				

* indicates significant p value

(Key: ASGS = Australian Sheep-Goat Scale, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, RPBS = Revised Paranormal Belief Scale, RT = Reality Testing IPO-RT).

For completeness, correlations between each problem type, the new (MMUpbs) and existing (ASGS and RPBS) paranormal belief scales and reality testing appear in Table 7. Of the problem types, only perception of randomness correlates negatively with all measures.

Table 7. Correlations between each problem type, MMUpbs, paranormal belief (ASGS, RPBS) and reality testing

Measure	MMUpbs	RTtot	RPBStot	NAPrasch	TPBrasch	ASGSrasch
Base Rate	-.13*	-.01	-.09	-.08	-.13*	-.13*
Conjunction Fallacy	-.09	-.01	-.05	-.08	-.10*	-.04
Probability	-.13*	-.02	-.10*	-.10*	-.08	-.14*
Perception Of Randomness	-.18**	-.13*	-.18**	-.22**	-.24**	-.19**

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

(Key: MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, RTtot = Reality Testing IPO-RT, RPBStot = Revised Paranormal Belief Scale total, NAPrasch = New Age Philosophy rasch scaled, TPBrasch = Traditional Paranormal Beliefs rasch scaled, ASGSrasch = Australian Sheep-Goat Scale rasch scaled)

6.4.6. High vs. low level of paranormal belief/reality testing and problem solving

Median splits performed on each paranormal measure and reality testing to produce low vs. high conditions. Next, t-tests compared low vs. high on each problem type (see Table 8).

Table 8. High vs. low paranormal belief, reality testing and problem solving

<i>Problem type</i>	Level of Score				<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Below Median		Above Median					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
ASGS								
Base Rate	1.21	0.86	1.04	0.85	1.633	262	.285	.20
Conjunction Fallacy	1.12	0.97	1.17	0.98	-0.436	262	.543	.05
Probability	2.16	1.23	1.92	1.16	1.626	262	.144	.20
Percep of Randomness	2.62	0.92	2.42	0.99	1.694	262	.041*	.21
MMUpbs								
Base Rate	1.20	0.82	1.03	0.89	1.639	262	.048*	.20
Conjunction Fallacy	1.11	0.96	1.18	1.00	-0.585	262	.513	.07
Probability	2.13	1.19	1.94	1.20	1.284	262	.326	.16
Percep of Randomness	2.62	0.92	2.42	0.99	1.672	262	.062*	.21
RPBS								
Base Rate	1.19	0.85	1.05	0.87	1.330	258	.173	.16
Conjunction Fallacy	1.12	0.95	1.17	1.01	-0.407	258	.754	.05
Probability	2.13	1.16	1.95	1.23	1.252	258	.238	.15
Percep of Randomness	2.67	0.91	2.35	0.98	2.748	258	.004*	.34
RT								
Base Rate	1.13	0.82	1.10	0.90	0.325	262	.863	.03
Conjunction Fallacy	1.20	0.96	1.09	0.99	0.907	262	.422	.11
Probability	2.03	1.18	2.04	1.22	-0.058	262	.861	.01
Percep of Randomness	2.67	0.91	2.36	0.99	2.657	262	.008*	.33

* indicates significant *p* value

(Key: *ASGS* = Australian Sheep-Goat Scale, *MMUpbs* = Manchester Metropolitan University Paranormal Belief Scale, *RPBS* = Revised Paranormal Belief Scale, *RT* = Reality Testing IPO-RT).

The t-tests indicated consistent differences for perception of randomness on each paranormal measure and reality testing. Participants scoring below the median solved more perception of randomness problems than those above the median;

ASGS, $M = 1.76$, $SD = 0.62$ vs. $M = 1.64$, $SD = 0.58$, $t(262) = 1.679$, $p = .094$, $d = .20$.

MMUpbs, $M = 1.77$, $SD = 0.61$ vs. $M = 1.64$, $SD = 0.58$, $t(262) = 1.675$, $p = .095$, $d = .22$.

RPBS, $M = 1.78$, $SD = 0.59$ vs. $M = 1.63$, $SD = 0.61$, $t(262) = 2.111$, $p = .036$, $d = .25$.

RT, $M = 1.76$, $SD = 0.60$ vs. $M = 1.65$, $SD = 0.60$, $t(262) = 2.741$, $p = .126$, $d = .18$.

Similar small effect sizes observed across the measures.

6.5. Paranormal vs. conventional conjunction fallacy

A series of 2 (Conjunction type: Conventional vs. paranormal: Within subjects) x 2 (Level: low vs. high: Between subjects) mixed ANOVAs were conducted (see Tables 9 and 10 below).

Table 9. Paranormal vs. conventional conjunction fallacy: number of correct responses

<i>Problem type</i>	Level				Overall	
	Below Median		Above Median		<i>M</i>	<i>SD</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ASGS						
Conjunction	1.19	1.00	1.11	0.96	1.15	0.98
Paranormal Conjunction	2.48	0.77	2.67	0.63	2.57	0.70
Overall	1.83	0.89	1.89	0.79		
MMUpbs						
Conjunction	1.19	1.01	1.11	0.95	1.15	0.98
Paranormal Conjunction	2.49	0.78	2.67	0.60	2.58	0.70
Overall	1.84	0.89	1.89	0.78		
RPBS						
Conjunction	1.17	1.01	1.13	0.95	1.15	0.98
Paranormal Conjunction	2.52	0.78	2.64	0.62	2.58	0.70
Overall	1.84	0.89	1.89	0.79		
RT						
Conjunction	1.10	0.98	1.20	0.97	1.15	0.98
Paranormal Conjunction	2.49	0.79	2.67	0.59	2.58	0.70
Overall	1.80	0.88	1.94	0.78		

(Key: ASGS = Australian Sheep-Goat Scale, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, RPBS = Revised Paranormal Belief Scale, RT = Reality Testing IPO-RT).

Table 10. Summary ANOVA statistics²²

Scale	Problem type				Level				Problem type x Level			
	<i>F</i>	df	<i>p</i>	Partial η^2	<i>F</i>	df	<i>p</i>	Partial η^2	<i>F</i>	df	<i>p</i>	Partial η^2
ASGS	414.484	(1, 262)	<.001	0.63	0.526	(1, 262)	.469	.020	3.47	(1, 262)	.063	.013
MMUpbs	422.491	(1, 262)	<.001	0.62	0.392	(1, 262)	.532	.001	3.36	(1, 262)	.068	.013
RPBS	418.368	(1, 262)	<.001	0.62	0.339	(1, 262)	.561	.010	1.417	(1, 262)	.235	.05
RT	416.598	(1, 262)	<.001	0.61	3.215	(1, 262)	.074	.012	0.37	(1, 262)	.546	.001

(Key: ASGS = Australian Sheep-Goat Scale, MMUpbs = Manchester Metropolitan University Paranormal Belief Scale, RPBS = Revised Paranormal Belief Scale, RT = Reality Testing IPO-RT).

6.5.1. Australian sheep-goat scale (ASGS)

A significant main effect was found for problem type, $F(1, 262) = 414.484$, $p < .001$, $\eta p^2 = .63$. More correct responses were made for paranormal conjunction ($M = 2.48$, $SD = 0.77$) than for conventional conjunction ($M = 1.19$, $SD = 1.00$).

There was no significant main effect for level, $F(1, 262) = 0.526$, $p = .469$, $\eta p^2 = .020$. Participants above the median produced fewer correct answers than those below the median ($M = 1.89$, $SD = 0.79$).

There was no significant interaction found for problem type vs. level.

²² Cohen (1988) suggests that ηp^2 effects be interpreted using the following rule of thumb: values between .01-.06 reflect a small effect size, values within the .06-.13 range a medium effect size, and a value of .14 or higher indicates a large effect.

6.5.2. *New paranormal measure (MMUpbs)*

A significant main effect was found for problem type, $F(1, 262) = 422.491$, $p < .001$, $\eta p^2 = .62$. More correct responses were observed for conventional conjunction ($M = 1.19$, $SD = 1.01$) than for paranormal conjunction ($M = 2.49$, $SD = 0.78$).

There was no significant main effect found for level, $F(1, 262) = 0.392$, $p < .532$, $\eta p^2 = .001$. Participants above the median produced fewer correct answers than those below the median. ($M = 1.89$, $SD = 0.79$). Simple main effects analysis was conducted, which indicated that there no significant interaction between problem type vs. level.

6.5.3. *Revised paranormal belief scale (RPBS)*

A significant main effect was found for problem type, $F(1, 262) = 416.58$, $p < .001$, $\eta p^2 = .61$. Fewer errors were made for paranormal conjunction ($M = 2.58$, $SD = 0.70$) than for conventional conjunction ($M = 1.15$, $SD = 0.98$).

There was no significant main effect for level, $F(1, 262) = 0.339$, $p < .561$, $\eta p^2 = .01$. Participants above the median produced fewer correct answers than those below the median. ($M = 1.89$, $SD = 0.79$).

There was no significant interaction found for problem type vs. level.

6.5.4. *Reality Testing (RT)*

A significant main effect was found for problem type, $F(1, 262) = 416.60$, $p < .001$, $\eta p^2 = .61$. Fewer errors were made for paranormal conjunction ($M = 2.58$, $SD = 0.70$) than for conventional conjunction ($M = 1.15$, $SD = 0.98$).

Whilst there was no significant main effect for level this was approaching significance, $F(1, 262) = 3.215$, $p < .074$, $\eta p^2 = .012$. Participants above the median produced fewer correct answers than those below the median. ($M = 1.94$, $SD = 0.78$).

The interaction between problem type vs. level was not significant. Overall, findings demonstrate that a main effect exists for belief and type. Whilst, more conjunction problems appear solved when framed within a paranormal context: framing effect.

The relationship between study measures and paranormal conjunction problems was assessed further using Pearson's product moment correlation. Scores on paranormal conjunction problems negatively correlated with the measures of paranormal belief and RT; as level of paranormal belief and proneness to reality testing deficits increased performance on the paranormal conjunction problems decreased (see Table 11).

Table 11. Number of correct responses

Paranormal	
Measure	Conjunction Fallacy
ASGSrasch	-.24**
RPBStot	-.21**
TPBrasch	-.20**
NAPrasch	-.21**
RTtot	-.18**
MMUpbs	-.22**

**correlation significant at $p < .01$ (one-tailed).

(Key: *ASGSrasch* = Australian sheep-goat scale rasch scaled, *RPBStot* = Revised paranormal belief scale total, *TPBrasch* = Traditional paranormal beliefs rasch scaled, *NAPrasch* = New age philosophy rasch scaled, *RTtot* = Reality testing, *MMUpbs* = Manchester Metropolitan University paranormal belief scale)

6.6. Evaluation of new paranormal measure

The MMUpbs has established face validity, measuring the construct of paranormal belief. The MMUpbs also demonstrated satisfactory content validity; items are drawn from questions encompassing a broad range of paranormal constructs (i.e., astrology, psi, ESP and PK, ET/alien, haunting, religion, superstition, and witchcraft) (see Appendix A. Phase III Booklet, Section 1, pp. 313-317 for the 50-item MMUpbs). It was clear that the new measure of belief in the paranormal performed similarly to the established measures (ASGS and RPBS). Indeed, the MMUpbs shared considerable variance with the ASGS (65%) and RPBS (81%). The MMUpbs also shared significant variance with the two factors of the RPBS (TPB 60% and NAP 68%). Thus, the MMUpbs has good concurrent validity, test-retest reliability; it correlated positively with criterion measures. In addition to this, the MMUpbs demonstrated convergent validity; the MMUpbs correlated positively with other variables (i.e., reasoning measures and reality testing) in a pattern comparable to the ASGS and RPBS, whilst produces a normal distribution of responses, making it an appropriate measure (Peters et al., 2004).

Scores for each of the MMUpbs subscales were calculated and internal reliability assessed. Cronbach's alpha (α) assessed the internal reliability of each of the paranormal belief subscale measures; astrology ($r = .80$), ESP ($r = .80$), ET/alien ($r = .93$), ghost/haunting ($r = .92$), PK ($r = .88$), religion ($r = .87$), superstition ($r = .86$) and witchcraft ($r = .90$) demonstrating good/excellent internal reliability (George and Malley, 2003). All cronbach alpha subscales ranged between good (.80) and excellent (.93); consideration of individual items revealed/supported subscale coherence. (see Table 12 below).

Means and standard deviation scores were as follows: astrology ($M = 2.91$, $SD = 1.27$), ESP ($M = 3.70$, $SD = 1.32$), ET/alien ($M = 2.76$, $SD = 1.31$), ghost/haunting ($M = 3.62$, $SD = 1.56$), PK ($M = 2.33$, $SD = 1.28$), religion ($M = 4.10$, $SD = 1.50$), superstition ($M = 3.67$, $SD = 1.63$), and witchcraft ($M = 2.54$, $SD = 1.51$).

Table 12. MMUpbs subscales descriptive statistics

<i>MMUpbs Subscales</i>	Mean	SD	<i>α</i>
Astrology	2.91	1.27	.80
ESP	3.70	1.32	.80
ET/Aliens	2.76	1.31	.93
Ghosts/Hauntings	3.62	1.56	.92
PK	2.33	1.28	.88
Religion	4.10	1.50	.87
Superstition	3.67	1.63	.86
Witchcraft	2.54	1.51	.90

(Key: Astrology = Belief in astrology, ESP = Extra-sensory perception, ET/Alien = Extra-terrestrial/alien beliefs, Ghosts/Hauntings = Belief in ghosts/hauntings, PK = Psychokinesis, Religion = Religious beliefs, Superstition = Superstitious beliefs, and Witchcraft = Belief in witchcraft).

A further set of correlations examined relationships between MMUpbs subscales and established paranormal measures (ASGS and RPBS) (see Table 13).

Table 13. Correlations for paranormal measures and MMUpbs subscales

<i>MMUpbs Subscales</i>	<i>TPBrasch</i>	<i>NAPrasch</i>	<i>ASGSrasch</i>	<i>RPBStot</i>
Astrology	.42**	.61**	.54**	.58**
ESP	.58**	.57**	.61**	.62**
Ghosts/Hauntings	.60**	.68**	.72**	.75**
Extra Terrestrial	.40**	.50**	.45**	.52**
Superstition	.26**	.38**	.39**	.42**
Psychokinesis	.59**	.69**	.70**	.73**
Religion	.80**	.57**	.67**	.70**
Witchcraft	.75**	.61**	.64**	.76**

**correlation significant at $p < .01$ (one-tailed).

(Key: *TPBrasch* = Traditional paranormal beliefs rasch scaled, *NAPrasch* = New age philosophy rasch scaled, *ASGSrasch* = Australian sheep-goat scale rasch scaled, *RPBStot* = Revised paranormal belief scale total)

Analysis found significant positive correlations for all measures and subscales of paranormal belief (RPBS, TPB, NAP and ASGS) and the MMUpbs subscales (astrology, ESP, ghosts/hauntings, extra-terrestrial, superstition, psychokinesis, religion and witchcraft). All of the MMUpbs subscales were significantly positively correlated at the $p < .01$ ** level.

Table 14. Inter-subscale correlations

<i>MMUpbs Subscales</i>	1	2	3	4	5	6	7	8
Ghosts/Hauntings								
Extra Terrestrial	.51**							
Superstition	.44**	.14**						
Psychokinesis	.60**	.55**	.30**					
Religion	.53**	.26**	.11*	.42**				
Astrology	.58**	.31**	.47**	.56**	.26**			
Witchcraft	.53**	.43**	.15*	.62**	.53**	.33**		
ESP	.56**	.27**	.32**	.45**	.49**	.44**	.45**	

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

For the sake of completeness, table 14 contains inter-subscale correlations. All subscales were significantly positively correlated at the $p < .01$ ** level except for the following subscales which were positively correlated at the $p < .05$ * level: religion and superstition ($r = .11$ *), extra-terrestrial and superstition ($r = .14$ *) and witchcraft and superstition ($r = .15$ *).

6.7. Phase III discussion

Overall reasoning performance correlated negatively with belief in the paranormal; high paranormal belief was associated with fewer correct responses on reasoning tasks. Across paranormal belief measures a small but consistent effect was noted; ASGS ($r = -.21$ **), MMUpbs ($r = -.22$ **) and RPBS ($r = -.17$ *). However, there was no significant association between reasoning performance and reality testing ($r = -.07$).

Multiple regression analysis revealed perception of randomness to be the best predictor of belief in the paranormal. Whilst, each reasoning task (base rate, conjunction fallacy, and probability) correlated with one or more paranormal measure, only perception

of randomness correlated positively with all belief measures (MMUpbs, RPBS_{total}, RPBS, NAP, TPB and ASGS). These findings replicate those found by Dagnall et al. (2007), who concluded that belief in the paranormal arose from a specific deficit associated with perception of randomness (misrepresentation of chance). It is worth noting that correct responses across the two studies were similar (approximately 62%), this finding suggests that the original findings are not merely an artefact of that sample used; the current findings have replicated findings with a larger, more diverse sample.

In the present study, only the TPB dimension of the RPBS correlated negatively with conjunction fallacy. Previous research in this area has utilised median splits as a valid and analytical strategy with which to differentiate between sceptics and believers (Dagnall et al., 2007; Rogers et al., 2009; Wiseman and Morris, 1995). Comparisons between sceptics and believers supported the regression analysis. Participants below the median solved more perception of randomness problems than those above the median. Similar small effect sizes were evident across paranormal measures (ASGS, MMUpbs and RPBS) and reality testing. Median splits revealed no differences for conjunction fallacy, base rate and probability.

Within the present study, research revealed differences between believers and non-believers for paranormal conjunctions; believers solved fewer paranormal conjunctions. A difference between conjunction types produced more responses that are correct when items/problems are phrased in a paranormal context. This suggests that the presentation of conjunction fallacies in a paranormal context generates an advantage thus makes them easier to solve, but framing effects are less pronounced for non-believers.

In the Dagnall et al. (2007) study and phase III of this research, proneness to conjunction error was not a significant predictor of belief in the paranormal²³, nor did participants scoring below vs. above the median differ in terms of the number of conventional conjunction problems solved.

²³ Only the traditional paranormal belief (TPB) dimension of the RPBS correlated with level of belief in the paranormal.

6.8. Conclusion

The current findings outline the similarities in performance of the MMUpbs alongside the existing paranormal measures ASGS, and RPBS. The MMUpbs demonstrated consistent performance for conjunction while main effects exist for belief vs. type of problem. This finding is comparable across paranormal measures. Consistently, more conjunction problems appear solved when framed within a paranormal context; framing effect.

The current findings demonstrate that the new measure of paranormal belief (MMUpbs) performs in line with existing paranormal measures ASGS, and RPBS. Significant positive correlations exist between the MMUpbs subscales and the measures of paranormal belief (RPBS, TPB, NAP and ASGS). Correlations for the paranormal belief measures (RPBS, TPB, NAP and ASGS) and MMUpbs subscales positively correlated (see Table 13). The subscale items possessed moderate (.80, astrology, ESP etc.) to high (.93, ET/alien) internal reliability and demonstrated the potential for standalone measures of paranormal. The results help to establish that believers in the paranormal vs. non-believers perform less well on a narrow range of reasoning tasks; possible reasons for this require additional research, examination and exposition. Further summary and evaluation of the MMUpbs new measure of paranormal belief and items utilised for the measurement of paranormal belief are within the overall general discussion.

To conclude, findings indicated that the MMUpbs possesses similar psychometric properties to existing, established validity alongside measures of paranormal belief (ASGS and RPBS). The MMUpbs has, however, notable advantages. The MMUpbs contains reversed items and therefore is less prone to response bias (Paulhus, 1991; Schriesheim et al., 1989; van Sonderen et al., 2013). Additionally, the MMUpbs is composed of several component subscales, which stand as discreet, standalone measures, for example, the 8-items measuring ghost/haunting. Consequently, results revealed the new measure was psychometrically sound, contained coherent subscales, duly assessed construct breadth and correlated positively with established measures. These subscales will be of value to researchers wishing to concentrate on particular facets of paranormal belief, as opposed to the general construct. Further research is required to expand and explore the nature of these standalone subscales.

Chapter 7. Phase IV – validation of MMUpbs (paranormal belief and mental toughness)

7.1. General overview of phase IV

Phase IV of this doctoral thesis examined the relationship between belief in the paranormal and mental toughness. This final phase attempted to broaden validity testing of the newly formed MMUpbs by considering specific cognitive implications, whilst assessing real world applications of the newly developed measure. The extension of paranormal research from a ‘research niche’ into a wider context of decision-making and real-world implications is arguably long overdue. Investigation of paranormal beliefs has offered an intriguing understanding of non-analytical decision-making/real-world assessment, and the current phase will extend its impact.

In the first instance, a more cognitively based scale was used (mental toughness questionnaire; MTQ48, Clough et al., 2002; Crust and Clough, 2005) alongside the paranormal construct identifying potential real life applications of the scale. This allowed assessment of the psychometric performance of the MMUpbs (validity and reliability) in a real world setting. Additional research ideas for example, decision-making, level of perceived risk and gambling strategies provide future MMUpbs developments.

7.1.1. Introduction and background to phase IV

The term mental toughness (MT) originated from James E. Loehr (1982, 1986). Loehr, working with elite athletes, used MT to refer specifically to stress tolerance and maximised performance (Clough and Strycharczyk, 2012; Earle, 2012). Whilst formative MT research occurred within the domain of sports psychologists, MT has developed into a ubiquitous psychological construct related to performance success across a range of applied settings (sport, education, occupation, health, etc.) (Crust, 2008; Earle, 2012). Correspondingly, delineations of MT advanced and researchers now regard MT as a multidimensional construct (Jones et al., 2002). The main characteristics of MT are the ability to cope with adversity, persistence, resilience, self-belief, control, possession of superior mental skills and the capacity to thrive under pressure (Crust, 2008)²⁴. These attributes prove

²⁴ (1) Control: a tendency to feel and act as if one is influential; (2) Commitment: a tendency to involve oneself in rather than experience alienation from an encounter; (3) Challenge: belief that life is changeable and to view this as an opportunity rather than a threat; and (4) Confidence: a high

psychologically beneficial in performance situations, as evidenced by objective measures. This is consistent with the notion that mental toughness facilitates performance at the upper range of ability, regardless of the circumstances (Loehr, 1986). Particularly, MT appears to act as a stress moderator to the extent that high scoring MT individuals possess the capacity to deal effectively with stressors, pressures, and challenges (Clough et al., 2002). More generally, MT acts as a buffer against adversity and as a collection of enabling factors that promote and maintain adaptation to challenging situations (Coulter et al., 2010; Gucciardi et al., 2012).

The current phase of the PhD employed the Clough et al. (2002) definition of mental toughness (MT). This is one of the most frequently used models of mental toughness, which has received considerable research interest. This model is of particular interest to the investigator, as its originators have linked it to more rational and realistic thinking (Clough and Strycharczyk, 2012). The model comprises four broad characteristics (commitment, challenge, control and confidence). Commitment refers to perseverance and ability, despite problems and/or obstacles, to carry out tasks successfully. Challenge involves seeking opportunities for self-development. Control appears influential in one's own life and is subdivided into life control (a belief in being influential, not controlled by others) and emotional control (ability to keep anxieties in check and not reveal emotions to others). Lastly, confidence denotes levels of self-assurance distributed between confidence in abilities (belief in individual qualities with less dependence on external validation), and interpersonal confidence (being assertive and less likely to be intimidated in social contexts). According to Clough et al. (2002), these factors represent developable positive psychological traits. These elements appear embodied within the mental toughness questionnaire 48 (MTQ48) (Clough et al., 2002). The MTQ48 operationalises MT as a resistance resource, which buffers the effects of stress (Crust, 2010) and is a robust psychometric instrument (e.g., Perry et al., 2013)

Previous research links belief in the paranormal and mental toughness. Particularly, it suggests MT has important implications for risk-taking. For example, Bull et al. (2005) in a qualitative examination of MT in elite English cricketers noted that the presence of

sense of self-belief and unshakable faith concerning one's ability to achieve success. (Clough et al., 2002).

tough character, tough attitudes and tough thinking enabled participants to cope with external pressures. Within tough attitudes, willingness to take risks identifies as a global theme. This manifested in different ways. Firstly, risks taken in order to make things happen within the game. Secondly, players need to be willing to take career risks at certain points in order to take the next step towards achieving key goals. MT was associated with the willingness of the players to take these different kinds of risks. Further examination of MT has occurred in the context of Australian football (see Coulter et al., 2010). A personal construct psychology (PCP; Kelly, 1955/1991) framework was constructed which allowed Coulter et al. (2010) to observe and record mentally tough 'within' players taking risks (vs. more conservative judgements) during critical periods during matches.

Crust and Keegan (2010) extended attitudes towards risk taking and MT research within undergraduate athletes using the MTQ48. They found level of risk employed was indicative of athlete who was considered to be mentally tough. These findings are similar to Bull et al. (2005) where attitudes to physical risk-taking significantly correlated with overall mental toughness, subscales of challenge and confidence in one's athletic abilities. Interestingly, Crust and Keegan (2010) found that a specific expression of risk appeared to exist as a function of setting, leading to different attributions of interpersonal confidence associated to either psychological or physical risk. A paper by Llewellyn and Sanchez (2008) supports this notion. The authors reported that rock climbers only undertook additional risks, to challenge themselves, when they were confident in their ability to manage those risks. Additionally, Coulter et al. (2010) identified certain risk taking decision at crucial times during Australian soccer matches (vs. more conservative choices) as characteristic of mentally tough players.

In summary, research indicates that a potential psychological benefit of MT is the enhanced risk appreciation/sensitivity. In addition to increased awareness/appreciation of risk, MT may attenuate (moderate) the effects of factors influencing risk perception. Particularly, the degree to which individuals effectively assess evidence, form premises and test hypotheses. The inability to appraise systematically information is likely to undermine important decision-making processes. In this context, the present study included a measure of belief in the paranormal. Whilst, there is a paucity of previous work, the extant literature suggests a potential link between anomalous beliefs and risk perception. Particularly, Sjöberg and Wåhlberg (2002) found that belief in paranormal phenomena

correlated positively with perceived level of risk, seriousness of risk and demand for risk mitigation. Considered technological risk, this raises questions about subjective/perceived nature of belief, risk and experience (Sebald, 1984; Sjöberg and Wåhlberg, 2002).

Sjöberg and Wåhlberg (2002) hypothesised that new age beliefs, which incorporate paranormal beliefs, were based upon a distrust of current science, realism, and objectivity (Sebald, 1984). Likewise, Kouabenan (1998) reported that beliefs and social practices (religious rites, sacrifices, mystical, or Para-scientific consultations, ritual, or initiation practices) influenced risk perception and the causal explanation of accidents. Particularly, fatalistic participants possessed a limited knowledge of risks and accidents, which resulted in poor estimation of frequency (liability to both overestimate and underestimate). Generally, fatalistic participants took bigger risks. Kouabenan (1998) postulate this was because they believed that rites would protect them, or they felt unable to prevent events from happening,

This is consistent with research reporting correlations between anomalous beliefs and thinking style. Particularly, where there is a preference for intuitive-experiential interpretations and emotion-based reasoning (Irwin et al., 2012). Objective processing relies on the scrutiny and consideration of prior personal experience, general knowledge, and empirical evidence (informed, *authoritative opinion*). Thus, anomalous beliefs appear partially predicated on subjective interpretations of the world and less on probability. Particularly, paranormal believers demonstrate greater misrepresentation of chance and are correspondingly, susceptible to conjunction error (Dagnall et al., 2014). In the context of risk perception, this may manifest as a tendency to perceive causal links between associated events and a general heightened perception of risk (PRI).

The purpose of the current research (phase IV) was to examine the criterion related validity of the MMUpbs measure. The research considered the relationship between mental toughness and level of paranormal belief. Moreover, an appraisal of certain stressful situations perceived by the more mentally tough/hardier individuals may indicate a more adaptive coping mechanism relating to risky decision-making choices (PRI), which may inform choices made in relation to experient perception and level of paranormal belief endorsement.

7.2. Method

7.2.1. Respondents

A convenience sample of 175 from an original 187²⁵ participants (males 42; females 133, *Mean* age 23.71 years, *SD* = 7.65, range 18–62) took part in the study. Respondents recruited via undergraduate and postgraduate health care courses (Nursing, Physiotherapy, Occupational Health, Speech and Language Therapy, Psychology, etc.) from the Manchester Metropolitan University, and via emails to university staff and students. All respondents gave informed consent before completing questionnaires assessing mental toughness and belief in the paranormal.

7.2.2. Materials (instruments)

7.2.3. Mental toughness questionnaire 48 (MTQ48) (Clough et al., 2002)

The mental toughness questionnaire 48 (MTQ48) (Clough et al., 2002) assesses mental toughness. The measure is comprised of a series of statements assessing aspects of mental toughness (for example, “I don’t usually give up under pressure”, and “I can usually adapt myself to challenges that come my way”). Participants respond to each item by completing 5-point Likert scales (ranging from 5 strongly disagree to 1 strongly agree). The MTQ48 contains several subscale measures (Commitment, Challenge, Control and Confidence) (see Appendix A. Phase IV Booklet for the measure of MTQ48, pp. 341-342).

The MTQ48 typically takes between 10 and 15 minutes to complete (Crust and Clough, 2005). The measure possesses established psychometric properties. Particularly, the MTQ48 has an excellent reliability, an overall test–retest coefficient of 0.9 and proven validity. With respect to construct validity, the MTQ48 correlates significantly with self-efficacy, trait anxiety, self-image, optimism, and life satisfaction (cf. Clough et al., 2002). Criterion validity is evidence via correlations with several importance psychological and physiological indices. Notable examples are problem-focused coping (Nicholls et al., 2008), use of psychological strategies (Crust and Azadi, 2010), optimism and coping (Nicholls et al., 2008), pain tolerance/physical endurance (Crust and Clough, 2005), sports injury rehabilitation (Levy et al., 2006) and rating of exertion in high intensity exercise (Clough et al., 2002).

²⁵ Twelve respondents were removed from the final data set because of inconsistencies within item response across measures and where answers were omitted from the completed questionnaires.

7.2.4. Revised paranormal belief scale (RPBS) (Tobacyk and Milford, 1983; Tobacyk, 1988; Lange et al., 2000)

This is a modified version of Tobacyk and Milford's (1983) paranormal belief scale. The RPBS is a self-report measure, which contains 26 questions measuring belief in seven facets of paranormal belief: Traditional religious belief, psi belief, witchcraft, spiritualism, superstition, extraordinary life forms, and precognition. The RPBS, alongside traditional phenomena (psi including precognition) includes a range of related paranormal beliefs. Given the complexity of beliefs, this thesis considers critically the design, composition and purpose of the current MMUpbs alongside existing belief measures. (See section 4.2.4. for additional background for the RPBS).

7.2.5. Paranormal experiences (Drinkwater et al., 2012; Dagnall et al., 2016)

An 18-item scale measured paranormal experiences. Respondents were asked (using 'yes' or 'no') to indicate whether they "believe they have had a genuine paranormal experience". If they responded yes they then moved on to question two where a number of experiences were indicated (ESP, PK, witchcraft, OBE/NDE, haunting, contact/communication with dead, UFO visitation, UFO sighting, astrological prediction, or other (indicate)). (See subsection 4.3.7. within phase I for further explanation of this experience scale)

7.2.6. Paranormal belief factors

7.2.7. Belief in the paranormal (Dagnall et al., 2010a, 2010b)

Manchester Metropolitan University (MMU-N) (Dagnall et al., 2010a, 2010b) formed the basis of the newly constructed MMUpbs. The latest version of the MMUpbs (a 50-item scale) comprised eight paranormal facets (ghosts/hauntings, superstitions, religious belief, alien visitation, ESP, PK, astrology and witchcraft). The factors emerged from a principal component analysis (PCA) of existing paranormal belief measures followed by a confirmatory factor analysis (see phases I, II and III for further details of the composition and construction of this scale). Subscales are conceptually coherent, possess good face validity and are composed of items clearly related to the assigned factor label. Three newly generated items added at phase III effectively balance items across subscales of superstition, and witchcraft. MMUpbs items consist of statements affirming existence (e.g., 'there is a devil' and 'poltergeists exist'). Item responses correspond with

recommendations outlined by Rogers et al. (2009, 2011), Roe, (2002) and Thalbourne, (1998, 2003), where participants respond via a 7-point Likert scale (ranging from 1 strongly disagree to 7 strongly agree). The subscales and the overall MMUpbs measure possess excellent external reliability ($\alpha = .96$) (Dagnall et al., 2010a). Potential scores range from 50-350.

7.2.8. Procedure and ethical consideration

The study received ethical approval as part of a wider project examining relationships between anomalous beliefs and cognitive-perceptual measures. In accordance with the requirements for questionnaire design, the researcher produced a test booklet comprising phase measures (see McLeod, 2014). These included participant information sheet, informed consent form, a demographic question (age, gender, and student/occupation), study outline and measures (see Appendix A. Phase IV Booklet, pp. 333-363 for complete test booklet). Prior to commencing the test booklet, respondents read the briefing instructions. These stated that the study was concerned with personality, decision-making and belief in the paranormal. The guidelines informed respondents that data were anonymised and confidential, and advised them of their right to withdraw. Respondents who agreed to take part worked through the booklet. Completion of the questionnaires occurred in various locations that were quiet and comfortable (see subsection 4.3.8. procedure p. 105 and 4.3.9. Ethics, pp. 105-106 for further details).

7.3. Results

7.3.1. Data analysis

Initially, data screening checked for normality and outliers. Then, descriptive statistics were calculated and an assessment of measure internal consistency undertaken (full and subscale). Table 1 displays means, standard deviation and alpha coefficients for the MMUpbs (paranormal belief) and the MTQ48 (mental toughness). Analysis employed correlation to investigate relationships between the full scale MMUpbs and MTQ48 (full and subscales). Finally, further investigation explored associations between MMUpbs and MTQ48 subscales. Analysis used Pearson product moment throughout.

7.3.2. Reliability and scale descriptives

An assessment of scale reliability was undertaken. Cronbach's alpha (α) assessed internal reliability. This revealed that the MMUpbs ($\alpha = .96$) possessed excellent internal reliability, whilst the MTQ48 ($\alpha = .89$) was found to possess good internal reliability (George and Mallery, 2003). Descriptive statistics appear in Table 1.

Table 1. MMUpbs and MTQ48 descriptive statistics and internal reliability ($n = 175$).

	Mean	SD	α
Paranormal Belief (MMUpbs)	3.23	1.03	.96
Mental Toughness (MTQ48)	3.35	0.44	.89
MTQ48 (Subscales)			
Challenge	3.50	0.52	.42
Commitment	3.51	0.56	.80
Emotional Control	2.88	0.56	.49
Interpersonal Control	3.47	0.61	.71
Confidence	3.31	0.55	.81

Cronbach alpha analysis revealed the following internal reliabilities for the full scale MTQ48 ($r = .89$) and its subscales: commitment ($r = .80$), interpersonal control ($r = .71$) and confidence ($r = .81$). The MMUpbs was internally reliable ($r = .96$). Both subscales of challenge ($r = .42$) and emotional control demonstrated unsatisfactory internal reliability ($r = .49$). Despite this, challenge and emotional control were included for completeness. However, ensuing results using these subscales requires cautious interpretation.

7.3.3. Full scale paranormal beliefs and mental toughness

Correlation investigated relationships between the MMUpbs and MTQ48 (overall and subscales). Analysis revealed significant negative relationships between paranormal belief and mental toughness: MTQ48 overall ($r = -.28^{**}$), challenge ($r = -.25^{**}$), commitment ($r = -.28^{**}$), control of emotion ($r = -.36^{**}$), control of life ($r = -.29^{**}$), total control ($r = -.36^{**}$) and confidence ability ($r = -.17^*$). Confidence ($r = .10$) and total confidence ($r = -.08$) was not significant. These associations were in the low to mid-range (between $r = .18^*$ to $r = -.28^{**}$) (Cohen, 1988, 1992). See Table 2 for inter-scale correlations.

Table 2. Pearson product moment correlations between the full-scale MMUpbs and mental toughness subscales

	1	2	3	4	5	6	7	8	9	10
Paranormal (MMUpbs)										
Mental Toughness (MTQ48)	-.28**									
Challenge	-.25**	.73**								
Commitment	-.28**	.79**	.52**							
Control of Emotion	-.30**	.64**	.46**	.35**						
Control of Life	-.29**	.85**	.55**	.64**	.41**					
Total Control	-.36**	.89**	.60**	.60**	.83**	.85**				
Confidence Ability	-.17*	.84**	.49**	.52**	.56**	.72**	.77**			
Confidence Interpersonal	.10	.49**	.26**	.26**	.10	.35**	.27**	.32**		
Total Confidence	-.08	.86**	.48**	.51**	.45**	.70**	.69**	.89**	.72**	

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

Whilst variation was evident within the correlation matrix, a general pattern of results emerged. Specifically, MMUpbs correlated significantly with the majority of MTQ48 scales; as level of mental toughness increased, level of paranormal belief decreased.

7.3.4. Paranormal subscales and mental toughness

Further correlations examined relationships between MMUpbs subscales and the MTQ48. These found significant associations between haunting ($r = -.32^{**}$), superstition ($r = -.13^*$), religion ($r = -.22^{**}$), PK ($r = -.22^{**}$), astrology ($r = -.24^{**}$), ESP ($r = -.22^{**}$), witchcraft ($r = -.20^{**}$) and level of mental toughness. Belief in extra-terrestrial life was not significant ($r = -.05$). Again, analysis revealed an inverse relationship (see Table 3 below).

Table 3. Pearson product moment correlation between paranormal MMUpbs subscales and full-scale mental toughness

	1	2	3	4	5	6	7	8	9	10
PARANORMAL (MMUpbs)										
MENTAL TOUGHNESS (MTQ48)	-.28**									
Haunting	.86**	-.32**								
Superstition	.50**	-.13*	.41**							
Religion	.76**	-.22**	.60**	.25**						
PK (Psychokinesis)	.74**	-.22**	.54**	.30**	.43**					
Astrology	.73**	-.24**	.57**	.50**	.43**	.52**				
ET (Extra-Terrestrial)	.64**	-.05	.49**	.04	.38**	.53**	.28**			
ESP(Extra-Sensory Perception)	.81**	-.22**	.68**	.33**	.60**	.58**	.62**	.40**		
Witchcraft	.70**	-.20**	.52**	.15*	.60**	.58**	.38**	.43**	.47**	

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

7.3.5. Paranormal belief and mental toughness subscales

Further correlation analysis extended the previous section by exploring correlations between MMUpbs and MTQ48 subscales (see Table 4).

Consideration of the correlation matrix revealed an interesting pattern of results; each MTQ48 subscale produced a slightly different pattern of significant associations.

Challenge correlated with ghost/haunting ($r = -.23^{**}$), religion ($r = -.23^{**}$), PK ($r = -.23^{**}$), astrology ($r = -.25^{**}$), ESP ($r = -.15^*$) and witchcraft ($r = -.18^{**}$). Relationships were in the weak range ($r = -.15$ to $-.25$).

Commitment demonstrated the same pattern of relationships as challenge, correlating with ghost/haunting ($r = -.33^{**}$), religion ($r = -.24^{**}$), PK ($r = -.23^{**}$), astrology ($r = -.24^{**}$), ESP ($r = -.26^*$) and witchcraft ($r = -.20^{**}$). Correlations were in the weak-moderate range ($r = -.20$ to $-.33$).

Total Control produced a similar pattern of results to challenge and commitment, except relationships with superstition ($r = -.17^*$) and ET ($r = -.13^*$) were also significant; ghost/haunting ($r = -.39^{**}$), religion ($r = -.26^{**}$), PK ($r = -.30^{**}$), astrology ($r = -.29^{**}$), ESP ($r = -.29^{**}$), and witchcraft ($r = -.23^{**}$). Associations were in the weak-moderate range ($r = -.13$ to $-.39$).

Consideration of control subscales (emotion and life) revealed commonalities. Both subscales correlated negatively with ghost/haunting ($r = -.32^{**}$ vs. $r = -.32^{**}$), religion ($r = -.20^{**}$ vs. $r = -.23^{**}$), PK ($r = -.25^{**}$ vs. $r = -.25^{**}$), astrology ($r = -.30^{**}$ vs. $r = -.19^{**}$), ESP ($r = -.24^{**}$ vs. $r = -.25^{**}$), and witchcraft ($r = -.15^{**}$ vs. $r = -.23^{**}$). The only differentiation between the subscales was superstition ($r = -.20^*$), which correlated only with control of emotion. Relationships were in the weak-moderate range ($r = -.15$ to $-.32$).

Total confidence correlated only with ghost/haunting ($r = -.13^*$). Confidence subscale (ability and interpersonal) comparison revealed only a shared association with ESP ($r = -.17^{**}$ vs. $r = -.15^{**}$). Whilst, confidence was associated with ghost/haunting ($r = -.24^{**}$), superstition ($r = -.19^*$) and astrology ($r = .15^{**}$). Correlations were in the weak range ($r = -.17$ to $-.24$).

Table 4. Pearson product moment correlations between paranormal (MMUpbs) subscales and the mental toughness subscales (MTQ48).

	Ghost/Haunting	Superstition	Religion	PK	Astrology	ET	ESP	Witchcraft
Challenge	-.23**	-.11	-.23**	-.23**	-.25**	-.09	-.15*	-.18**
Commitment	-.33**	-.02	-.24**	-.23**	-.24**	-.08	-.26**	-.20**
Total Control	-.39**	-.17*	-.26**	-.30**	-.29**	-.13*	-.29**	-.23**
Emotion	-.32**	-.20**	-.20**	-.25**	-.30**	-.10	-.24**	-.15*
Life	-.32**	-.10	-.23**	-.25**	-.19**	-.11	-.25**	-.23**
Total Confidence	-.13*	-.12	-.06	-.03	-.07	.09	-.05	-.07
Ability	-.24**	-.19**	-.07	-.11	-.15*	.02	-.17*	-.07
Interpersonal	.08	.04	-.02	.12	.08	.14	-.15*	-.05

*correlation significant at $p < .05$ (one tailed); **correlation significant at $p < .01$ (one-tailed).

(Paranormal Key: Ghost/Haunting = Belief in Ghost/Haunting, Superstition = Superstitious belief, Religion = Religious belief, PK = Psychokinesis, Astrology = Belief in Astrology, ET = Belief in Extra-Terrestrials, ESP = Extra-Sensory Perception, Witchcraft = Belief in Witchcraft)

Finally, consideration of paranormal belief subscales revealed that ghosts/haunting, religion, PK, astrology, ESP and witchcraft were similarly related to challenge, commitment and control. Additionally, ghosts/hauntings, superstition, astrology and ESP correlated weakly with confidence. Of the paranormal subscales superstition and ET related differently to mental toughness subscales. Superstition only correlated with total control, emotional control and confidence ability. Whilst ET correlates only with total control.

To conclude, whilst there was a negative correlation between belief in the paranormal and mental toughness, relationships varied as both a function of MTQ48 subscales and paranormal belief type.

7.4. Phase IV discussion

The main purpose of the current research phase (IV) was to investigate further the correlates of paranormal belief while assessing real world potential of the MMUpbs. This phase extended research by assessing psychometric performance of the MMUpbs (validity and reliability) alongside a measure of mental toughness (MTQ48). This measured both the nature and composition of the paranormal measure whilst assessing it in terms real world performance. Findings revealed a negative relationship between the MMUpbs full scale and three subscales of MTQ48; challenge ($r = -.25$), control ($r = -.36$) and commitment ($r = -.28$). This research also assessed the validity and reliability of the MMUpbs as a global paranormal measure, while assessing paranormal subscales/facets alongside the cognitive measure. Findings revealed that subscales of the MMUpbs correlate with the MTQ48 full measure. Analysis reveals that level of paranormal belief decreases as level of mental toughness increases. Consequently, phase IV extends previous research, including further correlational analysis. Findings demonstrate that the new measure is both robust and reliable, while individual facets represent suitable standalone subscales of the full measure. This examination against the MTQ48 includes scope for future research by extending paranormal belief measurement in terms of individual subscales while pointing towards future research that may explore risk perception, decision-making, mental toughness and hardiness/resilience (Kobasa, 1979; Funk, 1992).

Current research provides a link between paranormal belief and low mental toughness (MTQ48). A significant negative correlation was found between the MMUpbs and MTQ48 ($r = -.28^{**}$) suggesting that somebody high in mental toughness will be low in paranormal belief. However, whilst the majority of the mental toughness subscales also correlated with the full measure of the MMUpbs, two subscales did not: Confidence interpersonal ($r = .10$) and total confidence ($r = -.08$). This might suggest that increased level of endorsement for paranormal is not affected by level of interpersonal confidence nor total confidence. To the extent that confidence does not play a part in paranormal formation, mental toughness choices appear unrelated to paranormal endorsement. Similarly, the relationship between the subscales of MMUpbs and MTQ48 are in the weak range. This suggests that several of the subscales present differing psychological mechanisms (e.g., superstition, belief in extra-terrestrial) important in explaining subsequent endorsement. Both of the subscales (confidence interpersonal and total confidence) revealed low internal reliability, which suggests that an increased level of mental toughness may account for reduced paranormal belief/behaviours.

Generally, the current findings are supportive of the previous literature, which has shown that higher levels of mental toughness relate to a more rational thinking style. This suggests that individuals who possess higher levels of paranormal belief (MMUpbs) might be less successful in coping under pressure. The relationship appears weakened between paranormal belief and level of mental toughness, whilst the MTQ48 may be a moderating factor when exploring level of belief. Cautious interpretation is still required when considering current paranormal belief findings. It would be beneficial to further explore the conclusions from this research within additional studies i.e., risk perception (decision-making), to discover the degree to which risky choices/decisions correlate with a greater level of paranormal belief.

Additionally, if we postulate using Irwin's (2003a, 2004) conjectures (implicates about formation and subsequent maintenance of paranormal beliefs) specifically, level of paranormal belief, level of emotion, and sense of control seen as a coping mechanism, then perhaps increased levels of mental toughness may reduce anxiety, enhance control and perhaps reduce paranormal belief (Irwin, 1994b, Wiseman and Watt, 2006). This depends upon degree to which belief is ingrained and more transitory, especially where people who hold paranormal beliefs perhaps possess psychological attributes meaning that they are

more likely to misattribute paranormal causation to normal experiences (Wiseman and Watt, 2006). The present findings therefore may extend to differences between more fluid beliefs (e.g., ghost/hauntings) than those considered less transitory (e.g., superstition). In this sense, it may affect levels of paranormal belief. Results reveal a trend for heightened levels of mental toughness, but this requires careful consideration in the context of paranormal belief endorsement. The elements of mental toughness (active subscales) may reduce aspects of belief in the paranormal particularly those associated with control. Control appears important; predominantly those who perceive little control over their own lives and consequently may be more prone to paranormal beliefs (Blackmore and Troscianko, 1985; Chorpita and Barlow, 1998). Accordingly, external locus of control (Dag, 1999; Groth-Marnat and Pegden, 1998), high anxiety (Watt et al., 2007) and emotional responsiveness form associations with belief in the paranormal (Irwin, 2000). Thus, this suggests those respondents scoring higher on mental toughness are less inclined to be paranormal believers.

In addition, several studies report an association between proneness to reality testing deficits and unconventional beliefs (particularly, belief in the paranormal, endorsement of urban legends and conspiracism) (e.g., Drinkwater et al., 2012). As such, emotion-based reasoning predicts level of paranormal belief (Irwin et al., 2012). Thus, believers tend to endorse paranormal occurrences because of their emotional rather than rational appeal (Sappington, 1990). It seems that individuals with high levels of paranormal beliefs have a different model of how the world works, based on a less 'classically' rational approach and a more emotion led style. If these findings are linked with those that mental toughness and associated with lower levels of emotional and passive coping mechanisms, we hypothesised that mental toughness would be linked to paranormal beliefs, which in turn would be suggestive of a less realistic/rational decision-making style. This lack of rational decision-making could link to risk taking, especially non-planned risk taking. Additionally, several of the subscale scores of the MTQ48 reveal significant negative and positive correlations with the subscales of the MMUpbs. However, the ET (extra-terrestrial) subscale fails to correlate with the majority of subscales (e.g., control of emotion (-.10) does not correlate with extra-terrestrial). This is interesting, because it suggests, many who are high in terms of mental toughness may believe in the existence of life (biological) on other planets but are unwilling to believe that aliens have visited earth.

It may also suggest that lower levels of emotion directly relating to high mental toughness are not good predictors of level of paranormal belief.

The current paranormal measure could further extend research to assess whether people who perceive or attribute more risk and or make riskier decisions, are prone to higher levels of paranormal beliefs. In this context, level of mental toughness may mediate level of paranormal belief. Therefore additional analysis/research is necessary while structural equation modelling (SEM, Hox and Bechger, 2001; Savalei and Bentler, 2006, 2010) or cluster analysis (CA, Anderberg, 2014) may permit acceptable scientific investigation (Jones et al., 2002). Clough et al. (2002) explored the concept of hardiness between elite sportsmen and women (Kobasa, 1979; Funk, 1992). Findings suggest hardiness may act as a shield from stress and appears related to improved performance in sport (Golby et al., 2002; Golby and Sheard, 2004).

The current research explored paranormal belief and mental toughness, but could easily establish additional stressful situations (Risk perception) assessing level of mental toughness, adaptive coping mechanisms, while expanding paranormal belief correlates in terms of certain decision-making strategies. Consequently, beliefs in the paranormal appear to share many of the MTQ48 traits (outlined from believers and their experiences), for example, mentally tough individuals are able to appraise stressful situations more positively and are able to employ adaptive coping behaviours (Clough et al., 2002). Perhaps the same also exists for those who embrace paranormal and believe in certain phenomena. Thus, future research could explore further relationships between MTQ48 and paranormal belief dimensions by ascertaining stressful situations (and or anxiety provoking scenarios). The potential practical applications of paranormal belief endorsement and the relationship to additional real world measures (e.g., decision-making or perception of risk) certainly need careful exposition. Mental toughness also requires further clarification as resilience and hardiness could explain some variance with belief in the paranormal.

Illustratively, hardy individuals may appraise stressful situations positively and are able to employ adaptive coping behaviours. Hardiness is a personality characteristic, which during times of injury reduces stress (Funk, 1992; Williams and Anderson, 1998). Nevertheless, no research to date has assessed this concept within this domain. In this context, participants deemed mentally tough, are those who appear to be more disciplined thinkers (Loehr, 1986). Furthermore, increased positive energy (especially during an

emergency), may enable the more mentally tough individual to remain relaxed, calm and energised enabling greater performance under uncertainty and hardship (Golby and Sheard, 2004). Problem resolution and increased positive attitude allows a greater capacity to work under pressure, make allowances/adaptation following mistakes, whilst improving performance (Kobasa, 1979; Loehr, 1986; Funk, 1992).

Additionally, Jones et al. (2002) suggest that mental toughness is a construct naturally developed that may provide a psychological edge, enabling sports men and women to cope better with the demands placed on their performance (Golby et al., 2002; Golby and Sheard, 2004). In this way, the more robust or resilient an individual is, may account for a level of determination and focused and confident performance under pressure (Clough et al., 2002). The important aspect is the self-belief of the individual to perform and sustain an ability to complete a victory over a rival and opponent. Finally, during such competitive endeavour many believe that this faith or belief in victory may lead to stronger mental toughness and vice versa (Clough et al., 2002). In this context, the introduction of paranormal beliefs and especially the MMUpbs has demonstrated the importance of such psychological constructs in further examining level of paranormal belief and its important in understanding real world experiences.

The current findings suggest the importance of assessing decision-making in relation to level of probabilistic reasoning and paranormal belief. It may be that important decision-making and probabilistic reasoning facets linked to the generation and maintenance of paranormal beliefs. Moreover, certain beliefs or judgements appear to affect choices made and the levels of perceived risk attributed to each choice made (Kobasa, 1979; Funk, 1992). The current research expanded work of both Clough et al. (2002) and Jones et al. (2002) by incorporating a paranormal measure alongside mental toughness MTQ48. In this way, certain aspects of the new paranormal belief measure would further establish the link between unconventional (anomalous) thinking, mental toughness and risk taking.

Furthermore, considering level of perceived risk alongside paranormal belief, lends scope for future research to incorporate alternate risk scales (see Risk Attitudes Scales, Rohrman, 2005; Decision-Making Scale, Clough et al., 2002). Alternatively, attitude measurement may also be an area to include within new areas of research alongside

paranormal belief and mental toughness (see the Manual for the Wilson-Patterson Attitude Inventory, Wilson, 1975).

Conversely, previous research (Sjöberg and Wåhlberg, 2002) has outlined bias to experiential processing suggesting that paranormal believers may have a poorer appreciation of chance or have a propensity to increased probability misjudgements. Kouabenan (1998) reported that beliefs and social practices (religious rites, sacrifices, mystical, or para-scientific consultations, ritual, or initiation practices) influenced risk perception and the causal explanation of accidents. There is an association between risk/chance specifically where people who may believe in the paranormal do not perceive risk at the same level as those who are non-believers. Together those sorts of factors may be associated to be less of a mediator than those of mental toughness or paranormal. Finally, a positive correlation found that high paranormal belief is associated with a high perception of risk. For example, there is an association to overestimate levels of risk with NAP (Sjöberg and Wåhlberg, 2002; Sebald, 1984).

Research suggests a relationship between stress and anxiety and endorsement of paranormal beliefs (Wiseman and Watt, 2005, 2006). For example, superstitious belief associates with perceived social difficulties, relatively poor self-adjustment (low self-efficacy Tobacyk and Shrader, 1991; high trait anxiety Wolfradt, 1997), and irrational beliefs (Roig et al., 1998). In fact, many researchers suggest that paranormal and superstitious beliefs may develop in the more anxious individuals with a strong need for control, while attempting to overcome apparent uncertainty (Irwin, 2000; Jahoda, 1968; Malinowski, 1948).

The current research sought to develop a more comprehensive paranormal scale that incorporated several new items e.g. superstition, I do say 'touch wood' or actually touch wood to promote good luck, or, I do say 'fingers crossed' or actually cross my fingers to promote good luck. This not only increased the superstitious questions, thus expanding the construct allowing independent subscale use, but also utilised the MTQ48 assessing perceived levels of control, resilience and stress in relation to paranormal belief (Clough and Strycharczyk, 2012; Earle, 2012).

7.5. Future ideas for research

Future research could further examine the relationship between mental toughness and level of paranormal belief by exploring the role of control. While mental toughness appears to attenuate belief in the paranormal, there may also be room for exploration of perceived anxiety, stress and risk. In this case, the current research phase has no measures of locus of control, risk or anxiety and thus further research should aim to understand moderation that occurs between relationships. For example, the personal risk inventory (PRI)²⁶ (Hockey et al., 2000) measures risky behaviour via completion of choice dilemmas: should also be included to assess decisions/choices made by paranormal believers and non-believers in an attempt to explain variance and mediation effects.

There may also be room for future research to investigate paranormal beliefs using an intervention-based study. Additionally, future research using an intervention-based study, could investigate the effect of mental toughness training on paranormal beliefs. Previous research reports that mental toughness improves internal control and emotional coping mechanisms (Kobasa, 1979; Funk, 1992), these factors are established associates of paranormal belief. Thus, mental toughness training should indirectly through these variables decrease level of paranormal beliefs. Subsequent studies could extend this paradigm to include other unusual beliefs, such as urban legends and conspiratorial ideation. Findings could have important real-world applications (Crust, 2009; Taylor and Stanton, 2007). Particularly in job placement and training situations where unconventional beliefs may adversely influence performance (e.g., nuclear industry).

This could include consideration of beliefs at the subscale level. Furthermore, these factors could further assess paranormal belief, level of control (self-efficacy) exploring their impact on paranormal facets (French and Stone, 2013). Evaluation of mental toughness and paranormal groups will allow investigation of the effects of an intervention of mental toughness on level of paranormal belief within the general population. Finally, potential research should make use of gambling strategies in conjunction with the refined MMUpbs to examine links between paranormal belief, superstitious strategy and gambling.

²⁶ PRI: choice situations frequently confronted by individuals in their normal lives involving an element of perceived risk

7.6. Conclusion

This phase established further MMUpbs validity and consistency in conjunction with the MTQ48. Consideration of the current findings suggests a need for further assessment/refinement to facilitate a more complete paranormal measure, and robust set of coherent paranormal subscales to establish psychometric coherence.

Chapter 8. General discussion

8.1. Methodological interest

8.1.1. Overview

By examining the content of existing self-report measures (e.g., RPBS and ASGS), at both a construct and item level, this doctoral thesis extended paranormal belief measurement. This review process led to the development of a new paranormal belief scale, which functions at both a global and factorial level. The inclusion of further items enhanced the breadth of common factor subscales. The production of discrete standardised subscales enables measurement of often under researched specific parapsychological phenomena. This was important because, current measures such as the RPBS use only a few items to measure each factor (superstition, witchcraft, etc.). Hence, the RPBS and ASGS function better at a global level (Drinkwater et al., 2017).

Correspondingly, the MMUpbs encompassed a broader range of beliefs than extant measures. Particularly, alongside commonly assessed factors (superstition, religion, PK, ESP and witchcraft) subscales measuring haunting/ghost, astrology and belief in extra-terrestrial life were developed. This approach to scale refinement was more organic and less rigid than conventional methods of measurement and development.

In this context, self-report measures may benefit from periodic, systematic review. This would facilitate the accommodation and addition of new paranormal beliefs as they emerge (e.g., new age philosophies). Adding new items in this way increases construct breadth and ensures that facets reflect currently held beliefs. Regular scale revision is consistent within the field of psychometrics. For example, the WAIS IV (Wechsler adult intelligence scale) updates periodically to reflect the nature and complexity of current thinking about intelligence measurement (Wechsler, 2008a).

This applies also to paranormal phenomena; many beliefs fluctuate over time (i.e., new beliefs gain favour, whilst others decline, e.g., crop circles; Jinks, 2012a). The same deviation appears with social phenomena (Gergen, 1965, 1973). Gergen, points out that social psychological reality becomes non-repeatable overtime because underlying human principals (for example, facts) do not remain stable. ‘Knowledge cannot accumulate in the usual scientific sense because such knowledge does not generally transcend its historical boundaries’ (Gergen, 1973, p310). As a result, measures may require enhancing or updating. Explicitly, newer items are required to reflect contemporary thinking and

maintain scale currency (e.g., the 2012 phenomenon, Sitler, 2006; slender man, Tolbert, 2013). In conclusion, the development of new items, which reflect current and emerging belief systems, would potentially improve scale reliability and validity.

8.1.2. Reversed Items

Scale development identified issues with reversed items. Often, respondents struggled to comprehend fully negatively worded statements (van Sonderen et al., 2013). For example, what does an item such as, “When dreams seem to foretell the future, it is just a coincidence” actually measure. Not believing in a specific instance/situation (dreams foretelling the future) does not invalidate belief in other contexts (e.g., visions predicting the future). For example, the fact that a respondent indicates that they do not believe in precognition via dreams does not mean that they do not believe in precognition per se, or other aspects of ESP. The question tells the researcher little about general belief in ESP; it is possible that respondents could believe that people have visions of the future, that people can communicate telepathically, see things remotely, but that they do not believe that information is transmitted via dreams. Problems with reversed items are not unique (Wong et al., 2003). Researchers report frequently that reversed items display lower reliability and weaker item-to-total correlations than positive-worded counterparts (Cronbach, 1942; Benson and Hocevar, 1985; Peabody, 1966).

In addition to this, reversed items have often proved difficult to accommodate within factorial models; reversed items frequently load on a separate factor (see Benson and Hocevar, 1985; Herche and Engelland, 1996). This occurred in the present study where, within the preliminary factor analysis and the subsequent phase II CFA, negative items clustered together. Thus, whilst reverse items may reduce potential response bias, the inclusion of such items may reduce a measure’s internal consistency and obscure its dimensionality (Benson and Hocevar, 1985; Goldsmith and Desborde, 1991; Harrison and McLaughlin, 1991; Schriesheim and Hill, 1981). For these reasons, some psychometricians have proposed that scales should only include positively worded items (or at least items in the same direction) (Iwata et al., 1994; Schriesheim and Eisenbach, 1995).

Respondents either misinterpret or acquiesce with some conditions/items. For instance, two types of reversed items highlight the difficulty that some may experience; acquiescent (where people who carefully read each question, when confronted with a

reversed item, still agree with the answer) and negative particles (e.g., words like ‘not’ or ‘no’ or affixal morphemes like ‘un-’, ‘non-’, ‘dis-’ or ‘-less’) (van Sonderen et al., 2013). In this context, a respondent who concurs with a positive item and disagrees with a reversed (negatively worded) item is not considered to be affected by acquiescence (van Sonderen et al., 2013). Similarly, inattention can also occur, where a respondent may consider an individual item and simply be unaware a consecutive item is formulated in a reversed fashion. They may also respond in accordance with a previously similar item thinking that the items share the same polarity (Drolet and Morrison, 2001).

The problem with this proposition is that the use of consistently worded questions may introduce additional difficulties. Regardless of item polarity, respondents may find complex items more difficult to interpret. Complexity in this context can refer to length, item structure and use of specialist terminology. For example, ‘humans are unable to exert influence upon the known physical world simply through conscious or unconscious purpose (psychokinesis)’ (Drolet and Morrison, 2001; van Sonderen et al., 2013). This problem increases when reverse oriented items rely on negative particles or affixal morphemes (van Sonderen et al., 2013). In this case, modification (reverse wording) questioning from the opposite position, will only lead to increased difficulties in interpretation (Swain et al., 2008).

Similarly, straight-line responding or other forms of acquiescence (Wong et al., 2003) can also cause difficulty in responding correctly. Thus, a sensible compromise position allows liberal dispersion of reversed items, while ensuring clarity of wording. In addition, the effect of reversed items on factor loadings and communalities should also be carefully dissected (Schriesheim et al., 1989). The current research demonstrated how negative items (regardless of item content) performed poorly in comparison to the more positively worded ones. There needs to be revived discussion and consideration of a counterproductive strategy that applies reversed items to measures in order to prevent response bias (Schriesheim et al., 1989; van Sonderen et al., 2013). Future research needs to examine how best to integrate and utilise negatively worded/phrased items when applied to new or modified measures that assess paranormal belief.

This doctoral thesis has generated a robust and reliable paranormal measure; however, there still appears to be a need to explore content/composition of some items/statements i.e., where respondents not believing in a specific instance/situation (mind

reading) does not invalidate belief in ESP or telepathy. Thus, the question (reversed or not) fails to fully explain general belief in ESP because it is possible that respondents could believe that people have visions of the future, can communicate telepathically, and see things remotely. Whilst, that they do not believe that information is transmitted purely via a mental process.

To conclude, factor analysis raised several questions. Issues of concern were item loss, performance of reversed items and factor loadings. As discussed previously, items sharing unexpected commonality were problematic and disrupted factorial structure. For instance, references to prediction and foreseeing the future (notions related to different factors ESP and Astrology) frequently cross-loaded, and hence failed to feature in the final factorial solution. The net effect was a reduction in construct breadth. Clearly, item disambiguation is a complex process requiring consideration and deliberation throughout the development of the scales. It is advisable that included items explain specialist terms in plain language, and that there is a clear association between the exposition/elucidation and the phenomenon of interest. For example, specifying that precognition is a form of ESP, involves seeing future events (Watt and Irwin, 2010).

8.1.3. Item generation and question phrasing

To extend item set production and develop newer type of questions, potential advancement may well adopt/approach item generation in a more sophisticated and theory driven manner (Irwin, 2009). Traditionally, researchers rely on questionnaires as a principal way to collect data (Stone, 1978). This method involves collating large item pools then reducing them to a set of related, but idiosyncratic statements (Hinkin, 1998). Scale development involved creating items en masse to assess the construct under examination (Schriesheim and Hinkin, 1990). Each of the retained items provides an indirect measure of the construct of interest. For instance, “Ghosts do exist” assesses belief in the existence of ghosts, which incidentally relates to general belief in the paranormal. An alternative and potentially more productive approach would be to assess belief in the paranormal via a series of global statements (e.g., I believe in the paranormal, that is forces/powers beyond current understanding). Such statements, link explicitly to working definitions of paranormality, and avoid obfuscations arising from the perceived validity of specific phenomena. Particularly, considering the factors identified in the present study, a

failure to endorse items supporting the existence of ghosts would affect the religious dimension and overall belief in the paranormal. Thus, someone with high general belief would by virtue of not endorsing one particular type of paranormal phenomenon be under represented on the global construct (Irwin, 2009).

Specifically, current research allows scope for inclusion of more experiential information gathered from individual discussion (potential semi-structured interviews) with which to inform subsequent composition of paranormal questions. This method although time consuming suggests that more in-depth discussion about particular experiences/occurrences may assist in further developing belief dimensions, types of items, breadth of factors whilst capturing beliefs from a wider range of percipients that are completing measures (Braun and Clark, 2006). There is scope to generate numerous questions and additional dimensions, taking care/consideration with complex questions/items that become more difficult to comprehend or rationalise. In this context, avoidance of items with complex embedded clauses and qualifiers is necessary, because respondents may find specific 'compound' items difficult to comprehend (Braun and Clark, 2006; Dey, 1993).

Correspondingly, there are potential problems with the use of double-barrelled items (Giles, 2013). For example, the RPBS contains the statement "There is a heaven and a hell". Respondents who only endorse one of these notions (heaven or hell) may not know how to respond to this item. Moreover, respondents may endorse the item (or reject it) based on belief in either. Alternatively, the item may produce mid-range, scores indicating uncertainty. Indeed, the process would remain the same, even though fewer complexes in developing a single item scale (Hinkin, 1998). Specifically, establishing construct validation via three steps: specifying the construct domain, empirically exploring the degree to which an item/items measure that domain, and investigating the extent to which the measure generates coherent findings; those consistent with theory (Nunnally, 1978). Construct validity is vitally important because it links theory to psychometric measurement (Kerlinger, 1986; Hinkin, 1995, 1998). Thus, feature measures need to be theory driven and must address the issues and concerns raised within this section.

8.1.4. Scale development: Global measures

Considering the inherent difficulties involved in precisely defining paranormality and paranormal concepts, the notion arose that a general global measure could best be produced by first developing a set of subscales. In the case of the current project, this would entail operationalizing the contents of each subscale prior to testing the subscales in tandem. This approach would hopefully avoid concept confusion and generate a set of discrete, but related scales. These subscales would assess independent facets of paranormality, or be combined to form a global measure of paranormal belief. This top-down approach runs contrary to the normal convention, where item pools are generated then reduced. The advocated strategy has the advantage of theory led rather than statistically driven.

Debates surrounding the development of the RPBS illustrate difficulties associated with scale development. Particularly, the original seven factors lacked breadth and coherence, and the factorial structure was criticised. Collectively, a two-factor (NAP-new age philosophies and TPB-traditional paranormal beliefs) solution emphasizes the different functions of paranormal beliefs (Ember and Ember, 1988; Goode, 2000; Irwin, 1992; Lawrence et al., 1995). Consequently, the factors are inclusive aspects of belief and offer few insights into particular phenomena. For example, the scales would be of limited use to researchers studying specific beliefs (hauntings, ESP, etc.). Thus, the scale development of the MMUpbs new measure of paranormal belief has incorporated additional items (e.g., astrology, witchcraft) so that all the facets can be used as individual subscales comprising between 5 and 8 items respectively.

Prior to scale construction, items were scrutinised, clarity checked and repetitions (overlaps) removed. To ensure that subscales sampled the breadth of construct domain a further literature review was undertaken and additional items added. Within subscales, there was reversing of selected items to counter potential response bias; the authors took care to ensure that reversed/negative worded items possessed semantic clarity. The final scale comprised 64-items measuring eight paranormal facets/dimensions. The dimension labels were largely consistent with Irwin's (2009) delineation of paranormal belief. Thus, needs to allow for endorsement of paranormal occurrences from those deemed outside the range of those currently expected (Irwin, 2009). This description also effectively reflects the variety of beliefs that fall into the paranormal category. According to Furr (2011),

selected questionnaire items must adhere to an explicit and precise construct definition. The MMUpbs conforms closely to the classification of paranormality forwarded by Irwin (2009).

8.1.5. Single item measurement vs. multi item measurement

Another approach would be to assess belief in the paranormal via endorsement of a single-item measure (Bergkvist and Rossiter, 2007). This could be a practical approach, if the intention is simply to assess general/global belief in the paranormal. Such an approach has generality without specificity, and avoids the problem of sampling precise construct content; the pitfalls of either failing to excluding core phenomena, or including phenomena that is peripheral or debatable. Single-item instruments have been successfully used to measure: psychological constructs (e.g., well-being, Diener, 1984; and job satisfaction, Wanous et al., 1997), personality (e.g., self-esteem scale, Robins et al., 2001), ability (Rammstedt and Rammsayer, 2002), and are useful screening instruments in medical settings (Konstabel et al., 2012). Shorter instruments are easier for respondents to complete because they are less time demanding (Giles, 2013). This has a number of benefits. Respondents will be more likely to volunteer, making it easier to recruit large sample numbers (Bergkvist and Rossiter, 2007; Burisch, 1984b).

Furthermore, single-item measures avoid difficulties associated with long scales, where item redundancy (repetition) may frustrate, fatigue, and bore participants (Bergkvist and Rossiter, 2007; Robins et al., 2001). The authors are mindful of the criticisms levelled at single item measures. Common concerns appear difficulty of estimating their reliability, low reliability and perceived inadequacy in comparison to longer measures. Considering reliability, longer scales will generally be more reliable because the addition of items negates measurement error (Wanous and Reichers, 1996a). Thus, each item provides an estimate of construct endorsement (Robins et al., 2007). The advantage of single-item measures is that respondents may comprehend their purpose and meaning more easily, and therefore produce more accurate and precise responses. In addition, because of the brevity of single-item measures respondents will be more able retain motivation and concentrate more fully (Bergkvist and Rossiter, 2007; Burisch, 1984a, 1984b).

However, there are several issues/problems with single item measures. The most noticeable limitation (Abdel-Khalek, 2006) of single-item measures is that they fail to

generate internal consistency reliability coefficients (Abdel-Khalek, 2006). Also, at least three (probably more) items are required to construct a psychometric measurement model (see Herzberg and Brähler, 2006). This is a complex issue without an easy solution; alternative psychometric models can assess further validity and reliability. The principal concern with single-item measures centres on the degree to which they can adequately assess construct breadth, or the extent to which single items are capable of assessing construct breadth in comparison to longer scale measures (Smith et al., 2000). To alleviate this concern, single-items should contain detailed and comprehensive content (e.g., see Section 3, global questions of paranormal belief, item 1, p. 308). Additionally, item(s) presentation should be at an understandable level of abstraction (cf. John et al., 1991). This has the benefit of ensuring that items require less cognitive effort to comprehend (e.g., see Section 3, global questions of paranormal belief, item 2, p. 308). Additionally, lower level constructs possess a predictive advantage over broad factors (Paunonen, 1998; Paunonen and Ashton, 1998, 2001a).

Such issues and discussions are worthy of inclusion within any debate regarding the paranormal especially whilst developing a coherent and robust paranormal belief measure. Certainly, it is vital that researchers begin with a clear conceptualisation of the target construct (Clark and Watson, 1995; Paunonen and Ashton, 2001a). In this case, it would be one unsullied by definitional debates about the legitimacy and veracity of particular paranormal phenomena. No delineation will ever prove sufficient, nor will it receive universal acclaim. Currently we have a board agreement that paranormal beliefs share a set of important characteristics; lack general scientific verification and endorsement, regarding those people who might normally be expected by their society to be capable of rational thought and reality testing (Bell et al., 1985; Irwin, 2009). It may be that belief in the paranormal represents a single cognitive personality trait, where paranormal belief is just, all or nothing (Randall and Desrosiers, 1980). Certainly, any measurement item(s) should conform to the former definition of endorsement corroboration (Burisch, 1984b; Clark and Watson, 1995).

Whilst some authors have argued primary item pools should be extensive, given the specific theoretical view of the target construct, our experience suggests that greater focus and consideration is required. Consistent with this, we would support the method recommended by Konstabel et al. (2012), who propose closely matching items to construct

definitions. This approach avoids common problems surrounding statistical selection, that may result in a set of items whose content is biased or narrower ('bloated specific') than intended. Konstabel et al. (2012) also usefully recommend that items should not be from different levels of abstraction. Particularly, one item should not logically assume another. For example, having a specific statement regarding belief in PK (the ability to move objects by the power of mental processes) and asking whether respondents have themselves experienced the process of PK, whereby they have moved objects by the power of their mental processes. In addition, items referring to different perspectives should be excluded (e.g., 'I consider myself to be psychic and friends and family believe I am psychic'), because perceptions of others' views, can vary the point of view systematically (Burisch, 1984b).

8.1.6. Internet mediated research

In exploring belief measurement, the current doctoral research employed internet mediated research (IMR) where online items/questionnaires assisted in gathering information about thinking styles, mental toughness, paranormal belief and experience. Thus, further expansion of paranormal items can advance scientific rigor, especially where new experience and rationality may directly affect individual differences (Kamel Boulos and Wheeler, 2007). In this context, it is important to develop surveys that contain new items allowing expansion of the paranormal beliefs. Intrinsically, there are positives to using self-report questionnaires; gathering large data sets, are convenient, provide an easy method of collecting statistics where large number of percipients improve statistical strength (Westen and Rosenthal, 2005). They also provide a feasible way to assess constructs of interest (Donaldson and Grant-Vallone, 2002).

Below is additional positive/progressive aspects of survey design summarised at a general level and within the framework of the assessment. Moreover, it is important to point out that questionnaire based methods represent an important means by which to assess beliefs about the paranormal because:

1. They examine the nature of beliefs and their implications,
2. A self-report measure is central to measuring constructs (see Kagan, 2007; Robins et al., 2007),
3. Provide self-motivation for respondents to talk about themselves, and,

4. Are relatively inexpensive, whilst generate an abundance of data in a short space of time (Kline, 1993).

Though there are clearly many advantages for self-report measures, limitations need explaining. For example, minor changes to question wording, context and format can dramatically reduce the strength of the results obtained (Schwarz, 1999a). Similarly, response bias or the need to respond to items in a more favourable way can also affect findings; specific to item content (Paulhus, 1991). There are also extreme responses specified between extremes of the scale as well as acquiescence, where responses given suggest that respondents have not fully comprehended or considered the question. Finally, some would argue that reliability and validity of paranormal belief measures can be challenged (Lawrence, 1995) meaning further assessment of subscales is required. To this end, the current thesis makes a valuable contribution to the psychometric measurement of paranormal belief by answering Lawrence. Particularly it delivers a more comprehensive range of subscale measures while highlighting important relationships that exist between thinking style and level of paranormal belief. In this context, it makes an important contribution to both paranormal belief research and critical thinking assessment.

8.1.7. The social and temporal nature of belief and paranormality

More generally, it is important to measure and quantify beliefs because it facilitates understanding of perceived existence by making sense of the world we live in, helping to understand people's rationality (British Psychological Society, 2013; Kamel Boulos and Wheeler, 2007). The process of belief generation and experiences will of course affect belief formation (Irwin, 2009; Jinks, 2012). In addition, the way a percipient expresses, explains or labels experience may affect personal perception of that incident. Irwin and Wilson, (2013) identified two psychological correlates within parapsychological perception of experience: people who are inclined to anomalous experience where a construct shares variance with schizotypy particularly, asocial aspects of psychosis-proneness (Goulding, 2004, 2005; Mason et al., 1995), and people disposed to make paranormal attributions sharing similar facets with proneness to deficits in reality testing (Lenzenweger et al., 2001). Subsequent failure to assess critically the experience or reality can lead to paranormal attributions (Irwin et al., 2014). Here, it appears that they both explain further experiential processing style (see footnote 3 p. 41 for a description of

cognitive experiential self-theory, CEST; Denes-Raj and Epstein, 1994) suggesting a causal relationship exists between various paranormal experiences.

Assessment and development of experiences, questionnaires and measures allowed evaluation of paranormal beliefs (ASGS, RPBS etc.). Items used may explore many of the different types of occurrence (alien encounter, visitation etc.) but there may be a distinct difference between primary and secondary items (Jinks, 2012)²⁷. As such, a contradiction exists between primary vs. secondary views, which may in fact lead respondents to form quasi-beliefs about the paranormal. This has implications for this thesis because it shows that further development of the items used, the individual factors (either 7 or 8) that may be utilised as standalone subscales is required.

8.2. Future developments

8.2.1. Potential for generation of new items

The potential of generating additional questions in order to improve the breadth/dimensionality of measures should include qualitative research e.g. interpretative phenomenological analysis (IPA) or thematic analysis (TA), which would include important aspects of an experient's interpretation of paranormal experience (Braun and Clark, 2006; Wilde and Murray, 2009, 2011). This would allow data to be gathered relating to social contexts and discourse reflecting more up to date modern day opinion. Such narratives persuade social consensus (Gitlin, 1980), shape the individual and appear to directly affect and influencing the populous worldview. This affects the consensus regarding paranormal phenomena (Edwards, 2001). Within the general population believers within belief categories, demonstrate similar levels of conviction, whilst reporting a varied range of experiences and phenomena. Whilst there is room for further scales/item enrichment and improvement, the current research explores belief category through item and scale improvement. This should carefully examine experience and phenomena to assimilate carefully useful experiential data. This could generate more improved measures, allowing for updates at regular intervals keeping items and scales

²⁷ According to Jinks, (2012) primary and secondary are framed within known characteristics of quasi-beliefs, whereby respondents profess strong belief in the popular expression of a topic. This is known as the primary item (e.g., the Bermuda triangle 'mystery') but disagree with related items "cause" of the topic, known as secondary items (e.g., people mysteriously disappearing, never to be seen again).

more relevant within contemporary society. Perhaps, inclusion of more recent/relevant terminology also enhances future scales/items development. This would offer added breadth and coverage as the norm for all questionnaire progress. Subsequent cultural and societal norms should shape surveys/measures allowing facet/item expansion. Extending measures in line with subjective experiences (SPE) and conception of experiences/observations may play an important part in the development of future paranormal items (Drinkwater et al., 2013).

It appears that our changing world, shaped by socio-cultural contexts influences paranormal experience and belief, leading to experiences that differ because of the context in which they occur (Houran and Lange, 2001). Consequently, the majority of paranormal phenomena and beliefs about unusual happenings are in principle explainable by science. Thus, paranormal is *relative to time*, dependent upon advances made in science, to explain and interpret such phenomena (Martin, 1994). Further scientific assessment regarding the anomalous and specific verification will further explain paranormal phenomena.

The results of this PhD thesis provides further evidence for the relationship between associates of paranormal belief (e.g., belief in religion, paranormal beliefs), and the potential structure of a revised measure of paranormal belief. Moreover, where the RPBS identifies religious belief as a single construct (fundamental to paranormal belief generation), the current thesis introduces additional items that improves conceptual clarity for the 8-factor solution. Research produced several directions for future studies in paranormal belief and experience. For instance, further development of the current 50-item paranormal measure should assess suitability of individual factors (e.g., witchcraft) as a standalone subscale. Measures should include a more diverse range of factors where experience of psi and subsequent interpretation can further improve facet breadth.

8.2.2. *Effectiveness of scales*

Additionally, development should examine the effectiveness of scales that employ polarity scales (true vs. false; agree vs. disagree) and those that use Likert scales (strongly agree 1-7 strongly disagree). This is because paranormal type questionnaires/measures may not fully explain the composition of belief in general, but rather, only point to the differences that exist between sheep (believers) and goats (sceptics), rather than the individual composition of believers (Jinks, 2013). Current research outlines the

psychometric approach to better understanding and evaluating paranormal belief. However, there is room for item/scale improvement by combining both phenomenological and psychometric approaches. Together these are equally important. Specifically, psychometrically, items that are constructed, within general measures (e.g., ASGS, RPBS) have a propensity towards beliefs in the paranormal. Secondly, these items look for a relationship between specific beliefs in paranormal but not the types of believer that may exist. Alternatively, the phenomenological approach presents individual differences in experience and by combining; both approaches may improve and explain specific types of believers and subsequent sceptics (Jinks, 2012). A study conducted by Roe (1999) posits an example of this. Believers and sceptics rated mock scientific papers (pro vs. anti ESP). The study explored how believers and sceptics assessed these papers, with a significant tendency to rate papers that were incongruent with their prior beliefs. Additional paranormal research should therefore explore individual differences between believers and sceptics in isolation (see Jinks, 2012a, 2012b). Providing a more comprehensive approach to item development that may allow subcategories of the MMUpbs to act as standalone facets (e.g., witchcraft items), thus permitting further examination of these discrete differences.

8.2.3. Nature of paranormal believers

The diverse nature and make up of paranormal believers is equally important in understanding and explaining belief in the paranormal phenomena. Bader et al. (2010) posit data about the individual differences seen between men and women across the USA. For example, men believe more in the existence of extra-terrestrials whilst women are more likely to believe in spiritualists and fortune-tellers. The current research conducted is important in terms of the composition and type of believers where personal experience and semi structured questioning may explain individual gender differences (Parra, 2015; Schuler and Papousek, 2008). Alternatives regarding the nature of believers also involves the composition and level of education. Those dropping out of education were more than likely to believe in the paranormal than their academic peers. It appeared that more highly educated were more likely to be part of a paranormal research group/investigate phenomena or may have more of an interest and are simply trying to seek out and make a radical discovery, for example, finding that UFO/ET actually exists (Bader et al., 2010).

Perhaps it is suggestive of a deeper meaning to our existence, one that helps answer the question, is there life after death (Bader et al., 2010).

Religiosity and modern culture perpetuate interest in paranormal and anomalous belief. Spiritual perspectives and our media saturated society affect people's belief in today's world (e.g., TV - Most Haunted, Ghost Hunters; films – The Fourth Kind, Paranormal Activity). The prevalence of such material presents information that it is; a) propagated through the media, b) information that is assimilated and interpreted and c), fuels both positive and negative speculation alike with regard to the development and formation of the anomalous and belief in the paranormal. However, it seems that today's paranormal worldview is in conflict with the worldview of science where explanations of the anomalous compete with current science (Kutz, 2001).

8.3. Ideas for future research

8.3.1. Qualitative vs. quantitative methods: An important annexation

In approaching a suitable framework for an appositely designed measure, the current research has taken a purely quantitative approach. However, there is merit in an amalgamation of both quantitative and qualitative methods for future research to enhance breadth and quality of a measure. Initial quantitative design allowed verification of elements for improved scale design and composition of individual subscales that are reliable and valid. Exploratory and confirmatory factor analysis allowed removal of items sharing variance, and permitted the purification of structure and individual facets/items. Conversely, subsequent research allows scope for further expansion of items and factors, where qualitative methods may enhance update (regularly) of existing paranormal measures. Successive evaluation and reevaluation of scales would allow new paranormal experience and alternate phenomena to generate additional paranormal facets.

It seems that both qualitative and quantitative methods form part of a continuum of research, involving a research objective and the precise techniques required to satisfy the research question (Casebeer and Verhoef, 1997). As a mixed methods approach, subsequent studies should utilise both quantitative and qualitative data. Thus, combining a single study (or multiple studies) will allow the same underlying paranormal phenomenon, to be investigated more rigorously (Leech and Onwuegbuzie, 2008). It is therefore important to try to incorporate differing methods in a way that forms a consistent and

cohesive structure allowing a philosophical and methodologically examination of future items and measures (Sale et al., 2002). Accordingly, a mixed methodological potential approach to item design exists. Scale enhancement/construction and improved function requires application to new questionnaires/scales as well as reappraisals (detailed techniques for achieving validity, reliability, and standardisation) of older ones (Oppenheim, 1992; Sapsford, 1999). This should improve rigour, the quality of data; develop accurate conclusions, while delivering precise recommendations (Boynton and Greenhalgh, 2004).

Fundamentally, two distinct research paradigms enable diverse methods of data collection, produce analysis revealing dissimilar contrasting findings. The quantitative position enables analysis of causal relationships from within a value-free framework (Denzin and Lincoln, 1994). It also allows greater distance of the investigator from those examined allowing more of an ontological position. This forms the basis of striving for an absolute truth within a quantitative paradigm. The qualitative paradigm is composed of both constructivism (Guba and Lincoln, 1994) and interpretivism (Altheide and Johnson, 1994). Thus, creation of reality (within the context of the situation/event/experience) helps the experient reappraise and explain the experience (Denzin and Lincoln, 1994). This method allows for a variety of investigative techniques: one to one interviews, semi structured focus groups and respondent observation, leading to purposeful narratives of articulate participants, providing valuable material (Reid et al., 2005).

Research conducted by the Institute for Frontier Areas of Psychology and Mental Health (IGPP) provides additional evidence of the use and purposeful narratives of respondents accounts. Schmied-Knittel and Schetsche, (2005) conducted a representative survey of the German population (1,510 people) regarding paranormal experiences. At least 50% of respondents expressed that they had or been involved in a 'classic' paranormal phenomena, prophetic dreams, apparitions etc. (Gurney and Myers, 1887-88). During the second stage of the IGPP project, 220 telephone interviews were thematically analysed. The results indicated that experiencers were affected in dissimilar (individual) ways; phenomena occurred rarely (they were by definition exceptional experiences). Experiences showed dependable comparisons and characteristics. Furthermore, experiencers frequently generated rational explanations for perceived phenomena and seamlessly integrated exceptional experiences into the individual biography (Schmied-

Knittel and Schetsche, 2005). Normalisation of such events namely involved endorsement of paranormal, while other ‘natural’ explanations were disregarded (Schmied-Knittel and Schetsche, 2005). This method offers scales/measure development through a process of normalization, which makes it increasingly easy for the people to talk about their experiences possibly informing future item/factor enhancement.

Experiential aspects of paranormal belief may also allow construct breadth enhancement, extending paranormal facets and extending essential phenomena (e.g., ghosts and poltergeists) (Dagnall et al., 2010). The current thesis addresses this issue. However, there is room to extend, adapt and reassess current items/measures. This should include cultural changes over time between the original inception and currently perceived perspectives. Intrinsically, important paranormal concepts need to evolve (the survival hypothesis, life after death, ghosts etc.). In addition, belief in ghosts is still relatively high within contemporary society, reflecting the significance of the subject (Gallup and Newport, 1991; Newport and Strausberg, 2001). Consequently, future scale developments and studies still need to include items assessing further belief in ghosts etc. (Dagnall et al., 2010) while incorporating alternative explanations and paranormal topics. Such additions may inform understanding of current paranormal belief generation and maintenance (Irwin, 2009).

Anomalous beliefs in this context are of importance, for level of endorsement attributed to an occurrence or experience, do appear to affect directly their interpretation. Perception and therefore interpretation may be part of the puzzle. In the present context, a relationship may exist between intuitive-experiential thinking (Denes-Raj and Epstein, 1994; Pacini and Epstein, 1999b) and anomalous occurrences (Aarnio and Lindman, 2005; French and Wilson, 2006), where experiential thinkers might be predisposed to interpret certain anomalous events, more reliably recalling their occurrence (Irwin and Wilson, 2013).

8.4. Applications

8.4.1. Real world application: Cognitive implications of MMUpbs

Presenting the MMUpbs alongside the MTQ48 in phase IV revealed that mental toughness factors, particularly lower levels of control and confidence, were associated with higher belief in the paranormal. The finding that control and confidence were important in relation

to paranormal belief is a useful finding. For example, in some contexts (e.g., sports performance) extreme paranormal beliefs can be detrimental in relation to an individual's levels of perceived control and confidence. Specific facets of paranormal belief that could have an impact include superstitious belief (Lazarus, 2000a), which was found to be important in this body of work.

Therefore, these results have important implications concerning how paranormal belief affects mental toughness. Additionally, low levels of superstitious belief (within a sporting/academic context) can increase confidence and reduce learnt helplessness (Rudski and Edwards, 2007). Intrinsically, this means that lower level of ritualistic/superstitious behaviour appearing to protect one from the effects of learnt helplessness (Dudley, 1999), whilst actively engaging in heightened rituals or employing extreme superstitions may create more maladaptive behaviour/performance. In this context, findings reveal level of paranormal belief may mediate level of superstitious belief.

Future applications for the MMUpbs full and subscales should attempt to investigate both structure and types of beliefs people possess, whilst comparing attitudes towards science, scientific reasoning, and epistemological beliefs. This will allow assessment of conventional and unconventional beliefs with a view to exploring paranormal endorsement and acquisition of certain beliefs that may be of use within clinical psychology. Applications can also explore socio-cultural factors governing peoples' beliefs (e.g., what and why we believe). Thus, paranormal measures should continue to investigate further beliefs in terms of a cultural purpose, the personal functions within contemporary society, exploring additional nuances regarding the human condition (Irwin, 2009).

Chapter 9. General Conclusion: Further developments

Certainly, there is a need to understand, explain and find meaning from within shared/common paranormal experiences (Brocki and Wearden, 2006). Common experience in this context refers to a belief of an occurrence/event is perceived as paranormal. As such, inclusion of pertinent qualitative methods (i.e., generating material from interviews and analysed using thematic analysis) would extend current research (Braun and Clark, 2006). Particularly, research should include an experient's subjective paranormal experience (SPE) to develop new items and as a method of generating new paranormal facets/categories (Drinkwater et al., 2013; Glicksohn, 1990; Holt et al., 2004). However, whilst useful for future research, current research only employed quantitative methods, whilst examined a broad range of items/measures of paranormal belief, developing a new paranormal belief measure.

Previous measures, whilst effective in establishing norms for paranormal belief assessment, have only measured belief in a narrow range of facets (e.g., PK and ESP) (Lawrence, 1995; Thalbourne, 2010). Only by looking at these important factors in isolation, can we assess how these elements relate to each other and how these are suitably measured. Therefore, the relationship between paranormal beliefs and experiences needs further consideration, especially how experiences have affected beliefs, and the impact of paranormal experiences on beliefs (Glicksohn, 1990; Wilson and French, 2006). Given the limitation of previous measures, there is a need to develop a broader set of facets and items that will produce a more global rounded view of experience and belief (Houran and Lange, 2004).

The purpose of this thesis was to develop a more comprehensive and extensive paranormal belief measure, extending item breadth and the parametric quality of the eight subscales within the global measure. This was accomplished through four distinct phases of research: I (exploratory factor analysis), II (confirmatory factor analysis), III and IV (additional quantitative exploratory phases examining the psychometric properties and establishing validity of the MMUpbs). Further complementary research is required to develop further the current scale. This should incorporate the following additions: using a refined questionnaire, measure of experience and introduce enhanced/refined facets/items. Therefore, if we triangulate them and use them holistically then several advantages will ensue: creates potentially new avenues of item generation, establishes common themes that

may be utilised for item generation providing a broader selection of items and themes to extend the current global scale, but also allow separation of individual facets so they can be used as standalone measures.

9.1. Redevelopment of the MMUpbs

Additional research could explore items by partitioning data (Cluster analysis - CA)²⁸ into meaningful subgroups thus extrapolating factors and items, which is an alternative to multidimensional scaling or factor analytic approaches (Punj and Stewart, 1983). As such, together they may provide further insight to the nature and development of paranormal beliefs for both believers and sceptics. CA provides explorative analysis dividing these data into groups/clusters based upon characteristics both useful and meaningful (Mooi and Sarstedt, 2011). Tobacyk (1995) suggests that idiographic methods may advance item development where cluster analysis (or Q-technique factor analysis)²⁹ identify types of persons characterized by particular intra-individual profiles of paranormal belief dimensions (Gabor, 2013). In this context, factors identified from direct respondent comparison, reveal characterization of individuals while responding in accordance to their own subjectivity (Iliescu, 2005). Thus, cluster analysis and the Q-Technique may provide important additional structural and content analysis needed for subsequent iterations of a paranormal belief dimension (Tobacyk, 1995).

Subsequent re development of the factors should also consider the polarity of item with yes/no responses may elicit a comparable set of results with the existing Likert scales (1-7) forming a swifter format response. Previous research has established locus of control as an important feature in further understanding paranormal beliefs (sensation seeking and locus of control: Groth-Marnat and Pegden, 1998; locus of control: Tobacyk et al., 1998). This area may offer further avenues of research if the multidimensional operationalization's of both constructs are compared with those of sensation seeking, mental toughness and an alternative decision-making (risk perception) scale (see risk attitudes scales, Rohrmann, 2005).

²⁸ Cluster analysis allows the division of variables into distinct groups. The objective is simply to divide variables into homogeneous and divergent groups. This is achieved by identifying redundant questions and improving the quality of the final measure (Mooi and Sarstedt, 2011).

²⁹ Q-Technique method is a research methodology used in psychology to study people's "subjectivity"

Alternatively, inclusion of more meaningful risk scenarios, where level or perception of risk (risk assessment) applied to a range of scenarios support perception of risk. Likert scales can assess level of hazard (how hazardous and how likely it is to happen). Level of risk is an area that could prove to be fruitful in helping establish a more meaningful attribution of risk. The current research leaves room to examine also risk attribution, by including perceived level of responsibility, level of caution, aversion and or risk promotion. Conceivably, rationalization of any given problem or risky decision appears to fluctuate dependent on the level of mental toughness and the level of belief in the paranormal. There is also potential for including conspiratorial beliefs alongside the MMUpbs within the confines of a new study, which explores the increase in belief (resistance to change) when faced by an opposing view. Further investigation, would allow exploration of the multidimensional nature of paranormal beliefs, whilst advancing and assessing the newly constructed MMUpbs.

Appositely, developments within the field of parapsychology have certainly been influential during the writing of this doctoral thesis. Research exploring consciousness (Lansky, 2011; Nelson, 1998), quantum (reality) mechanics (Nelson et al., 1996, Nelson et al., 1996; Radin, 2002, 2006), Synchronistic Archetypal Resonance (SAR) (Mishlove and Engen, 2005) and Synchronicity (Storm, 2008) raised further paranormal research questions, and expanded possible explanations for paranormal phenomena. Certainly, myriad interesting questions remain unanswered, suggesting that current paranormal research needs to encompass paradigms alongside brain function, perception of meaning, and elements of numinosity; vague impression of forces at work that appear larger than one's conscious self (Mishlove and Engen, 2005; Radin, 2006). Previous paranormal supposition for example, a theory of 'morphic resonance' where members of the same species, appear to be "on the same wavelength," appear to tap into shared information (Sheldrake, 1988) may also help shape future expositions.

Specifically, exploration of consciousness relating directly to specific localization of function and one's belief in the paranormal may merit further consideration. Such complex neuronal pathways and function localization, especially those areas that process beliefs, may help to serve specific function and assist in explaining consciousness and its development (Tarlaci and Pregolato, 2016). Research exploring Functional Near Infrared

(fNIR) optical imaging³⁰ brain activity may provide future paranormal research possibilities (Persinger, 2001; Persinger and Valliant, 1985). Other important examples transcend specific neurobiology of ESP (Watt and Irwin, 2010) while explore quantum psychiatry of thought insertion and delusion (Globus, 2012; Radin, 2006). In this context, such areas offer important/potential for new research within the context of not just assessing belief, but developing the ever-expanding narrative surrounding paranormal belief exploration.

9.2. Potential weaknesses/limitations

Limitations and potential weaknesses of the current research acknowledge areas for further refinement and consolidation. One limitation involves consideration of item development with regard to the general/individual nature of paranormal beliefs. Firstly, to advance subsequent new items/measures a greater understanding of the nature of belief generation and paranormal belief types is required. Secondly, measurement of the types of beliefs, change because of the types of experience, which need inclusion and interpretation into existing measures to both expand and advance new items/scales. Nevertheless, there is some scope for additional areas (e.g., voodoo, demonology, witchcraft/Wicca and extra-terrestrial) to enhance and develop current measures. Furthermore, greater consideration of phenomenology, especially the personal/experiential is required for item development improvement. Thus, item development and possible enhancements is still required to broader factors and measures of paranormal belief. Such development of new items may come from experiential information gathered from interviews and experiential material. Thus, in this context, mixed methods should both extend the types of encounter and experience, whilst assisting with refinement of the older and newer paranormal measures.

There does however, seem to be some debate (Jinks, 2012; Irwin, 2012) regarding the limitations with regard to the types of believers vs. disbelievers (sheep vs. goats) following the completion and interpretation of such questionnaires (see Thalbourne and Storm, 2012). The questionnaire traditionally asks participants to decide (using a seven point Likert scale) their preference for a varied selection of items, producing a general set of statistics regarding the nature of beliefs for that sample/population.

³⁰ fNIR: Infrared technique (optical imaging) in a non-invasive way to measure haemodynamic changes (i.e., blood oxygenation and volume) that occur during cognitive tasks (Villringer and Dirnagl, 1997).

Conversely, there is scope to clarify, the choices/selections in terms of type of respondent, where certain subscales can be isolated in order to determine the specific types of believers. Furthermore, the validity of the current measure needs additional refinement and assessment. Assuming that the measure remains equivalent, new and existing items therefore will need analysing over a longer period. To this end, all phases of the current research thesis have established satisfactory reliability of the MMUpbs while making available a more comprehensive set of items. The attributes of the individual facets need further evaluation. For example, research that explored alien beliefs conducted by Dagnall et al. (2010) has already established a mechanism whereby individual aspects/facets have extended the current extra-terrestrial items to provide a grounded and suitable framework for expanding the breadth of the general paranormal measure.

The current research has also extended the breadth of subscales, expanding current paranormal belief facets/items. The results of these explorations help establish potential real world implications (e.g., risk perception and decision-making) that may account for some of the variance within paranormal belief endorsement. However, they only consider one measure (MTQ48) exploring real world correlates; however, further measures of this type (e.g., anxiety or risk) are required to explore further the nature of paranormal beliefs.

This may have implications regarding subsequent conclusions drawn about belief within individual factors. For example, interpretation of specific item dimensionality (Tobacyk, 1991) from an individual facet specifically level of superstition informs improvements within assessment precision. The current MMUpbs measure while requiring further longitudinal valuation does establish a more complete set of functional, separate subscales of paranormal belief. These subscales require additional assessment as standalone factors are an area for future research and development. However, this remains a work in process, to produce a bi-factor measure, which functions at both a global and factorial level. Thus, further research needs to explore this.

9.3. Concluding comments

The MMUpbs considers a range of paranormal measures in order to assess what the paranormal is. Subsequent development of the MMUpbs promises to provide a fuller understanding of the cognitive processes that underlie belief in the paranormal. To date MMUpbs evaluation has reaffirmed existing items, and generated new items in line with

previous scales (ASGS and RPBS). Although, the scale requires further refinement and modification both at the conceptual and item levels.

This thesis makes an important original contribution to the understanding and development of paranormal belief measurement. Principally, the thesis considers across a range of paranormal measures what core/common elements of paranormal belief are

- produced a composite measure which assesses both overall belief in the paranormal and the individual facets
- provided a full subscale measures of the individual facets and extended factors that are previously under developed (astrology, haunting and extra-terrestrial belief)
- examined scale functioning in terms of negatively worded items
- explored the interaction between real world performance and belief in the paranormal

Firstly, following construction of the amalgamated measure (see subsection 4.2.1. Introduction and background to phase I p97) extraction identified 8 common paranormal belief factors. This contained item clusters measuring belief in, hauntings, belief in extra-terrestrials, superstition, and religious belief, extra-sensory perception (ESP), psychokinesis (PK), astrology and witchcraft. This revealed core elements of paranormal belief as defined by existing measures. These could help to further content of subsequent measures. Secondly, current paranormal belief scale is a composite measure, which assesses both overall belief and important individual facets (e.g., Ghost/Hauntings) where each facet explores one dimension of paranormal belief. Further assessment measured validity and reliability of the MMUpbs in a real world context. The amalgamation of both established scales/questionnaires investigated formation and maintenance of paranormal beliefs whilst offering potential to extend the current paranormal design.

Several important developments for future research are worthy of note. Wiseman and Watt (2006), contend that a new measure of paranormal belief would establish a more detailed understanding of the diversity and nature of paranormal beliefs, where the core/common elements of paranormal belief are extended and refined. Also, consideration of the quasi nature of beliefs and assess individual factors by introducing primary and secondary items could be explored (Jinks, 2012a). According to Jinks (2012a), quasi belief is semi-propositional in nature and represents the world in a more superficial way, while holding a belief that is true *prior* to any truth evaluation (Recanati, 1997). This serves two

purposes, it allows examination of item context, and it assists in explaining the function and meaning of the items. Moreover, it may assist in the production/selection of individual items that may be used (as per MORI polls) to assess belief in the existence of the paranormal. Moreover, a question of factorial design may need further exposition because there is need to understand specific differences between a believer's explicit beliefs, those publicly held, against those implicit beliefs privately held³¹.

Houran and Lange (2000) imply that respondents might also generate answers to questions while simultaneously holding opposing and secret beliefs from ones they are attempting to present (Irwin, 2014; Jinks, 2012b). Furthermore, the concept of good primary or good secondary items is still open to debate and requires further research (Jinks, 2012b). This notion is extended from holding simultaneous and contradictory beliefs; which relates to self-deception (Gur and Sackeim, 1979; Risen, 2016) on the one hand i.e., unaware of the potential for contradictory belief and those who hold differing views/beliefs at the same time (Irwin et al., 2014; Risen, 2016). The idea for two frames of reference does require further consideration. For example, decoupling detection and correction; where a dual process model or corrective model (Risen, 2016) supposes that people can and do detect error, but choose not to correct for it (Risen, 2016) seems to apply in this case. In addition, belief inconsistency may further explain positional beliefs where a system (1) generates intuitive answers and is either corrected or not, by another system (2) (see Kahneman and Frederick, 2002, 2005). In this context, this may be useful in further explaining paranormal belief endorsement, because current theory suggests that both paranormal and supernatural beliefs exists where people clearly disbelieve one thing whilst endorsing another (for example, belief in god, and scepticism about the devil) (Norenzayan and Gervais, 2013). Similarly, just like superstitious beliefs, paranormal and supernatural beliefs are formed and maintained, becoming upheld and stabilised even though they are not true (Lindeman and Svedholm, 2012; Svedholm and Lindeman, 2013).

In order to address further belief endorsement, item polarity and response format (for example, yes/no answering), together with the advantages and disadvantages of a yes/no measure experienced against a five point/seven point Likert scale requires further examination. Hasson and Arnetz, (2005) found that in some cases a uniform construct

³¹ This could be thought of as 'double think' (see Irwin et al., 2014)

(single visual analogue scale; VAS) can replace a single Likert item and whilst deemed to be comparable, are not interchangeable with multi-item Likert indices. They found that there was moderate to strong correlations in responses between VAS and Likert based items. Generally, Likert scales (compared to VAS) provide a uniform fine-grained (graduated) data collection method (Vickers, 1999). It also takes less time to explain the nature of results to respondents (Vickers, 1999; Jaeschke et al., 1990). The use of Likert scales suggests ease of administration, whilst allowing for accessible interpretation. Although, wording within Likert scale descriptive categories may affect the item response, such scales offer more responsiveness than VAS (Vickers, 1999). Difficulties may appear in the selection from the number of or types of items offered, whereas too few may not provide enough choice or sensitivity, forcing participants to select an answer that does not represent their true belief (Hasson and Arnetz, 2005; Ajzen, 2005). However, Likert scales are used effectively alongside IMR (internet mediated research) where recruitment of large numbers of respondents is utilised, while maintaining an immediate and manageable database that enables connection and communication within real time online platforms (Kamel Boulos and Wheeler, 2007).

The responses are quantifiable and easily analysed. Since it does not require the participant to provide a simple and concrete yes or no answer, it does not force the participant to take a stand on a particular topic, but allows them to respond in a degree of agreement; this makes question answering easier on the respondent (Jaeschke et al., 1990). In addition, the responses presented accommodate neutral or undecided feelings of participants. Likert scale is uni-dimensional and only gives 5-7 options of choice. Therefore, it may fail to measure the true attitudes of some respondents (Hasson and Arnetz, 2005; Ajzen, 2005) because of the items unidimensional nature. Using Likert type scales may also be the result of various combinations of ratings that may lead to a loss of scale item information (Bowling, 1998) and may lead to incorrect conclusions from responses given to items or may influence reliability and test re test consistency (Matell and Jacoby, 1971; Svensson, 2001). Matell and Jacoby's suggestion is that three Likert scale items are enough to provide an adequate response to questions asked. In addition, it is possible that peoples' answers will be influenced by previous questions (response bias), or will heavily predispose to one response side (agree/disagree). Frequently, people avoid

choosing “extreme” options on scales, because of negative implications associated with “extremists”, even if an extreme choice would be the most accurate (LaMarca, 2011).

The current full-scale measure contains 8 individual factors (haunting/ghosts, witchcraft, astrology etc.) and whilst combined, implications for singular facets that represent a single factor need elucidation. For instance, the notion that the multiple-item measure is inherently more “reliable” than the single factor does permit calculation of inter-item correlations, establishing reliability of the full-scale measure (Peter, 1979; Rossier, 2002). However, evaluation of single item measures may be inadequate when establishing the unidimensionality of that measure. Furthermore, multiple-item measures are analysed appropriately by means of exploratory factor analysis (EFA) and/or confirmatory factor analysis (CFA) (Cortina, 1993). Additionally they may require examination through coefficient beta (Revelle, 1979) in order to establish adequate reliability and internal consistency (see Hinkin, 1998) needed for improved scale/facet development.

Conversely, single-item scales deemed equally predictive and valid, as multiple-item scales, are sufficiently reliable to replace that measure (See Cronbach, 1961; Bergkvist and Rossiter, 2007; Smith et al., 2000). In this context, further examination of the item structure is required to explore sufficiently singular item potential (global paranormal items) and benefits of shorter subscales of any new measure. Current research contemplates some additional elements in terms of item function, item construction and categories that may need to be further expanded and considered. The process of item development and questionnaire reappraisal has informed the current thesis and established measures (RPBS and ASGS) have proven to be robust and exemplars for paranormal belief measurement. Likewise, items used to assess beliefs derived from item response theory (IRT) where a single item measure can perform almost as well as an original set of items, unless the latter is multidimensional, in which case an item for each dimension might be better. In this way, the MMUpbs extended dimensionality of the complete measure, and individual facets to explain further the nature of paranormality.

Future research should aim to refine scale items, thus producing a concise and easy to administer paranormal belief measure, whilst determining whether factors within the revised measure are associated with levels of perception. For example, ways in which perception differs between a range of believer, in terms of what factors influence

perception should extend the research in relation to paranormal belief generation and maintenance. Current findings propose that there is a relationship with cognitive-personality correlates (e.g., schizotypy, delusional ideation); nevertheless, the MMUpbs full measure should be assessed in conjunction with perceptual measures (e.g., bender gestalt test or visual inattention test).

Construction of MMUpbs whilst promising requires further enhancement of the items/factors. It has delivered an apposite starting point for the investigating clarity of individual factors. Preliminary testing indicates the MMUpbs is psychometrically sound, possesses excellent reliability and validity, although there need care prior to full implementation. Particularly, further item development and analysis is required to ensure that all subscales contain a suitable range of items. Currently, items assessing superstition, astrology, witchcraft and precognition appear relatively under developed in comparison to ghosts and ET (see Table 2. p.115).

However, it does provide an enhanced utility because this new measure should prove useful to researchers interested in global paranormal beliefs, as well as those interested in individual facets. It should also be of interest to general readers and nonprofessionals who wish to investigate both paranormal belief (within the current scale) using an established and robust measure (Tobacyk, 2004). The current doctoral thesis established extant measures, identified improvements, and enhanced self-report measurement of belief in the paranormal. Particularly, it has...

1. Indicated an overall improved factorial structure, which added additional dimensions to increase construct breadth (e.g., haunting, astrology, aliens).
2. provided sufficient breadth to measure individual dimensions (e.g., witchcraft),
3. improved subscales by addition of new items to make them more reliable
4. considered and refined item clarity
5. examined balance of response bias vs. the consequences of item reversal

Thirdly, the current measure considers functioning in terms of negatively phrased items. For example, response bias appears as a major concern for scale developers because it can seriously compromise the validity of self-report scales (van Sonderen et al., 2013). Consequently, current research points towards a more balanced approach of both positively worded/reversed items and measures (Baumgartner and Steenkamp, 2001). Price and Mueller, (1986) argue that reverse-scored items can reduce response set bias. Conversely,

Harrison and McLaughlin, (1991) recommend that the psychometric properties of a measure may cause damaging affects to the results if reversed items are randomly placed within it. For respondents to have the best chance of interpreting measure/items careful consideration of specific wording/placement needs thought (Hinkin, 1998). Consequently, experimenters should closely examine factor loadings and communalities during factor analysis (Harrison and McLaughlin, 1991; Schriesheim et al., 1989).

Additionally, classification of beliefs and anomalous events need further demarcation. Irwin et al. (2014) postulate that there is still incongruity between paranormal explanations and interpretations classed as more pseudoscientific. Importantly, Irwin et al. (2014) also hypothesises that percipients may interpret their anomalous experiences in non-paranormal terms, which may encourage a more conservative paranormal attribution (Irwin et al., 2014). The current findings concur with previous findings (Blackmore, 1997; Ross and Joshi, 1992; Dagnall et al., 2010a) regarding the nature (paranormal phenomena exist outside of conventional norms; Irwin, 2009), and number (40-50% of the population having had one or more paranormal experience, believe in the existence of paranormal phenomenon) of paranormal believers. Importantly, development of the scale has increased both breadth and complexity of individual factors.

Relatedly, future research as part of an ongoing review process should continue to evaluate the appropriateness of items and subscales. To inform this process, researchers should accommodate more interpretive/experiential data (subjective experience) to improve scale currency and facilitate growth of factors and items. Further research should develop enriched item breadth and facilitate functioning of discrete standalone paranormal belief subscales.

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Appendix

Appendix A. Questionnaires

Phase I Booklet

Anomalous Experiences/Belief Questionnaire

INFORMATION FOR PARTICIPANTS

You are invited to participate in phase I of a PhD research project being conducted by myself (Mr Ken Drinkwater). The project aims to examine anomalous experience, paranormal belief, conspiracy belief, and the relationship with anomalous beliefs.

Your participation in this survey therefore would be much valued, regardless of the nature of your personal views.

Participants are asked to complete a survey comprising four sections/questionnaires, plus a few basic questions about their demographic background. Based on responses to these items we will be able to explore the links between paranormal belief, reality testing and reasoning.

You must be 18 years of age or older to participate in this project and your participation is entirely voluntary. You can choose not to participate at any time.

Please answer all questions frankly and honestly. The integrity of our research depends upon your truthful responses. Your anonymity in this study is guaranteed and your responses cannot be traced back to you in any way.

In the unlikely event that this research raises any personal or upsetting issues for you, you would be strongly encouraged to visit a counsellor at your local Community Health Centre. Contact details for these services can be located in your local telephone directory.

The results of this study may later be published in an academic journal. De-identified data collected will be stored online in a password-protected site accessible only to the researchers and will be destroyed 5 years later.

The results of the study can be obtained by contacting me (K.Drinkwater@mmu.ac.uk) after 1st July 2009.

Anomalous Experiences/Belief Questionnaire

This is a new study and you will **not** have completed this questionnaire previously.

The following questionnaire is divided into 4 sections:

1. Experiences
2. Belief
3. Conspiracist Belief/Urban Legends
4. Anomalous Beliefs

There is no time limit for completing this questionnaire so please feel free to take your time when considering your answers. Usually, the questionnaire takes between 15-20 minutes to complete.

The answers you provide will remain confidential. Your scores will be allocated a participant number when the data/results are compiled. All information disclosed in the questionnaires will be kept confidential and will be stored securely.

At any time during the study, you have the right to withdraw the entirety of your data.

Your time and assistance is much appreciated.

This study is being conducted in accordance with BPS Ethical Guidelines.

The present study is simply looking at the relationship between various beliefs and paranormal experiences.

Many thanks.

Should you have any further questions please do not hesitate to contact me:

Mr Ken Drinkwater
[\(K.Drinkwater@mmu.ac.uk\)](mailto:K.Drinkwater@mmu.ac.uk)

Consent

I understand the purposes and procedure involved in this study and I am willing to participate in it:

YES NO

Personal Information

Age: _____

Gender: _____

Are you currently a student? YES NO

a. If yes, year of study: _____

b. Course: _____

If not a student

Occupation: _____

(NB: In order to identify your data (should you wish to withdraw from this study) please provide a unique identifier in the box below, otherwise please leave this blank)

Section 1: Experiences

Q.1. Do you believe that you have had a genuine paranormal experience?

Yes / No

Q.2. If YES, indicate below what sort of event was it.

(Please see list below and indicate on the scale provided whether you have experienced any of the listed events).

a) Extra-sensory Perception (ESP) (e.g., telepathy, foretell a future event/premonition, remote viewing)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

b) Psychokinesis (e.g., move objects by thought, effect chance events)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

c) Witchcraft (e.g. spells and curses)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

d) Out of Body Experience/Near Death Experience

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

e) Haunting

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

f) Contact/Communication with the dead

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

g) UFO visitation

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

h) UFO sighting

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

i) Astrological predication (e.g., Fortune tellers, tarot cards readings, tea leaf readings, palmistry)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

j) Other (please specify)

Yes / No

Please indicate type of event:

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

Q.3. Do you believe in the paranormal because of your experience/s?

Definitely Not	Probably Not	Unsure	Probably	Definitely
1	2	3	4	5

Section 2: Belief

Please indicate your level of agreement with the statements by circling the appropriate number below:

1) Ghosts do not exist

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

2) I have avoided walking under a ladder because it is associated with bad luck

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

3) I believe in God

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

4) It is possible for people to know about the outcome of an event before it happens

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

5) Humans are not able to exert influence upon the physical world simply through conscious or unconscious intention (psychokinesis)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

6) Card reading (e.g., tarot cards) can tell a lot about a person and their future

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

7) Beliefs about witches' spells and magical powers are based upon hearsay and superstition

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

8) Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has approached the surface of the Earth

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

9) Spirits of the dead can be seen by the living

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

10) If you break a mirror, you will have bad luck

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

11) There is a heaven and a hell

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

12) When dreams seem to foretell the future, it is just a coincidence

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

13) People are able to bend metal objects simply by thinking about it (psychokinesis)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

14) Astrological predictions, which come true, are merely the result of coincidence

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

15) Witches/warlocks cannot perform genuine acts of magic

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

16) Extra-terrestrials have visited earth throughout history

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

17) Some places are haunted by the souls of people now dead

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

18) The number "13" is unlucky

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

19) There is a devil

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

20) Some people have visions of the future, which come true

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

21) The mind can be used to control the outcome of a random process (e.g., dice rolling or coin tossing)

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

22) Some people can actually predict the future by looking at the lines on the palm of your hand

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

23) Witches/warlocks can actually curse/cast spells

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

24) Alien intelligence is responsible for some UFO sightings

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

25) It is not possible to communicate with the spirit world

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

26) I do say 'touch wood' or actually touch wood to promote good luck

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

27) There is supportive evidence for the existence of life after death

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

28) Telepathy (mental communication) between two people is not possible

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

29) The powers of the mind can not be used to cure people

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

30) A person's future has nothing to do with their zodiac sign

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

31) People who believe in magical/ritual ceremonies are wasting their time

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

32) Aliens have not implanted objects into people

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

33) Contrary to scientific belief, some people can make contact with the dead

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

34) I do say 'fingers crossed' or actually cross my fingers to promote good luck

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

35) There is no such thing as an afterlife

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

36) Extra-sensory perception (ESP) does not exist

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

37) It is not possible to psychically project images onto photographic film

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

38) It is not possible for planetary forces to control personality traits

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

- 39) Witches/warlocks, who can perform genuine acts of magic, exist outside the realm of imagination**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 40) Alien spaceships have not crash-landed on earth**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 41) People have genuinely seen "ghosts" or "apparitions"**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 42) Luck is nothing more than random chance**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 43) The soul continues to exist after the death of the body**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 44) People have feelings/hunches that come true and are not just coincidences**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 45) A person's thoughts can influence the movement of a physical object**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 46) Contrary to scientific opinion, there is some validity in fortune telling**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 47) There are actual cases of witchcraft**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 48) Alien crafts regularly visit earth**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 49) Poltergeists exist**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 50) It is a mistake to base any decisions on how lucky you feel**
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

51) We will never be reunited with deceased friends and relatives

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

52) Extra-sensory perception (ESP) is a gift that many people possess and should not be confused with tricks used by illusionists/magicians

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

53) I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

54) Astrology cannot be used to accurately predict the future

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

55) Black magic really exists and should be dealt with in a serious manner

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

56) People have been taken on board alien spaceships

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

57) Ghosts/poltergeists can cause objects to move, appear (materialise) or disappear (dematerialise)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

58) I do not believe that luck exists

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

59) Earthly existence (life) is the only existence we have

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

60) People have premonitions about the future that come true and are not just coincidences

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

61) In spite of the laws of science, some people can use psychic powers to levitate objects

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

62) Horoscopes prepared by qualified experts can accurately predict the future

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

63) Through the use of mysterious formulas and incantations it is possible to cast spells.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
-------------------	--	--	----------------------------	--	--	----------------

Disagree				nor Disagree			Agree
1	2	3	4	5	6	7	
64) Aliens are abducting human beings							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

Section 3: Conspiracist Beliefs

A conspiracy theory has been defined as: ‘an alternate explanation for an historical or current event, when there is no definitive explanation or the official explanation is considered to be inadequate or deficient in some manner’.

Please indicate your level of agreement with the statements by circling the appropriate number below:

1) Conspiracy theories accurately depict real life events							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

2) The information contained within conspiracy theories is generally true							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

3) When I hear conspiracy theories I feel that they are untrue							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

4) Conspiracy theories have been shown to contain information, which has proved to be false							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

5) I have heard several conspiracy theories, which I believe to be true							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

Urban Legends

Urban Legends or ‘Urban Myths’ are defined as ‘enduring, folk narratives that have reached a wide audience, usually by word of mouth or via email’.

Please indicate your level of agreement with the statements by circling the appropriate number below:

1) Information contained within Urban Legends has generally proved to be false.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

2) Urban Legends are tales that depict 'real life' events.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

3) The information contained within Urban Legends is generally true.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

4) Urban Legends are nothing more than rumours or hearsay.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

5) I have heard several stories (Urban Legends), which I believe to be true.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

6) When I hear stories (Urban Legends) I feel that they are untrue.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

Section 4: Anomalous Belief

Section A

Please read each of the statements below and indicate whether you believe it to be true, do not know (?) or false. Please circle your response clearly:

True	<input checked="" type="radio"/>	False
	(Do not know)	

1. I believe in the existence of ESP.

True ? False
(Do not know)

2. I believe I have had personal experience of ESP.

True ? False
(Do not know)

3. I believe I am psychic.

True ? False
(Do not know)

4. I believe that it is possible to gain information about the future before it happens, in ways that do not depend on rational prediction or normal sensory channels.

True ? False
(Do not know)

5. I have had at least one hunch that turned out to be correct and which (I believe) was not just a coincidence.

True ? False
(Do not know)

6. I have had at least one premonition about the future that came true and which (I believe) was not just a coincidence.

True ? False
(Do not know)

7. I have had at least one dream that came true and which (I believe) was not just a coincidence.

True ? False
(Do not know)

8. I have had at least one vision that was not an hallucination and from which I received information that I could not have otherwise gained at the time and place.

True ? False
(Do not know)

9. I believe in life after death.

True ? False
(Do not know)

10. I believe that some people can contact spirits of the dead.

True ? False
(Do not know)

11. I believe that it is possible to gain information about the thoughts, feelings or circumstances of another person, in a way that does not depend on rational prediction or normal sensory channels.

True ? False
(Do not know)

12. I believe that it is possible to send a “mental message” to another person, or influence them at a distance, by means other than normal channels.

True ? False
(Do not know)

13. I have had at least one experience of telepathy between myself and another person.

True ? False
(Do not know)

14. I believe in the existence of psychokinesis (or “PK”), that is, the direct influence of mind on a physical system, without the mediation of any known physical energy.

True ? False
(Do not know)

15. I believe I have personally exerted PK on at least one occasion.

True ? False
(Do not know)

16. I believe I have marked psychokinetic ability.

True ? False
(Do not know)

17. I believe that, on at least one occasion, an inexplicable (but nonrecurring) psychical event of an apparently psychokinetic origin has occurred in my presence.

True ? False
(Do not know)

18. I believe that persistent inexplicable physical disturbances, of an apparently psychokinetic origin, have occurred in my presence at some time in the past, e.g., a poltergeist.

True ? False
(Do not know)

Section B

Please indicate your level of agreement with the statements by circling the appropriate number:

1) The soul continues to exist though the body may die

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

2) Some individuals are able to levitate (lift) objects through mental forces.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

3) Black magic really exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

4) Black cats can bring bad luck.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

5) Your mind or soul can leave your body and travel (astral projection).

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

6) The abominable snowman of Tibet exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

7) Astrology is a way to accurately predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

8) There is a devil.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

9) Psychokinesis, the movement of objects through psychic powers, does exist.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

10) Witches do exist.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

11) If you break a mirror, you will have bad luck.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

12) During altered states, such as sleep or trances, the spirit can leave the body.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

13) The Loch Ness monster of Scotland exists.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

14) The horoscope accurately tells a person's future.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

15) I believe in God.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

16) A person's thoughts can influence the movement of a physical object.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

17) Through the use of formulas and incantations, it is possible to cast spells on persons.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

18) The number "13" is unlucky.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

19) Reincarnation does occur.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

20) There is life on other planets.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

21) Some psychics can accurately predict the future.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

22) There is a heaven and hell.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

23) Mind reading is not possible.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

24) There are actual cases of witchcraft.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

25) It is possible to communicate with the dead.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

26) Some people have an unexplained ability to predict the future.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

Please check that you have completed all the questions and that your responses are clear.

If you have any experiences of the paranormal and you wish to tell us about them, then please feel free to leave a contact email address so that we can get back in touch and arrange a short interview.

Leave your email/contact details in the space provided below:

Many thanks for taking time to complete this questionnaire.

Belief in the Paranormal Questionnaire – Phase II

INFORMATION FOR PARTICIPANTS

You are invited to participate in phase II of a PhD research project being conducted by myself (Mr Ken Drinkwater). The project aims to examine paranormal belief and the relationship with three global measures/statements. Your participation in this survey therefore would be much valued, regardless of the nature of your personal views.

Participants are asked to complete a survey comprising three sections/questionnaires, plus a few basic questions about their demographic background. Based on responses to these items we will be able to explore the links between paranormal belief and global measures/statements accordingly.

You must be 18 years of age or older to participate in this project and your participation is entirely voluntary. You can choose not to participate at any time.

Please answer all questions frankly and honestly. The integrity of our research depends upon your truthful responses. Your anonymity in this study is guaranteed and your responses cannot be traced back to you in any way.

In the unlikely event that this research raises any personal or upsetting issues for you, you would be strongly encouraged to visit a counsellor at your local Community Health Centre. Contact details for these services can be located in your local telephone directory.

The results of this study may later be published in an academic journal. De-identified data collected will be stored online in a password-protected site accessible only to the researchers and will be destroyed 5 years later. The results of the study can be obtained by contacting me (K.Drinkwater@mmu.ac.uk) after 1st July 2013.

This is phase II of a PhD project and you will not have completed this questionnaire previously.

The questionnaire is divided into **three** sections (including participant information):

Basic demographic participant information

1. MMU-N Paranormal Beliefs (50-items)
2. RPBS (26-items) and ASGS (18-items)
3. Global measures/statements of paranormal belief (3-items)

There is no time limit for completing this questionnaire so please feel free to take your time when considering your answers. Usually, the questionnaire takes between 10 and 15 minutes to complete.

The answers you provide will remain confidential. Your scores will be allocated a participant number when the data/results are compiled. All information disclosed in the questionnaires will be kept confidential and will be stored securely.

At any time during the study, you have the right to withdraw the entirety of your data.

This study is being conducted in accordance with BPS Ethical Guidelines.
Completion of this survey signifies that you have consented to participate in the study.

Thank you very much for your time and contribution to this research project.
Your time and assistance is much appreciated.

Should you have any further questions please do not hesitate to contact me using the email address provided.

Mr Ken Drinkwater
[\(K.Drinkwater@mmu.ac.uk\)](mailto:K.Drinkwater@mmu.ac.uk)

Personal Information

Age: _____

Gender: _____

Are you currently a student?

YES / NO (Circle as appropriate)

a. If yes, year of study: _____

b. Course: _____

If not a student

Occupation: _____

I understand the purposes and procedure involved in this study and I am willing to participate in it:

YES / NO (Circle as appropriate)

(NB: In order to identify your data (should you wish to withdraw from this study) please provide a unique identifier in the box below, otherwise please leave this blank)

Section 1

MMUpbs

The following pages contain information about anomalous beliefs.

Please indicate your level of agreement with the statements by circling the appropriate number below:

1) Ghosts do not exist

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

2) I have avoided walking under a ladder because it is associated with bad luck

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

3) I believe in God

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

4) It is possible for people to know about the outcome of an event before it happens

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

5) Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has approached the surface of the Earth

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

6) Spirits of the dead can be seen by the living

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

7) If you break a mirror, you will have bad luck

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

8) There is a heaven and a hell

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

9) When dreams seem to foretell the future, it is just a coincidence

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

10) People are able to bend metal objects simply by thinking about it (psychokinesis)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

11) Astrological predictions, which come true, are merely the result of coincidence

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

12) Extra-terrestrials have visited earth throughout history

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

13) Some places are haunted by the souls of people now dead

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

14) The number "13" is unlucky

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

15) There is a devil

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

16) Some people have visions of the future, which come true

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

17) The mind can be used to control the outcome of a random process (e.g., dice rolling or coin tossing)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

18) Witches/warlocks can actually curse/cast spells

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

19) Alien intelligence is responsible for some UFO sightings

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

20) It is not possible to communicate with the spirit world

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

21) I do say 'touch wood' or actually touch wood to promote good luck							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
22) Telepathy (mental communication) between two people is <u>not</u> possible							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
23) A person's future has nothing to do with their zodiac sign							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
24) Contrary to scientific belief, some people can make contact with the dead							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
25) I do say 'fingers crossed' or actually cross my fingers to promote good luck							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
26) There is <u>no</u> such thing as an afterlife							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
27) It is <u>not</u> possible for planetary forces to control personality traits							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
28) Witches/warlocks, who can perform genuine acts of magic, exist outside the realm of imagination							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
29) Alien spaceships have <u>not</u> crash-landed on earth							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
30) People have genuinely seen "ghosts" or "apparitions"							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	
31) The soul continues to exist after the death of the body							
Strongly Disagree			Neither Agree nor Disagree			Strongly Agree	
1	2	3	4	5	6	7	

32) People have feelings/hunches that come true and are not just coincidences

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

33) A person's thoughts can influence the movement of a physical object

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

34) There are actual cases of witchcraft

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

35) Alien crafts regularly visit earth

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

36) Poltergeists exist

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

37) We will never be reunited with deceased friends and relatives

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

38) I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

39) Astrology cannot be used to accurately predict the future

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

40) Black magic really exists and should be dealt with in a serious manner

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

41) People have been taken on board alien spaceships

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

42) Ghosts/poltergeists can cause objects to move, appear (materialise) or disappear (dematerialise)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

43) Earthly existence (life) is the only existence we have

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

44) In spite of the laws of science, some people can use psychic powers to levitate objects

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

45) Horoscopes prepared by qualified experts can accurately predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

46) Through the use of mysterious formulas and incantations it is possible to cast spells.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

47) Aliens are abducting human beings.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

48) Aliens (Extra-terrestrial life forms) have implanted objects into people.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

49) Mental communication between two people is possible.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

50) Fortune telling can accurately predict your future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

Section 2

Paranormal Belief – RPBS

Please indicate your level of agreement with the statements by circling the appropriate number:

1) The soul continues to exist though the body may die

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

2) Some individuals are able to levitate (lift) objects through mental forces.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

3) Black magic really exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

4) Black cats can bring bad luck.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

5) Your mind or soul can leave your body and travel (astral projection).

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

6) The abominable snowman of Tibet exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

7) Astrology is a way to accurately predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

8) There is a devil.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

9) Psychokinesis, the movement of objects through psychic powers, does exist.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

10) Witches do exist.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

11) If you break a mirror, you will have bad luck.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

12) During altered states, such as sleep or trances, the spirit can leave the body.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

13) The Loch Ness monster of Scotland exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

14) The horoscope accurately tells a person's future.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

15) I believe in God.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

16) A person's thoughts can influence the movement of a physical object.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

17) Through the use of formulas and incantations, it is possible to cast spells on persons.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

18) The number "13" is unlucky.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

19) Reincarnation does occur.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

20) There is life on other planets.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

21) Some psychics can accurately predict the future.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

22) There is a heaven and hell.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

23) Mind reading is not possible.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

24) There are actual cases of witchcraft.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

25) It is possible to communicate with the dead.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

26) Some people have an unexplained ability to predict the future.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

ASGS

Please read each of the statements below and indicate whether you believe it to be true, do not know (?) or false. Please circle your response clearly:

True	<input checked="" type="radio"/>	False
(Do not know)		

1. I believe in the existence of ESP.

True ? False
(Do not know)

2. I believe I have had personal experience of ESP.

True ? False
(Do not know)

3. I believe I am psychic.

True ? False
(Do not know)

4. I believe that it is possible to gain information about the future before it happens, in ways that do not depend on rational prediction or normal sensory channels.

True ? False
(Do not know)

5. I have had at least one hunch that turned out to be correct and which (I believe) was not just a coincidence.

True ? False
(Do not know)

6. I have had at least one premonition about the future that came true and which (I believe) was not just a coincidence.

True ? False
(Do not know)

7. I have had at least one dream that came true and which (I believe) was not just a coincidence.

True ? False
(Do not know)

8. I have had at least one vision that was not an hallucination and from which I received information that I could not have otherwise gained at the time and place.

True ? False
(Do not know)

9. I believe in life after death.

True ? False
(Do not know)

10. I believe that some people can contact spirits of the dead.

True ? False
(Do not know)

11. I believe that it is possible to gain information about the thoughts, feelings or circumstances of another person, in a way that does not depend on rational prediction or normal sensory channels.

True ? False
(Do not know)

12. I believe that it is possible to send a “mental message” to another person, or influence them at a distance, by means other than normal channels.

True ? False
(Do not know)

13. I have had at least one experience of telepathy between myself and another person.

True ? False
(Do not know)

14. I believe in the existence of psychokinesis (or “PK”), that is, the direct influence of mind on a physical system, without the mediation of any known physical energy.

True ? False
(Do not know)

15. I believe I have personally exerted PK on at least one occasion.

True ? False
(Do not know)

16. I believe I have marked psychokinetic ability.

True ? False
(Do not know)

17. I believe that, on at least one occasion, an inexplicable (but nonrecurring) psychical event of an apparently psychokinetic origin has occurred in my presence.

True ? False
(Do not know)

18. I believe that persistent inexplicable physical disturbances, of an apparently psychokinetic origin, have occurred in my presence at some time in the past, e.g., a poltergeist.

True ? False
(Do not know)

Section 3

Global Questions of Paranormal belief.

Please indicate your level of agreement with the statements by circling the appropriate number below:

1. ‘The term paranormal refers to hypothesized processes that in principle are “physically impossible” or outside the realm of human capabilities as presently conceived by conventional scientists (Thalbourne, 1982)’.

Strongly Strongly Disagree			Neither Agree nor Disagree			
Agree						
1	2	3	4	5	6	7

2. ‘I believe in the existence of paranormal phenomena’.

Strongly Strongly Disagree			Neither Agree nor Disagree			
Agree						
1	2	3	4	5	6	7

3. ‘As the concept is popularly used, a paranormal belief is defined on a working basis as a proposition that has not been empirically attested to the satisfaction of the scientific establishment, but is generated within the non-scientific community and extensively endorsed by people who might normally be expected by their society to be capable of rational thought and reality testing’ (Irwin, 2009).

Strongly
Strongly
Disagree
Agree

1

2

3

4

5

6

7

Neither Agree

nor Disagree

Please check that you have completed all the questions and that your responses are clearly marked.

Thank you for taking the time to complete this final year PhD project.

Paranormal Belief, RPBS, Reality Testing and Reasoning Questionnaire

INFORMATION FOR PARTICIPANTS

You are invited to participate in phase III of a PhD research project being conducted by myself (Mr Ken Drinkwater) in collaboration with Dr Neil Dagnall. The project aims to examine paranormal belief, reality testing and the relationship with reasoning. Your participation in this survey therefore would be much valued, regardless of the nature of your personal views.

Participants are asked to complete a survey comprising four sections/questionnaires, plus a few basic questions about their demographic background. Based on responses to these items we will be able to explore the links between paranormal belief, reality testing and reasoning.

You must be 18 years of age or older to participate in this project and your participation is entirely voluntary. You can choose not to participate at any time.

Please answer all questions frankly and honestly. The integrity of our research depends upon your truthful responses. Your anonymity in this study is guaranteed and your responses cannot be traced back to you in any way.

In the unlikely event that this research raises any personal or upsetting issues for you, you would be strongly encouraged to visit a counsellor at your local Community Health Centre. Contact details for these services can be located in your local telephone directory.

The results of this study may later be published in an academic journal. De-identified data collected will be stored online in a password-protected site accessible only to the researchers and will be destroyed 5 years later. The results of the study can be obtained by contacting me (K.Drinkwater@mmu.ac.uk) after 1st November 2013.

This is phase III of a PhD project and you will not have completed this questionnaire previously.

The questionnaire is divided into four sections (including participant information):

Basic demographic participant information

1. Paranormal Beliefs
2. RPBS
3. ASGS - Belief
4. Reality Testing
5. Reasoning

There is no time limit for completing this questionnaire so please feel free to take your time when considering your answers. Usually, the questionnaire takes between 10 and 15 minutes to complete.

The answers you provide will remain confidential. Your scores will be allocated a participant number when the data/results are compiled. All information disclosed in the questionnaires will be kept confidential and will be stored securely.

At any time during the study, you have the right to withdraw the entirety of your data.

This study is being conducted in accordance with BPS Ethical Guidelines.
Completion of this survey signifies that you have consented to participate in the study.

Thank you very much for your time and contribution to this research project.
Your time and assistance is much appreciated.

Should you have any further questions please do not hesitate to contact me using the email address provided.

Mr Ken Drinkwater
[\(K.Drinkwater@mmu.ac.uk\)](mailto:K.Drinkwater@mmu.ac.uk)

Personal Information

Age: _____

Gender: _____

Are you currently a student?

YES / NO (Circle as appropriate)

a. If yes, year of study: _____

b. Course: _____

If not a student

Occupation: _____

I understand the purposes and procedure involved in this study and I am willing to participate in it:

YES / NO (Circle as appropriate)

(NB: In order to identify your data (should you wish to withdraw from this study) please provide a unique identifier in the box below, otherwise please leave this blank)

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Section 1

The following pages contain information about anomalous beliefs.

Please indicate your level of agreement with the statements by circling the appropriate number below:

1) Ghosts do not exist

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

2) I have avoided walking under a ladder because it is associated with bad luck

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

3) I believe in God

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

4) It is possible for people to know about the outcome of an event before it happens

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

5) Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has approached the surface of the Earth

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

6) Spirits of the dead can be seen by the living

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

7) If you break a mirror, you will have bad luck

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

8) There is a heaven and a hell

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

9) When dreams seem to foretell the future, it is just a coincidence

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

10) People are able to bend metal objects simply by thinking about it (psychokinesis)

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

11) Astrological predictions, which come true, are merely the result of coincidence

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

12) Extra-terrestrials have visited earth throughout history

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

13) Some places are haunted by the souls of people now dead

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

14) The number "13" is unlucky

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

15) There is a devil

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

16) Some people have visions of the future, which come true

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

17) The mind can be used to control the outcome of a random process (e.g., dice rolling or coin tossing)

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

18) Witches/warlocks can actually curse/cast spells

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

19) Alien intelligence is responsible for some UFO sightings

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

20) It is not possible to communicate with the spirit world

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

21) I do say 'touch wood' or actually touch wood to promote good luck

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

22) Telepathy (mental communication) between two people is not possible

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

23) A person's future has nothing to do with their zodiac sign

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

24) Contrary to scientific belief, some people can make contact with the dead

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

25) I do say 'fingers crossed' or actually cross my fingers to promote good luck

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

26) There is no such thing as an afterlife

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

27) It is not possible for planetary forces to control personality traits

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

28) Witches/warlocks, who can perform genuine acts of magic, exist outside the realm of imagination

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

29) Alien spaceships have not crash-landed on earth

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

30) People have genuinely seen "ghosts" or "apparitions"

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

31) The soul continues to exist after the death of the body

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

32) People have feelings/hunches that come true and are not just coincidences

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

33) A person's thoughts can influence the movement of a physical object

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

34) There are actual cases of witchcraft

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

35) Alien crafts regularly visit earth

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

36) Poltergeists exist

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

37) We will never be reunited with deceased friends and relatives

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

38) I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

39) Astrology cannot be used to accurately predict the future

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

40) Black magic really exists and should be dealt with in a serious manner

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

41) People have been taken on board alien spaceships

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

42) Ghosts/poltergeists can cause objects to move, appear (materialise) or disappear (dematerialise)

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

43) Earthly existence (life) is the only existence we have

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

44) In spite of the laws of science, some people can use psychic powers to levitate objects

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

45) Horoscopes prepared by qualified experts can accurately predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

46) Through the use of mysterious formulas and incantations it is possible to cast spells.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

47) Aliens are abducting human beings.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

48) Aliens (Extra-terrestrial life forms) have implanted objects into people.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

49) Mental communication between two people is possible.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

50) Fortune telling can accurately predict your future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

Section 2

Paranormal Belief Scale

Please indicate your level of agreement with the statements by circling the appropriate number:

1) The soul continues to exist though the body may die

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

2) Some individuals are able to levitate (lift) objects through mental forces.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

3) Black magic really exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

4) Black cats can bring bad luck.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

5) Your mind or soul can leave your body and travel (astral projection).

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

6) The abominable snowman of Tibet exists.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

7) Astrology is a way to accurately predict the future.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

8) There is a devil.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

9) Psychokinesis, the movement of objects through psychic powers, does exist.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

10) Witches do exist.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

11) If you break a mirror, you will have bad luck.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

12) During altered states, such as sleep or trances, the spirit can leave the body.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

13) The Loch Ness monster of Scotland exists.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

14) The horoscope accurately tells a person's future.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

15) I believe in God.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

16) A person's thoughts can influence the movement of a physical object.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

17) Through the use of formulas and incantations, it is possible to cast spells on persons.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

18) The number “13” is unlucky.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

19) Reincarnation does occur.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

20) There is life on other planets.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

21) Some psychics can accurately predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

22) There is a heaven and hell.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

23) Mind reading is not possible.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

24) There are actual cases of witchcraft.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

25) It is possible to communicate with the dead.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

26) Some people have an unexplained ability to predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

Section 3

ASGS - Belief

Please read each of the statements below and indicate whether you believe it to be true, do not know (?) or false. Please circle your response clearly:

True	<input checked="" type="radio"/>	False
	(Do not know)	

1. I believe in the existence of ESP.

True ? False
(Do not know)

2. I believe I have had personal experience of ESP.

True ? False
(Do not know)

3. I believe I am psychic.

True ? False
(Do not know)

4. I believe that it is possible to gain information about the future before it happens, in ways that do not depend on rational prediction or normal sensory channels.

True ? False
(Do not know)

5. I have had at least one hunch that turned out to be correct and which (I believe) was not just a coincidence.

True ? False
(Do not know)

6. I have had at least one premonition about the future that came true and which (I believe) was not just a coincidence.

True ? False
(Do not know)

7. I have had at least one dream that came true and which (I believe) was not just a coincidence.

True ? False
(Do not know)

8. I have had at least one vision that was not an hallucination and from which I received information that I could not have otherwise gained at the time and place.

True ? False

(Do not know)

9. I believe in life after death.

True ? False

(Do not know)

10. I believe that some people can contact spirits of the dead.

True ? False

(Do not know)

11. I believe that it is possible to gain information about the thoughts, feelings or circumstances of another person, in a way that does not depend on rational prediction or normal sensory channels.

True ? False

(Do not know)

12. I believe that it is possible to send a “mental message” to another person, or influence them at a distance, by means other than normal channels.

True ? False

(Do not know)

13. I have had at least one experience of telepathy between myself and another person.

True ? False

(Do not know)

14. I believe in the existence of psychokinesis (or “PK”), that is, the direct influence of mind on a physical system, without the mediation of any known physical energy.

True ? False

(Do not know)

15. I believe I have personally exerted PK on at least one occasion.

True ? False

(Do not know)

16. I believe I have marked psychokinetic ability.

True ? False

(Do not know)

17. I believe that, on at least one occasion, an inexplicable (but nonrecurrent) psychical event of an apparently psychokinetic origin has occurred in my presence.

True ? False

(Do not know)

18. I believe that persistent inexplicable physical disturbances, of an apparently psychokinetic origin, have occurred in my presence at some time in the past, e.g., a poltergeist.

True ? False
(Do not know)

Section 4 - IPO-RT (Lenzenweger et al., 2001)

Reality Testing

1) When everything around me is unsettled and confused, I feel that way inside.

Never True Sometimes True Always true
1 2 3 4 5

2) I am not sure whether a voice I have heard, or something that I have seen is my imagination or not.

Never True Sometimes True Always true
1 2 3 4 5

3) When I'm nervous or confused, it seems like things in the outside world don't make sense either.

Never True Sometimes True Always true
1 2 3 4 5

4) I feel almost as if I'm someone else, like a friend or a relative, or even someone I don't know.

Never True Sometimes True Always true
1 2 3 4 5

5) I think I see things which, when I take a closer look, turn out to be something else.

Never True Sometimes True Always true
1 2 3 4 5

6) When I am uncomfortable, I can't tell whether it is emotional or physical.

Never True Sometimes True Always true
1 2 3 4 5

17) I feel as if I have been somewhere or done something before when I really haven't.

Never True Sometimes True Always true
1 2 3 4 5

18) I can't tell whether I simply want something to be true, or whether it really is true.

Never True Sometimes True Always true
1 2 3 4 5

19) I believe that things will happen simply by thinking about them.

Never True Sometimes True Always true
1 2 3 4 5

20) Somehow, I never know how to conduct myself with people.

Never True Sometimes True Always true
1 2 3 4 5

Section 5

Reasoning

Please read through the following questions carefully. Work through the questions systematically and provide an answer for each question.

Section A

1) Imagine a coin was tossed six times. Which pattern of results do you think is most likely?

Please clearly circle your response.

- a) HHHHHH
- b) HHHTTT
- c) HTHHTT
- d) All are equally likely

2) A local small town is served by two hospitals, one large the other small. At the large hospital about 45 babies are born everyday. At the small hospital the average

births is 15 per day. Approximately 50% of all babies born are boys; however, the exact percentage varies each day. For a period of one year both hospitals recorded the number of days on which more than 60% of the babies born were boys. Which hospital do you think recorded more such days?

Please clearly circle your response.

- a) the large hospital
- b) the small hospital, or
- c) about the same.

3) Which of the following is most likely?

Please clearly circle your response.

- a) Man under 55 and has a heart attack
- b) Man has a heart attack
- c) Man smokes and has a heart attack
- d) Man is over 55 and has a heart attack

4) Sheila and some friends try to contact spirits via a Ouija board. They receive a message, which suggests that Shelia will have an accident.

Which of the following is most likely?

- a) Sheila has an accident.
- b) As predicted by the Ouija board Sheila has an accident.
- c) Sheila has a car crash.

5) Vic and Bob are preparing to play a board game. They are choosing a game piece from 3 Blue, 2 yellow and 2 Red pieces. If Vic reaches into the box without looking and gets a yellow game piece, what is the probability that Bob, without looking will also get a yellow games piece?

- a) $1/7$ (.14)
- b) $1/6$ (.17)
- c) $2/7$ (.29)
- d) $1/2$ (.50)

Section B

6) Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy.

As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Is Linda more likely to be?

Please clearly circle your response.

- a) **A social worker and an activist.**
- b) **A social worker and a feminist.**
- c) **A social worker.**
- d) **An activist and a feminist.**

7) A hat contains 10 red and 10 blue Smarties. On each trial, I pull out a Smartie, note its colour and place it back into the hat. On the first 10 trials, I pull out 8 red Smarties and 2 blue. Am I more likely to get red or blue next time?

Please clearly circle your response.

- a) **Red**
- b) **Blue, or**
- c) **Both are equally as likely.**

8) A fatal disease strikes Manchester and 1 in 10,000 people will contract the disease. A test is developed to test for the presence of the disease. This test correctly identifies the disease 95% of the time and will falsely identify the disease 5% of the time. A person has the test and the result is positive.

What is the probability that they have the disease?

- a) .95
- b) .5
- c) .15
- d) .0015

9) Melissa shuffled a deck of number cards containing 5 each of the numbers 2, 4, 6, 7. If Melissa randomly selects a 4 from the deck and does not return it, what is the probability that she will select a 4 on her next draw?

- a) $3/20$ (.15)
- b) $4/5$ (.80)
- c) $4/19$ (.21)
- d) $1/4$ (.25)

10) Andrew often sits by the telephone at work. Just as he is thinking about his friend Elaine, she rings.

Which of the following is most likely?

- a) Elaine rang because Andrew was thinking about her.
- b) Andrew was thinking about Elaine because she was about to ring.
- c) Elaine rang.

Section C

11) Two football teams (Team A and Team B) are playing in a local derby. What is the likely outcome?

Please clearly circle your response.

- a) Team A score first and the game is drawn.**
- b) Team A score first and win**
- c) Team A score first and lose, or**
- d) Team A score first**

12) A Professor is speaking in his office to a student who has achieved promising extra-sensory perception scores (ESP). The student states that they can also move objects with the power of their mind. The Professor is dubious and says he will only believe if they are able to move a picture located on a nearby wall. After a few seconds, the picture crashes to the floor.

Which of the following is most likely?

- a) The picture fell to the floor.**
- b) The picture fell to the floor because the student willed it to.**
- c) Vibrations caused the picture to fall.**

13) A coin is tossed to decide which football team kicks off first. In the last four matches between Mytholmroyd and Giggleswick United, Mytholmroyd have kicked off first every time. Which is more likely to kick off first at their next encounter?

Please clearly circle your response.

- a) Mytholmroyd
- b) Giggleswick United, or
- c) Both are equally as likely.

14) You go to a party where there are 100 men, 70 of the men are Psychologists and 30 are Engineers. Before being introduced to each man you are given a short personality description of him. The personality descriptions for two men are as follows:

Jack is a 45-year-old man. He is married with 4 children. He is generally conservative, careful and ambitious. He shows no interest in politics and social issues and spends most of his free time on his hobbies, which include; carpentry, sailing and mathematical puzzles.

What is the probability that Jack is an Engineer?

- a) 100%
- b) 70%
- c) 50%
- d) 30%

15) There are 3 different doors that students may use to enter Kingsbury High School. There are 4 different staircases that student may use to reach the second floor. If a student randomly chooses a door to enter the school and a stairway to the second floor, what is the probability that he or she will use the first or second staircase?

- a) $\frac{2}{7}$ (.29)
- b) $\frac{1}{4}$ (.25)
- c) $\frac{6}{7}$ (.86)
- d) $\frac{1}{2}$ (.50)

Section D

16) Dianne has had several dreams, which she believes have predicted the future. Most recently she has a dream in which she saw a plane crash.

Which of the following is most likely?

- a) Dianne dreamt about the plane crash because it was going to happen.**
- b) Dianne's dream about the plane crash made it happen.**
- c) A plane crash happened.**

17) All families of six children in a city were surveyed. In 72 families the exact order of births of boys and girls was GBGBBG. What is your estimate of the number of families in which the exact birth order of boys and girls was BGBBBB?

Please clearly circle your response.

- a) 32**
- b) 52**
- c) 72**
- d) 92**

18) Candidate A had appeared in 6 polls and won 5, whilst candidate B had appeared in 18 polls and won 13.

In a head to head poll, who do you expect to win?

Please clearly circle your response.

- a) Candidate A**
- b) Candidate B, or**
- c) Both are equally as likely**

19) Which of the following is most likely to occur?

Please clearly circle your response.

- a) **An all-out nuclear war between the United States and China.**
- b) **A situation in which neither country intends to attack the other with nuclear weapons, but an all-out nuclear war between the United States and China is triggered by the actions of a third country in the Middle East.**
- c) **A political ally of the United States is attacked, which results in an all-out nuclear war between the United states and China**

20) Roger is completing in a 1,000 metre run with 8 competitors. Frederick, the runner with the best results from the last race, will get the best starting position. The Computer will randomly select the other runners' positions.

What is the probability that Jason will get the least favourable position?

- a) **1/9 (.11)**
- b) **1/8 (.13)**
- c) **1/7 (.14)**
- d) **7/8 (.88)**

Please check that you have completed all the questions and that your responses are clearly marked. Thank you for completing this PhD research project.

Paranormal Experiences/Beliefs, Mental Toughness and Decision-Making

This is a new study and you will **not** have completed this questionnaire previously. It forms the final phase of a PhD.

The questionnaire is divided into 4 sections:

1. Experiences
2. Paranormal Belief
3. Mental Toughness
4. Decision-making

There is no time limit for completing this questionnaire so please feel free to take your time when considering your answers. Usually, the questionnaire takes between 20/25 minutes to complete.

The answers you provide will remain confidential. Your scores will be allocated a participant number when the data/results are compiled. All information disclosed in the questionnaires will be kept confidential and will be stored securely.

This study is conducted in accordance with BPS Ethical Guidelines. At any time during the study, you have the right to withdraw the entirety of your data.

The present study is simply looking at the relationships that exist between anomalous/paranormal beliefs, paranormal experiences, decision-making choices and mental toughness. In the unlikely event that this research raises any personal or upsetting issues for you, you would be strongly encouraged to visit a counsellor at your local Community Health Centre. Contact details for these services can be located in your local telephone directory.

The results of this study may later be published in an academic journal. De-identified data collected will be stored online in a password-protected site accessible only to the researchers and will be destroyed 5 years later. The results of the study can be obtained by contacting me (K.Drinkwater@mmu.ac.uk) after 1st June 2014.

Your time and assistance is much appreciated. Many thanks.

Should you have any further questions about this research then please do not hesitate to contact me on my work email:

Mr Ken Drinkwater
[\(K.Drinkwater@mmu.ac.uk\)](mailto:K.Drinkwater@mmu.ac.uk)

Consent

I understand the purposes and procedure involved in this study and I am willing to participate in it:

YES NO

Personal Information

Age: _____

Gender: _____

Are you currently a student? YES NO

a. If yes, year of study: _____

b. Course: _____

If not a student

Occupation: _____

(NB: In order to identify your data (should you wish to withdraw from this study) please provide a unique identifier in the box below, otherwise please leave this blank)

Section 1: Experiences

Q.1. Do you believe that you have had a genuine paranormal experience?

Yes / No

Q.2. If YES, indicate below what sort of event was it.

(Please see list below and indicate on the scale provided whether you have experienced any of the listed events).

a) Extra-sensory Perception (ESP) (e.g., telepathy, foretell a future event/premonition, remote viewing)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

b) Psychokinesis (e.g., move objects by thought, effect chance events)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

c) Witchcraft (e.g. spells and curses)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

d) Out of Body Experience/Near Death Experience

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

e) Haunting

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

f) Contact/Communication with the dead

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

g) UFO visitation

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

h) UFO sighting

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

i) Astrological predication (e.g., Fortune-tellers, tarot cards readings, tealeaf readings, palmistry)

Yes / No

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

j) Other (please specify)

Yes / No

Please indicate type of event:

Frequency (please circle):

Single Incident	Occurred between 2-5 times	Occurred more than 5 times
1	2	3

Q.3. Do you believe in the paranormal because of your experience/s?

Definitely Not	Probably Not	Unsure	Probably	Definitely
1	2	3	4	5

Section 2: Anomalous Belief

The following pages contain information about paranormal beliefs.

Please indicate your level of agreement with the statements by circling the appropriate number below:

1) Ghosts do not exist

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

2) I have avoided walking under a ladder because it is associated with bad luck

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

3) I believe in God

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

4) It is possible for people to know about the outcome of an event before it happens

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

5) Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has approached the surface of the Earth

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

6) Spirits of the dead can be seen by the living

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

7) If you break a mirror, you will have bad luck

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

8) There is a heaven and a hell

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

9) When dreams seem to foretell the future, it is just a coincidence

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

10) People are able to bend metal objects simply by thinking about it (psychokinesis)

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

11) Astrological predictions, which come true, are merely the result of coincidence

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

12) Extra-terrestrials have visited earth throughout history

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

13) Some places are haunted by the souls of people now dead

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

14) The number "13" is unlucky

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

15) There is a devil

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

16) Some people have visions of the future, which come true

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

17) The mind can be used to control the outcome of a random process (e.g., dice rolling or coin tossing)

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

18) Witches/warlocks can actually curse/cast spells

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

19) Alien intelligence is responsible for some UFO sightings

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

20) It is not possible to communicate with the spirit world

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

21) I do say 'touch wood' or actually touch wood to promote good luck

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

22) Telepathy (mental communication) between two people is not possible

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

23) A person's future has nothing to do with their zodiac sign

Strongly Disagree							Strongly Agree
1	2	3	Neither Agree nor Disagree	4	5	6	7

- 24) Contrary to scientific belief, some people can make contact with the dead
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 25) I do say 'fingers crossed' or actually cross my fingers to promote good luck
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 26) There is no such thing as an afterlife
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 27) It is not possible for planetary forces to control personality traits
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 28) Witches/warlocks, who can perform genuine acts of magic, exist outside the realm of imagination
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 29) Alien spaceships have not crash landed on earth
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 30) People have genuinely seen "ghosts" or "apparitions"
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 31) The soul continues to exist after the death of the body
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 32) People have feelings/hunches that come true and are not just coincidences
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 33) A person's thoughts can influence the movement of a physical object
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 34) There are actual cases of witchcraft
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 35) Alien crafts regularly visit earth
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 36) Poltergeists exist
- | | | | | | | |
|-------------------|---|---|----------------------------|---|---|----------------|
| Strongly Disagree | | | Neither Agree nor Disagree | | | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
- 37) We will never be reunited with deceased friends and relatives

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

38) I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

39) Astrology cannot be used to accurately predict the future

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

40) Black magic really exists and should be dealt with in a serious manner

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

41) People have been taken on board alien spaceships

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

42) Ghosts/poltergeists can cause objects to move, appear (materialise) or disappear (dematerialise)

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

43) Earthly existence (life) is the only existence we have

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

44) In spite of the laws of science, some people can use psychic powers to levitate objects

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

45) Horoscopes prepared by qualified experts can accurately predict the future.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

46) Through the use of mysterious formulas and incantations it is possible to cast spells.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

47) Aliens are abducting human beings.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

48) Aliens (Extra-terrestrial life forms) have implanted objects into people.

Strongly Disagree				Neither Agree nor Disagree				Strongly Agree
1	2	3	4	5	6	7		

49) Mental communication between two people is possible.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

50) Fortune telling can accurately predict your future.

Strongly Disagree 1 2 3 Neither Agree nor Disagree 4 5 6 Strongly Agree 7

Section 3: Mental Toughness

Please indicate your response to the following items by **circling one** of the numbers, which have the following meaning;

1 = strongly disagree; **2** = disagree; **3** = neither agree nor disagree; **4** = agree; **5** = strongly agree

Please answer these items carefully, **thinking about how you are generally**. Do not spend too much time on any one item.

	« Disagree Agree »				
	1	2	3	4	5
1) I usually find something to motivate me	1	2	3	4	5
2) I generally feel in control	1	2	3	4	5
3) I generally feel that I am a worthwhile person	1	2	3	4	5
4) Challenges usually bring out the best in me	1	2	3	4	5
5) When working with other people I am usually quite influential	1	2	3	4	5
6) Unexpected changes to my schedule generally throw me	1	2	3	4	5
7) I don't usually give up under pressure	1	2	3	4	5
8) I am generally confident in my own abilities	1	2	3	4	5
9) I usually find myself just going through the motions	1	2	3	4	5
10) At times I expect things to go wrong	1	2	3	4	5
11) "I just don't know where to begin" is a feeling I usually have when presented with several things to do at once	1	2	3	4	5
12) I generally feel that I am in control of what happens in my life	1	2	3	4	5
13) However bad things are, I usually feel they will work out positively in the end	1	2	3	4	5
14) I often wish my life was more predictable	1	2	3	4	5
15) Whenever I try to plan something, unforeseen factors usually seem to wreck it	1	2	3	4	5
16) I generally look on the bright side of life	1	2	3	4	5
17) I usually speak my mind when I have something to say	1	2	3	4	5

18) At times I feel completely useless	1	2	3	4	5
19) I can generally be relied upon to complete the tasks I am given	1	2	3	4	5
20) I usually take charge of a situation when I feel it is appropriate	1	2	3	4	5

	«Disagree Agree»				
21) I generally find it hard to relax	1	2	3	4	5
22) I am easily distracted from tasks that I am involved with	1	2	3	4	5
23) I generally cope well with any problems that occur	1	2	3	4	5
24) I do not usually criticise myself even when things go wrong	1	2	3	4	5
25) I generally try to give 100%	1	2	3	4	5
26) When I am upset or annoyed I usually let others know	1	2	3	4	5
27) I tend to worry about things well before they actually happen	1	2	3	4	5
28) I often feel intimidated in social gatherings	1	2	3	4	5
29) When faced with difficulties I usually give up	1	2	3	4	5
30) I am generally able to react quickly when something unexpected happens	1	2	3	4	5
31) Even when under considerable pressure I usually remain calm	1	2	3	4	5
32) If something can go wrong, it usually will	1	2	3	4	5
33) Things just usually happen to me	1	2	3	4	5
34) I generally hide my emotion from others	1	2	3	4	5
35) I usually find it difficult to make a mental effort when I am tired	1	2	3	4	5
36) When I make mistakes I usually let it worry me for days after	1	2	3	4	5
37) When I am feeling tired I find it difficult to get going	1	2	3	4	5
38) I am comfortable telling people what to do	1	2	3	4	5
39) I can normally sustain high levels of mental effort for long periods	1	2	3	4	5
40) I usually look forward to changes in my routine	1	2	3	4	5
41) I feel that what I do tends to make no difference	1	2	3	4	5
42) I usually find it hard to summon enthusiasm for the tasks I have to do	1	2	3	4	5
43) If I feel somebody is wrong, I am not afraid to argue with them	1	2	3	4	5
44) I usually enjoy a challenge	1	2	3	4	5
45) I can usually control my nervousness	1	2	3	4	5
46) In discussions, I tend to back-down even when I feel strongly about something	1	2	3	4	5
47) When I face setbacks I am often unable to persist with my goal	1	2	3	4	5
48) I can usually adapt myself to challenges that come my way	1	2	3	4	5

Section 4: Decision-Making and Risk Scenarios

You are presented with a set of 20 hypothetical scenarios, which differ in various ways but are representative of the kinds of everyday decisions that people have to make.

We need you to consider only the two options described under each scenario.

There are no right and wrong answers. We are interested in finding out what kinds of decisions people make, and how much variability there is in different kinds of situations. We also wish to assess the extent to which personal decisions are perceived as having risks attached to them.

Completing the Rating Sheet

Please tell us about your response to each SENARIO **as if you were there at this moment (don't try to work out what you would normally/generally do)**.

Please consider only the information included in the scenario, and the two options provided.

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Decision rating

Having read the scenario, which of the two alternative actions do you think you would take? (*Remember that no other options can be considered*). You can indicate this by circling one of the numbers to the left (for A) or right (B) of the grid, the higher the number the more certain you are that you would take that option.

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

**NOW PLEASE READ THE SCENARIOS ON THE FOLLOWING PAGES AND
COMPLETE THE RATING SHEETS PROVIDED**

1. Parking

You have to visit a close relation in hospital, and you manage to get away from work for an hour at a busy time. As usual, the small visitor's car park opposite the hospital is full, and you know from experience that you will probably have to wait 15 minutes or so at this time for a space. You could drive into the hospital staff car park but security staff occasionally patrol this, and you know that cars have been clamped. You wonder where you should park.

Decision

Indicate your decision by clearly circling A or B:

A Use the staff car park

B Use the visitors car park

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

2. Checkout

You approach the checkout in a major store to pay for the goods you have selected. An intense argument starts between the shop assistant and the customer in front of you about the amount of change given. You were not paying particular attention to the transaction but you are certain that the customer is right. You wonder what you should do.

Decision

Indicate your decision by clearly **circling A or B**:

A Support the customer

B Do not get involved

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

3. Weekend Break

You are planning a weekend break in the country with some old friends. You have spent many happy, relaxing weekends in a favourite hotel, the Manor, which has always provided you with excellent hospitality and a personal touch. You hear of another hotel in the same area (The Grange) which appears to offer a slightly higher standard of accommodation, meals, etc., but you know no one who has stayed there, and nothing else about it. The Grange is offering 3 nights for the price of 2 for the weekend you wish to go. You wonder which hotel you should book.

Decision

Indicate your decision by clearly circling A or B:

A Book the new hotel (The Grange)

B Book the old hotel (The Manor)

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

4. Infection

Your doctor informs you that you have a viral infection and it is important that you have plenty of rest and keep warm. Without ample rest, the infection may become more serious and may even require hospitalisation. However, you have an important meeting at work, which you very much want to attend as it may have a significant effect on your future. You wonder what you should do.

Decision

Indicate your decision by clearly circling A or B:

A Stay home

B Attend the meeting

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

5. Day Rover

You are travelling on your local rail system and have purchased a day rover ticket, which covers the central area. You decide later to visit a friend but realise that he or she lives outside the central area. On arrival at your friend's station, you find that the barriers are unmanned as the stationmaster is busy elsewhere. You wonder whether you should try to find the stationmaster (to pay the excess fare) or forget about the problem.

Decision

Indicate your decision by clearly circling A or B:

A Find stationmaster

B Forget about it

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

6. Lottery

You win £15,000 on a local radio lottery contest. You could invest it in a high interest account, which will give you around £20,000 in five years, but you hear of an opportunity to invest in part ownership of a small hotel. Your share of income derived from the hotel is predicted to be £30,000 in 5 years but, as with all property, this is not guaranteed (e.g., costly unexpected repair bills or a market collapse). You wonder whether to invest in the hotel or in the high interest account.

Decision

Indicate your decision by clearly circling A or B:

A Put money in high interest account

B Invest in the hotel

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

7. Washing Machine

You need to wash some clothes urgently, but your washing machine begins to make grating noises and for a short time, there is a distinct smell of burning. After a while, the smell and noise go away and the machine appears to be operating as normal. You could go to the laundrette in town, or the washing machine may be all right now. You do not have any other way of washing your clothes. You wonder whether to carry on using it or go to the laundrette.

Decision

Indicate your decision by clearly circling A or B:

A Go to the laundrette

B Use the washing machine

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

8. Pub Outing

You start a new job and on Friday, you hear people talking about going to the pub when they finish work. You would like to get to know your colleagues better but you have not received an invitation. You are unsure whether this is deliberate or an oversight. You pass the pub on your way home and wonder whether to call in anyway or not.

Decision

Indicate your decision by clearly **circling** A or B:

A Call in to the pub

B Do not call in

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

9. Work Deadline

You have a tight deadline to meet and have nearly completed your task. You plan to finish your work in the evening and check it in the morning before handing it in by the noon deadline. Just before you start the evening session, a friend rings you offering a free ticket for an event you would very much like to see. You think that you can probably finish the work in the morning but you cannot be sure. You wonder whether to go to the event or spend the evening working.

Decision

Indicate your decision by clearly **circling A or B**:

A Go to the event

B Spend the evening working

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

10. Candlestick

You are looking after a friend’s house and unfortunately manage to break an antique candlestick. You know that this is both very valuable and has important sentimental value. You contact a local antique restorer who says that it can be repaired and he can do this before the owner returns. You wonder whether to have the candlestick repaired and not say anything, or to own up to the accident.

Decision

Indicate your decision by clearly circling A or B:

A Own up to the accident

B Have the repair done

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how ‘risky’ do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

11. Alarm Clock

You have an important appointment tomorrow and must get up very early. After you already have ready for bed you notice that your battery alarm has stopped. Shaking it makes it begin to work again. You suspect that the battery is nearly drained. You have no spare batteries but you know that the 24-hour garage (some 15 minutes' walk away) sells the relevant battery. You wonder whether to go out and buy it, or stay in bed.

Decision

Indicate your decision by clearly **circling A or B**:

A Stay in bed

B Buy the battery

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

12. Dentist

Your regular dentist has always given you excellent treatment but you often have to wait a few weeks to get an appointment (except for emergencies). A new dentist opens near to you who guarantee to see you within three days. You wonder whether to try the new dentist or stick with your old one.

Decision

Indicate your decision by clearly circling A or B:

A Try new dentist

B Stay with old dentist

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

13. Traffic Lights

You are driving home on a road you know well. You arrive at some road works, which reduce the road to a single lane on a hump-backed bridge. Access to this lane is controlled by temporary traffic lights, which are showing red. After 3 minutes the lights still have not changed, though no traffic has come over the bridge in that period. You wonder whether to drive on through or wait for the lights to change.

Decision

Indicate your decision by clearly circling A or B:

A Wait for the lights to change

B Drive through on red

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

14. Rotivator

You are helping a friend clean up their allotment and have hired a petrol driven Rotavator. You are responsible for its safe return. Half way through the job, it runs out of petrol. Searching in your friends shed, you find a can of liquid marked "PETROL". You are not sure what is in the can, as you did not put it there. Examining the contents does not really help, though the liquid smell seems more or less as you would expect. You wonder whether to use it or try to get some petrol from elsewhere.

Decision

Indicate your decision by clearly circling A or B:

A Find somewhere to get petrol

B Use liquid in the can

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

15. Fruit Machine

For a bit of fun you have a go on a 'fruit machine'. To your surprise you win £10 but a flashing light invites you to press the 'double or quits' button (giving you £20 or you lose the £10). You wonder whether to keep the initial winnings or accept the gamble.

Decision

Indicate your decision by clearly circling A or B:

A Keep initial winnings

B Accept the gamble

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

16. Club Meal

You have recently joined a local club and the members invite you out for a meal. When your main course arrives, it seems to you very badly cooked. Other people who ordered the same dish are happily eating theirs. You wonder whether you should make a formal complaint or do nothing about it.

Decision

Indicate your decision by clearly circling A or B:

A Do nothing

B Make formal complaint

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

17. Local Train

You decide to travel to an important meeting by taking the train from your nearest mainline station, and a local train to connect with this. The most convenient local train is timed to get you there with 4 minutes to spare. As it is not an advertised connection, the mainline train will not wait if you are delayed. You may also take an earlier slow train, though you will need to leave the house one hour earlier and have a 45 minute wait at the main station. You wonder which local train you should take.

Decision

Indicate your decision by clearly circling A or B:

A Early slow train

B Later train

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

18. Drug Study

You are invited to take part in a drug study conducted by the local university medical school. It will involve you taking the drug twice a day and noting any symptoms. You feel that the research area is valuable and the research team say that there should be no serious short-term side effects. You wonder whether to volunteer for the study or not.

Decision

Indicate your decision by clearly circling A or B:

A Volunteer to take part

B Do not volunteer

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

19. Cheque

A set amount of money is in your bank account to pay bills and cover expenses for the following week. You pay in a cheque, which will take between 2 and 5 days to clear. Three days later, you see a bargain offer for an item you really need but you are unsure whether the cheque will have cleared. You wonder whether you should write a cheque for the item or go without it.

Decision

Indicate your decision by clearly **circling A or B**:

A Go without item

B Write cheque for item

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

20. Unlocked Door

You are very keen to see a film that is being shown for one night only at your local cinema. On your way to the cinema, you suddenly realise that you have not locked your front door. It will take you about 20 minutes to get back home and this will cause you to miss the first 5-10 minutes of the film. You wonder whether you should return to lock the door or not

Decision

Indicate your decision by clearly **circling A or B**:

A Go back

B Do not go back

Certainty

Now rate (by circling the corresponding number) how certain you are about your decision on the scale below (the higher the number the more certain you are).

Less 1 2 3 4 5 more

Riskiness

Finally, how 'risky' do you feel your chosen course of action to be. Indicate how risky you perceive your course of action to be by circling one of the numbers 1-5, the higher the number the greater the risk.

Less 1 2 3 4 5 more

Emotional response

Please indicate how emotionally affected you would be facing the dilemma. Indicate your response by circling 1-5 for each scenario.

Less 1 2 3 4 5 more

Importance

Please indicate how important each scenario seems to you by circling one of the numbers 1-3, the higher the number the more important it is.

Less 1 2 3 more

Familiarity

Please indicate how familiar each scenario seems to you by circling one of the numbers 1-3, the higher the number the more familiar the scenario seems.

Less 1 2 3 more

Please carefully check that you have completed all the questions above and that your responses are clear. Finally, if you have any experiences of the supernatural/paranormal/anomalous and you wish to talk about your experiences then please feel free to leave a contact email address in the box below so that I can get back in touch and arrange a short interview.

Many thanks for taking time to complete this Final Phase IV PhD questionnaire.

Appendix B. Measures

Compendium of Measures

Paranormal Measure: Literature search strategy

Between September 2008 and the present, a compendium of measures was established using a variety of internet searches and literature databases (PUBMEDa, PsycInfo, Google and Science Direct). Its purpose is to establish a comprehensive assortment of measures, scales, and surveys that will establish a usable index of measures that can be easily accessed in one document for subsequent researchers. This compendium is based on the index of scales already established by Irwin (2009) in his researcher's handbook, but seeks to extend this by including less well-established measures and those scales that have been rarely been used alongside prominent paranormal scales. The compilation also sought to provide guidance as part of an ongoing paranormal belief literature search that revealed a number of measures of paranormal belief; and non-paranormal scales used successfully alongside existing scales. (see Tables 1, 2, 3, 4 and 5) that may be useful in extending the breadth of the current items. The search strategies employed ranged between broad general terms including general paranormal type questions to the more specialised terms (e.g., Reality Testing subscale of the Inventory of Personality Organization; IPO-RT). Additional literature searches revealed a variety of published journal articles present employment of anomalous beliefs: for example, paranormal beliefs, reality testing, conspiracy theory etc. Moreover, internet and library searches capture research utilising paranormal belief scales (for example, see Irwin, 1993, 2004, and 2009) and extend the breadth of material considered. This included a selection of all the most recognised and important paranormal belief measures. Plus, the literature search included content that related to belief in paranormal (i.e. religiosity measures or spiritual wellbeing) including global items/measures previously used in conjunction with paranormal belief scales, specifically those which are not stand alone/paranormal measures for example, Quality of life (QOL - Aaronson and Beckman, 1993) or Confirmation Inventory (CI - Rassin, 2008). Most searches published in English (although one or two only contained abstracts in English) were from papers published over a 50-year period (1960-2014).

Parapsychological Measures: A potential indexing system

A selection of the most commonly used paranormal scales and those used frequently alongside standardised ones is presented. The measures are presented in a series of tables 1 to 4 ranking in level of paranormal measurement, the connections to alternate scales and in what context. (see Tables 1, 2, 3 and 4). All measures contained in the tables represent the most prevalent scales that relate to current scale development, and presented in terms of the most important measures important for the current thesis. They represent an index of measures considered for future research involving paranormal alongside measures and items measuring level of belief.

Current Measures

Most commonly administered Parapsychological Measures

The following chapter is devoted to the exploration and indexing of paranormal and anomalous belief measures (a compendium as it were). The sole aim here is to provide a suitable starting point for both the inexperienced and experienced researcher alike to begin a detailed search of the current and existing measures that are currently used, and those more obscure measures that may form an important historical collection for developing new strategies for paranormal investigation. The most prevalent measures currently utilised for the investigation of paranormal belief are as follows:

Paranormal Belief Scale (PBS) (Tobacyk and Milford, 1983). This 25-item measure assesses belief in the paranormal using a 5 point scale. It comprises the following factorial items: Traditional religious belief, psi, witchcraft, Superstition, Spiritualism, Extraordinary Life forms and Precognition.

Revised Paranormal Belief Scale (RPBS) (Tobacyk, 1988). This was an amended version of the PBS. In all, 26-items comprising seven distinct belief types: Traditional Religious Belief, psi, Witchcraft, Superstition, Spiritualism, Extraordinary Life Forms, and Precognition.

Australian Sheep-Goat Scale (ASGS) (Thalbourne and Delin, 1993; Thalbourne, 2001). This 18-item measure (Although there is a revised version containing 26-items) refers to a

questionnaire (or family of measures) containing several aspects of paranormal belief, for example, extra-sensory perception (ESP), life after death, and psychokinesis (PK).

Paranormal Short Inventory (PSI) (Randall, 1997). A 13-item measure developed from an original Supernaturalism Scale created by Randall and Desrosiers, (1980). This shorter version of the scale enabled measurement of a variety of paranormal phenomena.

Mental Experience Inventory (MEI) (Kumar and Pekala, 1992) was revised and became the Anomalous Experience Inventory to include additional items dealing with anomalous and paranormal experiences, beliefs and abilities; fear of having such abilities; and drug use.

Anomalous Experiences Inventory (AEI) (Gallagher, Kumar and Pekala, 1994). This 70 item true-false measure was designed to investigate unusual, anomalous and paranormal experiences, beliefs and abilities, as well as questions about fear of the paranormal. It also considered questions regarding alcohol and drug use.

Mystical Experiences Scale (MES) (Lange and Thalbourne, 2007). A 19-item scale developed from Thalbourne's (1991) Mystical Experiences Scale. Findings from this research/questionnaire point to mystical experiences revolving around a psyche; where positive affect is combined with a nonstandard interpretation of one's reality.

Cardiff Anomalous Perceptions Scale (CAPS) (Bell, Halligan and Ellis, 2006). A 32-item measure of anomalous perceptual experience, which includes a measure of perceptual anomalies.

Survey of Belief in Extraordinary Phenomena (SOBEP) (Windholtz and Diamant, 1974). This 35-item survey contains more UFO and graphology type questions than the more recent additions to the paranormal measures.

Manchester Metropolitan University Scale of Paranormal Belief (MMUSPB) (Foster, 2001). This was an unpublished manuscript regarding the makeup and design of

paranormal belief. It was intended to investigate paranormal specific factors. This scale was adapted for the current thesis and guided the current 50-item MMUpbs measure.

Poltergeists and Hauntings Scale (Kumar and Pekala, 2001). This measure assesses hypnosis-specific attitudes and behaviors alongside experiences of the paranormal and those paranormal beliefs.

Extra-terrestrial Life and UFO-related Beliefs (Chequers et al., 1997; Dagnall et al., 2010b). This is original 8-item measure (Chequers et al., 1997), but was adapted by Dagnall et al. (2007) because of potential problems with the breadth of items offered (e.g., abductees being taken on a spaceship). A new pool of items was created and following a Principal component analysis, exploring reports of alien life (see Holden and French, 2002. Two new factors were produced: Life on other planets (6-items) and extra-terrestrial visitations to earth (8-items).

Superstition Scale (Wiseman and Watt, 2004) is a short 6-item scale developed by Wiseman and Watt, (2004). This is based on the superstition subscale of the PBS/RPBS and containing 3-items: black cats bring bad luck, breaking a mirror brings bad luck and the number 13 is deemed unlucky. The other 3 items are more 'positive illusions' (Taylor, 1989), where it was hypothesised that beliefs in these types of positive superstitions may be psychologically adaptive in nature.

This section therefore presents several important and altogether alternative questionnaires/measures/items that are not paranormal in nature, but have been embraced alongside existing paranormal scales, successfully exploring alternate facets and new areas of paranormal. Table.1 below highlights measures that are currently the most widespread paranormal and most commonly administered:

Table 1. *Most commonly administered Parapsychological Measures*

<u>Most commonly administered Parapsychological Measures</u>		
<u>A List</u>	<u>Authors</u>	<u>Description</u>
PBS - Paranormal belief scale	Tobacyk and Milford (1983)	25 items. Assesses belief in the paranormal using a 5 point scale. comprised the following items: Traditional religious belief, Psi, witchcraft, Superstition, Spiritualism, Extraordinary Life forms and Precognition.
RPBS - Revised Paranormal Belief Scale	Tobacyk (1988)	26 items. This is an amended version of the PBS scale: seven distinct types of beliefs, namely, Traditional Religious Belief, Psi, Witchcraft, Superstition, Spiritualism, Extraordinary Life Forms, and Precognition.
ASGS - Australian Sheep Goat scale	Thalbourne, M. A., & Delin, P. S. (1993).	18 Items. (Revised version 26 items) The ASGS refers to a questionnaire measure (or family of measures) of belief in various aspects of the paranormal, such as extrasensory perception (ESP), life after death, and psychokinesis (PK).
Extraordinary Beliefs Inventory	Otis & Alcock, (1982)	30-items. (The EBI was designed to explore beliefs within the paranormal domain). This covers both popular and extraordinary beliefs
the Systems of Belief Inventory (SBI-15R)	(Holland et al., 1998).	The degree to which persons felt that they derived meaning from an existential perspective (i.e. ethereal, of an immaterial nature, or a sense of meaning of life); (2) the use of certain religious practices and rituals, such as meditation and prayer; (3) the relationship to a superior being or a perceived higher power, such as God; and, (4) the level of social support derived from a community of individuals sharing similar beliefs.
The Cardiff Anomalous Perceptions Scale (CAPS)	Bell, v., Halligan, P.W., & Ellis, H.D. (2005)	32 items. A New Validated Measure of Anomalous Perceptual Experience a new validated measure of perceptual anomalies.
Survey of Belief in Extraordinary Phenomena (SOBEP)	35 Items Windholz & Diamant (1974)	
Icelandic Sheep-Goat Scale	(Haraldsson, 1981 - Needs confirmation).	3 items. Icelandic Sheep-Goat Scale, which measures belief in clairvoyance, precognition, and psychic dreams
The Mental Experience Inventory	(Kumar and Pekala, 1992)	This was revised and became the Anomalous Experience Inventory to include additional items dealing with anomalous and paranormal experiences, beliefs and abilities; fear of having such abilities; and drug use.
Paranormal Short Inventory	Randall, T. M. (1997)	A short 13 item supernatural scale. Inspired by a longer form.
the Anomalous Experience Inventory (AEI)	70-Items Gallagher, C., Kumar, V. K., & Pekala, R. J. (1994).	This measure investigates unusual, anomalous and paranormal experiences, beliefs and abilities, as well as questions about drug/alcohol use and fear of the paranormal (comprised of five scales: Anomalous /Paranormal Experience, Belief, Ability, Fear, and Drug Use).
Survey of Anomalous Experiences (SAE)	(Irwin, 2012)	20 items: anomalous or uncanny experiences

Important scales outlined from table 1

Paranormal Belief Scale. (PBS - Tobacyk, 1983) The PBS is a multifaceted scale that was adapted from the more individual nature of the singular type dimensional scales (e.g., ASGS). The PBS is a 25-item scale comprised of the following items: Traditional religious belief (TRB), psi, witchcraft, Superstition, Spiritualism, Extraordinary Life forms and Precognition. A five point rating scale was used to indicate the degree of belief shown by each participant, highlighted through the 25-items, producing results relating to seven distinct belief factors.

Revised Paranormal Belief Scale. (RPBS - Tobacyk, 1988). Unpublished manuscript, Louisiana Tech University. The RPBS (or PBSR). The original measure of Paranormal Belief (PBS) was improved, and became the RPBS. Both PBS vs. RPBS (2 and 3 factor solutions) are important with regard to measurement/item development. They have contributed to the sheep-goat scale development enabling accurate measurement of paranormal belief.

A brief self-report inventory, the Systems of Belief Inventory (SBI-15R) (Holland et al., 1998). This measure explores the degree to which respondents felt that they derived meaning from an existential perspective (i.e. ethereal, of an immaterial nature, or a sense of meaning of life). It also utilises certain religious practices and rituals, such as meditation and prayer, and investigates the relationship to a superior being or a perceived higher power, such as God. Finally, this measure considers the level of social support derived from a community of individuals sharing similar beliefs.

Religious Orientation Inventory (ROI). The ROI is a 20-item self-report scale developed by Allport and Ross (1967). This measure has two scales: 1. extrinsic orientation and 2. intrinsic orientation.

The Brief Symptom Inventory. (BSI: Derogatis and Spencer, 1982; Derogatis and Melisaratos, 1983) is a brief form of the SCL-90-R that is used to reflect psychological symptom patterns of psychiatric and medical patients. Each item was rated on a 5-point scale of distress (0–4), ranging from ‘not at all’ to ‘extremely’.

The Mental Experience Inventory (Kumar and Pekala, 1992) is a 70-item true false survey/scale designed to investigate both paranormal and anomalous beliefs, experiences and abilities, and explores specific questions concerning alcohol/drug use and paranormal fear.

Revised Transliminality Scale (Lange, Thalbourne, Houran and Storm, 2000) is a 17-item measure reduced from the original 29-item scale (Thalbourne, 1998). This Rasch-scaled version validates a common dimension underlying seven psychological domains

Survey of Anomalous Beliefs (SAE) (Irwin, 2012) comprises 20 items that consider uncanny experiences (anomalous) for example, apparent telepathy, clairvoyance, precognition, psychokinesis, apparitions etc. 20 purely phenomenological uncanny experiences are presented, after which participants are asked if they attributed their experience to a specified paranormal process or a non-paranormal process. Importantly, three options are accounted for: 1 yes interpreted as paranormal in origin, 2 yes but interpreted to normal processes and 3 no.

The scales below are also important in terms of spiritual belief composition and whilst not included within the main current indexing system, are included here to expand the finalised list³².

A Brief Spiritual Beliefs Inventory (Holland, et al. 1998) (SBR-15R). This 15-item scale is used in quality of life research assessing life-threatening illness. This shortened scale (developed from the full version SBI-54) is designed to measure spiritual beliefs and those practices associated with such beliefs.

The MOS (Medical Outcomes Study) Short-Form General Health Survey (Stewart, Hays and Ware, 1988). The 20-item self-report measure assesses health care through the

³² NB: Whilst the current chapter aims to provide a comprehensive and diverse list of existing paranormal and non-paranormal measures, it does claim to be exact or complete. This compilation will establish potential for a more comprehensive indexing system that future researchers may wish to collaborate/enhance with additional measures, scales or questionnaires.

following constructs: physical and mental health, social and role and functioning plus, other general health concepts.

The Medical Symptom Checklist (MSCL) (Leserman, 1983), is a 25-item self-report scale assessing level of physical health, medical symptoms associated with stress-related disorders.

The Inventory of Positive Psychological Attitudes to Life (IPPA) (Kass, Friedman, Leserman, Caudill, Zuttermeister and Benson, 1991). This 30-item self-report scale, measures positive psychological attitudes (range 1-7): containing two subscales: 1) Life Purpose and Satisfaction, 2) Self-Confidence during potentially stressful situations.

Less commonly used Parapsychological Measures

The following scales/measures are those deemed less frequently used to investigate paranormal beliefs. The table 2 presents a selection of the measures found during the literature search.

Table 2. *Less commonly used parapsychological Measures*

Less Commonly Used Parapsychological Measures		
A List	Authors	Description
Measurement of phenomenological experience: Phenomenology of Consciousness Inventory.	Pekala, R. J., Steinberg, J., & Kumar, V. K. (1986).	Shor (1960) - the personal experience inventory & As & Lauer (1963) - the experience inventory; Pekala & Wenger, (1983) - Based on: The dimensions of consciousness questionnaire - 11 major and 18 minor dimensions of phenomenological experience: included imagery (vividness, amount) , attention (Absorption, direction) and altered experience (body image perception)
Functional Assessment of Chronic Illness Therapy (FACIT-Sp-Ex)		FACIT. "Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale." http://www.facit.org
Expanded Spiritual Well-Being Scale		a multidimensional scale used in diverse cancer populations
Index of Core Spiritual Experiences (INSPIRIT),	Kass et al (1991)	7 items. measuring intrinsic spirituality and spiritual experience(s). Index of Core Spiritual Experiences, INSPIRIT, Revised Research Format.
the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE	(Mason, Claridge, & Jackson, 1995)	81 Items. This is a health-related measure: three of the O-LIFE dimensions: The O-LIFE consists of four sub-scales: Unusual Experiences (UE), Cognitive Disorganisation (CD), Introverted Anhedonia (IA), and Impulsive Nonconformity (IN).
the Oxford-Liverpool Inventory of Feelings and Experiences, Short Form (O-LIFE)	(Mason, Linney, & Claridge, 2001)	43 items: O-LIFE, Short Form is an index of dimensional schizotypy. The questionnaire comprises four subscales labeled Unusual Experiences (12 items), Cognitive Disorganization (11 items), Introverted Anhedonia (10 items), and Impulsive Nonconformity (10 items). The Unusual Experiences (UE) subscale, also referred to as positive schizotypy, addresses unusual perceptual experiences and thoughts.
Reality Testing subscale of the Inventory of Personality Organization (IPO-RT)	(Lenzenweger et al., 2001)	20 Items.
Method of object-relations measurement	Bellak, Hurvich, and Gediman's (1973)	provided the framework for the Bell Object Relations and Reality Testing Inventory
Abstract Bell Object Relations Reality Testing Inventory (BORRTI)	(Bell, 1995)	This has facilitated empirical investigations of ego functioning, and has also produced 3 subscales (Reality Distortion, Uncertainty of Perception, and Hallucinations and Delusions) in a number of diagnostic categories
the Dissociative Experiences Scale (DES)	(Bernstein & Putnam, 1986; Carlson & Putnam, 1993).	28 Items. The DES is a 28-item self-report measure indexing the frequency of various experiences of dissociative phenomena in the respondent's daily life.
Magical Ideation Scale	(Eckblad, M., & Chapman, L.J., 1983).	30 yes/no-questions about people's beliefs in telepathy, astrology, conspiracy theories, UFOs. For example: I think I could read other people's minds if I wanted to.
Magical Ideation Scale (short version)	(Eckblad, M., & Chapman, L.J., 1983).	22 items.
The Mental Experience Inventory.	(Kumar, V. K., & Pekala, R. 1992).	There are eight subscales of the Mental Experience Inventory (Kumar, V. K., & Pekala, R. J. [1992]. The mental experience inventory. Unpublished psychological test.
Exeter Superstitions Questionnaire. (ESQ)	(Preece & Baxter, 2000)	8-Item measure, designed for use in secondary schools
Superstition Scale	(Nixon, H.K. 1925)	35-item scale measuring superstition
World Health Organization Quality of Life (WHOQOL)	World Health Organization Quality of Life (WHOQOL) Group (1995).	World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. <i>Social Science and Medicine</i> , 41(10), 1403-1409.
the Self-Perceived Quality of Life (SPQL) scale		This is a psychological assessment instrument which is based on a comprehensive theory of the Self-Perceived Quality of Life. The SPQL scale includes well-being, emotions, and physical and mental health indices. The SPQL scale has implications for evaluating the effectiveness of a wide range of interventions intended to improve mental health and well-being.

Important scales outlined from table 2

Measurement of Phenomenological Experience: Phenomenology of Consciousness

Inventory: This is based on both the personal experience inventory Shor (1960); As and Lauer, (1963) experience inventory. Previously Pekala and Wenger, (1983) developed dimensions of consciousness questionnaire containing 11 major and 18 minor dimensions of phenomenological experience: included imagery (vividness, amount), attention (absorption, direction) and altered experience (body image perception).

Index of Core Spiritual Experiences (INSPIRIT) (Davis and Smith, 1985; Greeley 1984; Kass et al., 1991). This measures 7-items exploring spiritual experience(s) and those facets deemed intrinsically spiritual. The Index of Core Spiritual Experiences, INSPIRIT, has also been revised. (NB: The preliminary version of the INSPIRIT contained 11 questions, including eight questions developed by the National Opinion Research Center (NORC) in conjunction with Davis and Smith, (1985) and Greeley, (1984).

The Oxford–Liverpool Inventory of Feelings and Experiences (O-LIFE) (Mason, Claridge and Jackson, 1995). This health-related 81-item measure consists of four distinct subscales: Unusual Experiences (UE), Cognitive Disorganisation (CD), Introvertive Anhedonia (IA), and Impulsive Nonconformity (IN).³³

The Oxford–Liverpool Inventory of Feelings and Experiences (O-LIFE) (Mason, Claridge and Jackson, 1995). (Short Form). 43-items.

The Reality Testing Subscale of the Inventory of Personality Organization (IPO-RT - Lenzenweger, Clarkin, Kernberg and Foelsch, 2001). The 20-items of the IPO–RT are designed to index “the capacity to differentiate self from non-self, intrapsychic from external stimuli, and to maintain empathy with ordinary social criteria of reality” (Kernberg, 1996, p.120).

Abstract Bell Object Relations Reality Testing Inventory (BORRTI) (Bell, 1995). This measure contains three subscales measuring a number of diagnostic categories within ego

³³ A four-scale questionnaire for measuring schizotypy (psychosis-proneness).

functioning. More specifically it assess; Reality Distortion, Uncertainty of perception, and hallucinations and delusions.

Magical Ideation Scale (Eckblad and Chapman, 1983). A 30-item yes/no measure that taps into people's beliefs regarding telepathy, astrology, conspiracy theories, UFOs. An example question is 'I think I could read other people's minds if I wanted to'. (NB: there is also a shorter 22-item version of this scale).

Extraordinary Beliefs Inventory (EBI) (Otis and Alcock, 1982). This 30-item measure was designed to investigate beliefs within a paranormal context. This includes both popular beliefs and the more extraordinary type beliefs (e.g., 'there is such a thing as extra-sensory perception').

All of the above measures are used less frequently to inform paranormal beliefs nevertheless they are important in the context of the current indexing and add to the formulation of paranormal beliefs. These are useful for exploring a wide range of anomalous, extraordinary beliefs as well as reality testing and the wider construct of perception and experiences. These contribute not only to the ever-growing list of measures (within a paranormal context) but certainly add value to the exploration of mindfulness and belief in the paranormal.

Scales regularly used in conjunction with Parapsychological measures

The following lists of scales/measures are those deemed to be used recurrently alongside paranormal measures to examine paranormal beliefs and the factors that influence their maintenance and generation. Table 3 below presents a selection of the measures found following the current literature search.

Table 3. Scales regularly used in conjunction with parapsychological measures

Scales that are regularly used in conjunction with Parapsychological measures		
B List	Authors	Description
Schizotypal Personality Questionnaire (SPQ-A)	(Raine, 1991) (Hall and Habbits, 1996).	74 items. The SPQ can be used with both adults and adolescents, and with both normal and pathological populations. It measures three factors of schizotypy (Cognitive-Perceptual, Interpersonal, and Disorganized)
Schizotypal Personality Questionnaire (SPQ-B)	(Raine and Benishay, 1995)	22 items. The SPQ-B is a quick, two minute, instrument which is based on the SPQ. It may be used when time limitations in a research protocol does not allow for use of the longer SPQ, or alternatively it may be used to screen large numbers, either by mail or telephone, for predisposition to schizotypal personality disorder prior to a later confirmatory diagnostic interview.
The Revised Transliminality Scale	Lange,R., Thalbourne, M.A., Houran, J., & Storm, L. (2000)	29 items. first conceptualized as openness/receptiveness to experiences/impulses where sources are in preconscious (or unconscious) processes (Thalbourne, 1991, pp. 181-182). This is the Rasch-scaled version of Thalbourne's (1998) original measure. Seven psychological domains are outlined in the revised measure: (1) Hyperaesthesia (heightened sensitivity to environmental stimuli); (2) Hypomanic/Manic Experience (though these are fleeting); (3) Fantasy-Proneness; (4) Absorption; (5) Positive (and perhaps obsessional) Attitude towards Dream Interpretation; (6) Mystical Experience; and (7) Magical Ideation.
An experimental Determinism/Free Will scale	Nadelhoffer, T., Shepard, J., Nahmias, E., Sripada, C., & Ross, L. (2014).	13 Items. A new scale on beliefs about free will, determinism, and dualism.
Free Will Inventory (FWI)	Nadelhoffer, T., Shepard, J., Nahmias, E., Sripada, C., & Ross, L. (2014).	29-item inventory. The Free Will Inventory (FWI) has two parts. a) consists of three 5-item subscales designed to measure strength of belief in free will, determinism, and dualism. b) consists of a series of fourteen statements designed to further explore the complex network of people's associated beliefs and attitudes about free will, determinism, choice, the soul, predictability, responsibility, and punishment.
A Validated Intrinsic Religious Motivation Scale		Journal for the Scientific Study of Religion 11, no. 4 (1972): 369-376.
the Positive and Negative Syndrome Scale (PNASS)	Kay SR, Fiszbein A, Opler LA. (1987). The PNASS measure considers the relationship between positive and negative symptoms, to one another and within a more global psychopathology.	30 items. This scale assesses levels of psychopathology and symptom severity and is accompanied by a detailed anchoring criteria for all seven rating points.
A children's global assessment scale (CGAS)	Shaffer D, Gould MS, Brasic J, Ambrosini P, Fisher P, Bird H, Aluwahlia S. (1983)	A practitioner-rated global measure of functioning aimed at children aged 4-16 years that explores everyday functioning. (see Shaffer, D., Gould, M.S., Brasic, J., Ambrosini, P., Fisher, P., Bird, H.R. and Aluwahlia, S. (1983) A children's global assessment scale (CGAS). Archives of General Psychiatry, 40(11), 1228-1231)
Meaning in Life Questionnaire (MLQ).	Steger, M.F., Frazier, P., Oishi, S., & Kaler, M. (2006).	10 Items. A new 10-item measure of the presence of, and the search for, meaning in life.
the Satisfaction With Life Scale (SWLS)		a scale to measure global life satisfaction. The SWLS is recommended as a complement to scales that focus on psychopathology or emotional well-being because it assesses an individual's conscious evaluative judgment of his or her life by using the person's own criteria.
the Sense of Coherence (SOC) scale	(Antonovsky, 1991)	29 Items. This 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.
Measurement of phenomenological experience: Phenomenology of Consciousness Inventory.	Pekala, R. J., Steinberg, J., & Kumar, V. K. (1986).	Shor (1960) - the personal experience inventory & As & Lauer (1963) - the experience inventory: Pekala & Wenger, (1983) - Based on: The dimensions of consciousness questionnaire - 11 major and 18 minor dimensions of phenomenological experience: included imagery (vividness, amount), attention (Absorption, direction) and altered experience (body image perception)
Functional Assessment of Chronic Illness Therapy (FACIT-Sp-Ex)		FACIT. "Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale." http://www.facit.org
Expanded Spiritual Well-Being Scale		a multidimensional scale used in diverse cancer populations
Abstract Bell Object Relations Reality Testing Inventory (BORRTI)	(Bell, 1995)	This has facilitated empirical investigations of ego functioning, and has also produced 3 subscales (Reality Distortion, Uncertainty of Perception, and Hallucinations and Delusions)
Method of object-relations measurement	Bellak, Hurvich, and Gediman's (1973)	in a number of diagnostic categories provided the framework for the Bell Object Relations and Reality Testing Inventory

Important scales outlined from table 3

The Positive and Negative Syndrome Scale (PANSS) (Kay, Opler and Fiszbein, 1986). This 30-item measure is a drug-sensitive instrument that assesses the balanced representation of both positive and negative symptoms, relating to global psychopathology.

This measure offers an insight into the realms of psychopathology (mental health, disorders) where it is important to the knowledge of biological, psychological, and social sources. This scale could be utilised to explore the similarities between the paranormal believer and the individual who has adaptive or maladaptive, those suffering from mental disorders have usually been treated within the psychiatric profession, and have been diagnosed in accordance with DSM-5-TR (APA, 2013), or ICD-10 (WHO, 2014).

Scales rarely used in conjunction with Parapsychological measures

The following scales/measures are those used less frequently alongside other paranormal measures in order to investigate paranormal beliefs. Table 4 below presents a selection of the measures found during the literature search.

Table 4. Scales rarely used in conjunction with Parapsychological measures

Scales that are rarely used in conjunction with Parapsychological measures (Continued)		
B List	Authors	Description
World Health Organization Quality of Life (WHOQOL)	World Health Organization Quality of Life (WHOQOL) Group (1995).	World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. <i>Social Science and Medicine</i> , 41(10), 1403–1409.
the Self-Perceived Quality of Life (SPQL) scale		This is a psychological assessment instrument which is based on a comprehensive theory of the Self-Perceived Quality of Life. The SPQL scale includes well-being, emotions, and physical and mental health indices. The SPQL scale has implications for evaluating the effectiveness of a wide range of interventions intended to improve mental health and well-being.
the combined schizotypal traits questionnaire (CSTQ)	(Bentall et al., 1989).	420 items
Launay Slade Hallucination Scales	(Launay & Slade, 1981)	12-Items (In more recent adjustments the LSH scales have items 9 and 11 adjusted to become positively phrased items)
Nielsen and Petersen's schizoprenism scale	(Nielsen & Petersen, 1976)	Nielsen, T. C. & Petersen, N. E. (1976). Electrodermal Correlates of extraversion, trait anxiety, and schizophrenia.
Claridge's STQ scales	(Claridge & Broks, 1984)	Consisting of Schizotypal Personality (STA) and Borderline Personality (STB)
Scales of the EPQ	(Eysenck & Eysenck, 1975)	the Extraversion (E), Neuroticism(N), Psychoticism (P) and Lie (L)
the Delusions Symptoms States Inventory (DSSI)	(Foulds & Bedford, 1975)	Delusions of Contrition (dC), Delusions of Persecution (dP), Delusions of Grandeur (dG) and Delusions of Disintegration (dD).
Revised Need for Closure Scale (RNFC)	(Webster & Kruglanski, 1994)	15-Item: This is a index of the need for cognitive closure and is an abridged version of a measure originally devised by Webster and Kruglanski (1994). Each item relates to a situation of cognitive uncertainty (e.g., "I dislike questions which could be answered in many different ways").
Cognitive Biases Questionnaire (CBQ)	(Peters et al., 2010)	30-Item: This is a self-report measure of reasoning biases known to be associated with the formation of psychotic delusions. The CBQ comprises five subscales, each of six items; Peters et al. (2010) label the subscales Jumping to Conclusions (JTC), Intentionalising (I), Catastrophising (C), Emotion-Based Reasoning (EBR), and Dichotomous Thinking (DT).
Cognitive Biases Questionnaire for Psychosis (CBQ-P)		
Davos Assessment of Cognitive Biases Scale (DACOBS)	(van der Gaag, Schütz, Ten Napel, Landa, Delespaul, Bak, Tschacher, & de Hert, 2013)	The DACOBS discriminates between schizophrenia spectrum patients and normal control subjects. van der Gaag M, Schütz C, Ten Napel A, Landa Y, Delespaul P, Bak M, Tschacher W, de Hert M. Development of the Davos assessment of cognitive biases scale [DACOBS]. <i>Schizophr Res</i> . 2013 Mar; 144(1-3):63-71.
Hinting task	(Corcoran et al., 1995)	The Hinting task measures theory of mind capacities. The participants read aloud 10 short stories containing a suggestive message. Subjects have to explain what the main character in the story really means to say. When they lack understanding a hint is given to help them. The Hinting task is used to validate the subscale 'Social Cognition problems'.
Beck Cognitive Insight Scale (BCIS)	(Beck et al., 2004).	The Beck Cognitive Insight Scale is a reliable and valid self-report measure of two biases: self-certainty and self-reflectiveness
Beads task	(Phillips & Edwards, 1966).	The beads task is an experimental task used to measure the tendency of jumping to conclusions in uncertain situations
Green Paranoid Thoughts Scale (GPTS)	(Green et al., 2008).	The GPTS consists of two subscales of 16 items each: part A measures ideas of social reference and part B measures paranoid thoughts
Dogmatism scale (DOG scale)	(Altemeyer, 2002).	The DOG scale is a measure of dogmatism, reflecting the bias to unchangeable and ill-founded opinions It has 22 items (2 practice items)
Auditory Verbal Learning Test (AVLT)	(Van den Burg et al., 1985).	The AVLT measures verbal learning Subjects have to recall 15 words that are read aloud to them in 5 consecutive runs.
Word fluency	(Luteijn and Barelids, 2004).	This task measures word fluency
Safety Behaviors Questionnaire-Paranoid Delusions (SBQ-PD)	(Freeman et al., 2001)	The SBQ-PD is a semi-structured interview to measure avoidance and safety behavior related to paranoid thoughts

Important scales outlined from table 4

Quality of Life (QOL) (Aaronson and Beckman, 1993). This scale assesses a patient's level of function in the major domains (physical, psychological, and social).

Medical Outcomes Study - short form (MOS) (Stewart et al., 1988). This is a shortened form of the MOS by McHorney et al. (1993). The shortened form is a 20-item measure used to assess six health concepts: physical; role functioning; social functioning; pain perception; health perceptions; and, mental health.

18-item Manic-Depressiveness Scale (Thalbourne, Delin and Bassett, 1994) 50-question version of the NEO-PI-R, based upon the Five Factor Model (FFM) (Costa and McCrae, 1992), this instrument is backed by a considerable amount of literature.

The scales above highlight important aspects relating to predisposition quality of life and are therefore included. They are occasionally used alongside the more recognised paranormal questionnaires, but they add important aspects of health and social function either positively or negatively described.

Scales used less frequently alongside parapsychological measures

The following scales/measures are those used less frequently alongside other paranormal measures. Table 5 below presents a selection of the measures found during the literature search.

Table 5. Scales used less frequently with Parapsychological measures

<u>Scales that are used less frequently with Parapsychological measures</u>		
<u>C List</u>	<u>Authors</u>	<u>Description</u>
REI - Rational-Experiential Inventory - (REI-31)	Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996).	31 items. The REI-31 was designed to assess preferences for information processing. Theoretically motivated by Cognitive-Experiential Self-Theory (CEST; Epstein, 1973), the various versions of the REI distinguish between 2 cognitive styles.
Need for Cognition (NFC) scale	(Cacioppo & Petty, 1982)	
Shortened NEO-PI-R	Costa and McCrae (1978, 1992, 1995)	
The Brief Symptom Inventory (BSI)	Derogatis, (1983)	brief form of the SCL-90-R that is used to reflect psychological symptom patterns of psychiatric and medical patients.
Tellegen Absorption Scale	(Tellegen, A., & Atkinson, G. (1974).	
Post-Critical Belief scale (PCBS)	(Duriez et al., 2000).	33 items. Used to measure the religiosity of participants providing measurements of Orthodoxy, External Critique, Relativism, and Second Naiveté.
Quality of life (QOL)	(Aaronson and Beckman, 1993).	Measurement of patient's level of function in major domains (physical, psychological, and social)
Medical Outcomes Study-short form (MOS)	(Stewart et al., 1988) This is a shortened form of the MOS by McHorney et al. (1993).	20 items. The shortened form measure used to assess six health concepts: physical; role functioning; social functioning; pain perception; health perceptions; and, mental health.
Manic-Depressiveness Scale	(Thalbourne, Delin & Bassett, 1994)	18 items:
NEO-PI-R, based upon the Five Factor Model (FFM)	(Costa and McCrae, 1992)	50 items.
The African American Acculturation Scale	Landrine H., & Klonoff, E.A. (1984)	74 Items.
the Childhood Trauma Questionnaire or CTQ	(Bernstein et al., 1994).	60 Items: The CTQ surveys abuse and neglect during the respondent's childhood. The test is comprised of four factorially determined subscales, namely, Neglect (11), and Sexual Abuse (5). Physical and Emotional Abuse (23 items), Emotional Neglect (21), Physical
Barkley Deficits in Executive Functioning Scale (BEDFS)	(Barkley, 2011)	20 items: Barkley Deficits in Executive Functioning Scale is a self-report measure of defects in executive functioning. The BDEFS comprises five subscales, each of four items; Barkley (2011) labels the subscales Self-Management to Time (SMT), Self-Organization (SO), Self-Restraint (SR), Self-Motivation (SM), and Self-Regulation of Emotion (SRE).
Emotion-Based Reasoning subscale of the Cognitive Biases Questionnaire (EBRS)	(Peters et al., 2010)	6 items: self-report measure of reasoning biases known to be associated with the formation of psychotic delusions. The Emotion-Based Reasoning subscale comprises six items indexing the inclination to draw an inference more for its emotional appeal than for its logical adequacy.
Inferential Confusion Questionnaire (ICQ-EV)	(Aardema et al., 2010)	30 items: self-report measure of inferential confusion and an expanded form of the measure originally developed by Aardema et al. (2005).
Confirmation Inventory (CI)	(Rassin, 2008)	10 items: confirmation bias and comprises such items as "I only need a little information to reach a good decision" and "Once I have made a decision, I do not change it".
Metacognitions Questionnaire (MCQ-30)	(Wells & Cartwright-Hatton, 2004)	30 Items: Assesses "individual differences in a selection of metacognitive beliefs, judgments and monitoring tendencies considered important in the metacognitive model of psychological disorders" (Wells & Cartwright-Hatton, 2004, p. 385), and is a shortened 30-item originally constructed by Cartwright-Hatton and Wells (1997). The MCQ-version of a measure comprises five sub-scales each with 6 items.

Important scales outlined from table 5

Post-Critical Belief Scale (PCBS) (Duriez, Soenens and Hutsebaut, 2005). This 33-item self-report scale measures religiosity. The scale assesses level of Orthodoxy (e.g. ‘only a priest can give an answer to important religious questions’); External review (e.g. ‘in the end, faith is nothing more than a safety net for human fears’). Relativism (e.g. ‘Secular and religious conceptions of the world give valuable answers to important questions about life’) and Second Naiveté (e.g. ‘The Bible holds a deeper truth which can only be revealed by personal reflection’). Recently translated into English, the original PCBS (administered in Dutch), completed in accordance with International Test Commission guidelines (Hambleton, 1994).

The scale above is important because of the nature of religiosity and the fact that it explores external and relativism in relation to posing important questions about life. This may be important in extending the notion of life after death and present an alternative to the survival hypothesis (Irwin, 1993).

Additional scales below offer further opportunities for collective research regarding paranormal belief factors and item development.

The Inventory of Positive Psychological Attitudes to Life (IPPA) (Kass et al., 1991). 30-item self-report scale, what measures positive psychological attitudes.

REI - Rational-Experiential Inventory - (REI) (31 or 40-items). (REI; Pacini and Epstein, 1999). This measure comprising rational and experiential subscales divided into ability (estimate a person’s belief in their own ability) and favourability (preference to engage in that type of processing).

Need for Cognition scale (NFC) (Cacioppo and Petty, 1982). This measures "the tendency for an individual to engage in and enjoy thinking" (Cacioppo and Petty, 1982, p. 116). Presents (18-items) statements examining level of satisfaction gained from thinking.

Tellegen Absorption Scale (TAS) (Tellegen and Atkinson, 1974). This 34-item measure, assesses a person’s disposition for situations where their full attention engages one’s representational (perceptual, enactive, imaginative, and ideational) resources (Tellegen and Atkinson, 1974).³⁴

Barkley Deficits in Executive Functioning Scale (BEDFS). Barkley, (2011) examines deficits in executive functioning for ADHD suffers.

Emotion-Based Reasoning subscale of the Cognitive Biases Questionnaire (EBRS) (Irwin et al., 2012).

³⁴ This was adapted and forms part of the Multidimensional Personality Questionnaire (Tellegen, 1982) MDQ consisting of 300-items.

Inferential Confusion Questionnaire (ICQ-EV) A 30-item questionnaire (Aardema et al., 2010) from an expanded measure developed by Aardema et al. (2005), examines inferential confusion.

Metacognitions Questionnaire (MCQ-30) Wells and Cartwright-Hatton, (2004). A short form of the Metacognitions Questionnaire.

Sense of Coherence (SOC) (29-item semantic differential questionnaire and a short 13-item version) (Antonovsky, 1993, 1994) Assesses why some people become ill under stress and others stay healthy.

The Emotional Creativity Inventory (Averill, 1999a, 1999b). A 30-item inventory examining three facets of emotional experience: preparedness; novelty; authenticity and effectiveness.

Summary of Measures

The measures above are important to the current research because they assess judgements, self-motivation as well as assessing information processing which have become hot topics of debate regarding paranormal belief generation.³⁵ These scales also include explorations of confirmation bias and individual differences seen in metacognition, trauma and neglect. The scales have been generally employed less frequently alongside those of the paranormal, nonetheless several have been used more recently in studies exploring paranormal belief, confirmation bias, jumping to conclusions and self-regulation, motivation and self-monitoring tendencies (see Irwin et al., 2012, 2013, and 2014).

The current literature search strategy and indexing of both commonly used paranormal scales, and those non-paranormal measures is not totally exclusive. Nor does this suggest that this list is complete, but presents a working compendium with which the current research phases have been shaped/guided. This section has helped develop a

³⁵ Aspects of positive attitudes in relation to paranormal belief may also be an important addition to the current list of measures that can help assess belief in the paranormal. The composition of measures whilst comprehensive is not finite and needs further additions for example, the Inventory of Positive Psychological Attitudes to Life (IPPA) (Kass et al., 1991), a 30-item self-report instrument measuring positive psychological attitudes (range 1-7) and containing two scales: 1) Life Purpose and Satisfaction, and 2) Self-Confidence During Potentially Stressful Situations.

workable composition with which to extend and refine the current background to the paranormal measure (see phase I and II), along with subsequent item assessment (see phase III and IV). This not only outlines previous important research conducted, but also charts many of the important measures that have guided this doctoral thesis.

Appendix C. Item Lists

Below are two sets of original items used for an initial analysis. C.1. presents the original items generated. This is the complete list used to produce items that were negatively worded and formed the measure for the MMUpbs, whilst C.2. outlines the first iteration of the 64-item scale. The 64 item scale represents the initial items that were subjected to EFA and successive CFA.

C.1. Original items generated.

ORIGINAL ITEM	NEW ITEMS	POS/NEG	No. of items
84 Ghosts exist	Ghosts do not exist	neg	8
36 Spirits of the dead can be seen by the living	Spirits of the dead can be seen by the living	pos	
1 Some places are haunted by spirits or souls of people now dead	Some places are haunted by spirits or souls of people now dead	pos	
4 It is possible to communicate with the dead	It is not possible to communicate with the spirit world	neg	
61 Contrary to scientific belief, some people can make contact with the dead	Contrary to scientific belief, some people can make contact with the dead	pos	
21 People have genuinely seen "ghosts" or "apparitions"	People have genuinely seen "ghosts" or "apparitions"	pos	
111 Poltergeists exist	Poltergeists exist	pos	
63 Ghosts/poltergeists can cause objects to appear or disappear (materialisation or dematerialisation)	Ghosts/poltergeists can cause objects to appear or disappear (materialisation or dematerialisation)	pos	
	Some buildings are genuinely haunted.		
20 Somewhere in the universe there are other forms of life			
76 The earth is the only planet in the universe that supports life			
109 The only intelligent life exists on earth			
118 There is life on other planets			
8 Intelligent life exists beyond our universe			
119 There is no such thing as extra-terrestrial life			
87 I have avoided walking under a ladder because it is associated with bad luck	I have avoided walking under a ladder because it is associated with bad luck	pos	8
89 If you break a mirror, you will have bad luck	If you break a mirror, you will have bad luck	pos	
12 I would be anxious about breaking a mirror because it is thought to cause bad luck	deleted due to duplication		
66 I am superstitious about the number 13 because it is associated with bad luck	deleted due to duplication		
113 The number "13" is unlucky	The number "13" is unlucky	pos	
110 I do say 'touch wood' or actually touch wood to promote good luck	I do say 'touch wood' or actually touch wood to promote good luck	pos	
16 I do say 'fingers crossed' or actually cross my fingers to promote good luck	I do say 'fingers crossed' or actually cross my fingers to promote good luck	pos	
	Luck is nothing more than random chance	neg	
	It's a mistake to base any decisions on how lucky you feel	neg	
	I do not believe that luck exists	neg	
38 I believe in God	I believe in God	pos	8
92 There is a heaven and there is a hell	There is a heaven and there is a hell	pos	
28 There is a devil	There is a devil	pos	
123 I believe in life after death	There is supportive evidence for the existence of life after death	pos	
117 There is no such thing as an afterlife	There is no such thing as an afterlife	neg	
17 The soul continues to exist after the death of the body	The soul continues to exist after the death of the body	pos	
We will never be reunited with deceased friends and relatives	We will never be reunited with deceased friends and relatives	neg	
Earthly existence is the only existence we have.	Earthly existence is the only existence we have.	neg	
34 Aliens are abducting human beings			
53 People have been taken on board alien spaceships			
82 Alien spaceships regularly visit earth			
121 Alien spaceships have crash landed on earth			
106 Alien's have implanted objects into people			
70 Alien intelligence is responsible for some UFO sightings			
112 Extra-terrestrials have visited earth throughout history			
41 Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has approached the surface of the Earth			8

29	I have had at least one premonition about the future that came true and which (I believe) was not just a coincidence	People have premonitions about the future that come true and are not just coincidences	pos	
68	I have had at least one dream that came true and which (I believe) was not just a coincidence	Extrasensory perception (ESP) is a gift that many people possess and should not be confused with tricks used by entertainers	pos	
102	I have had at least one hunch that turned out to be correct and which (I believe) was not just a coincidence	People have hunches that come true and are not just coincidences	pos	
56	I believe I have had personal experience of extrasensory perception (ESP)	Extrasensory perception (ESP) does not exist	neg	
81	I believe I have had at least one experience of telepathy between myself and another person	Telepathy between two people is not possible	neg	
23	Some people have visions or dreams of the future which come true	Some people have visions of the future which come true	pos	
91	When dreams seem to foretell the future, it is just a coincidence	When dreams seem to foretell the future, it is just a coincidence	neg	
	Have you ever come to know in advance that someone whom you have not thought of years is going to call you?	It is possible for people to know about the outcome of an event before it happens.	pos	8
94	A person's thoughts can influence the movement of a physical object	Humans are not able to exert influence upon the physical world simply through the conscious or unconscious intention (psychokinesis).	neg	
18	Some people, if they exert enough will power, can make objects move just by the power of their mind	Some people are able to bend metal objects simply by thinking about it (psychokinesis).	pos	
52	In spite of the laws of science, some people can use their psychic powers to make objects move	The mind can be used to control the outcome of a random process e.g. dice rolling or coin tossing	pos	
69	Some individuals are able to levitate (lift) objects through mental forces	The powers of the mind can not be used to cure people	neg	
46	Psychokinesis, the movement of objects through psychic powers, does exist	It is not possible to psychically project images onto photographic film	neg	
101	I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy	A person's thoughts can influence the movement of a physical object	pos	
		I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy	pos	
		In spite of the laws of science, some people can use their psychic powers to levitate objects	pos	8
93	The horoscope accurately tells a person's future			
40	Horoscopes prepared by properly qualified experts for individual people can accurately predict the future	Horoscopes prepared by properly qualified experts for individual people can accurately predict the future	pos	
48	Astrology is a way to accurately predict the future	Astrology cannot be used to accurately predict the future	pos	
10	Contrary to scientific opinion, there is some validity in fortune telling	Contrary to scientific opinion, there is some validity in fortune telling	pos	
19	It is quite possible for planetary forces to control personality traits	It is quite possible for planetary forces to control personality traits	pos	
2	In spite of what people think, card reading, for example, tarot cards, can tell a lot about a person and their future	In spite of what people think, card reading, for example, tarot cards, can tell a lot about a person and their future	pos	
26	As a general rule, a fortune teller's predictions which come true are the result of coincidence	As a general rule, predictions which come true are the result of coincidence	neg	
		Some people can actually foretell your future by looking at the lines on your palm	pos	
		A person's future has nothing to do with their zodiac sign	neg	
				8
14	Witches do exist	Witches/warlocks who can perform genuine acts of magic exist outside the realm of imagination	pos	
5	There are actual cases of witchcraft	There are actual cases of witchcraft	pos	
105	Black magic really exists	Black magic really exists and should be dealt with in a serious manner	pos	
		Through the use of mysterious formulas and incantations it is possible to cast spells.	pos	
		People who believe in magical/ritual ceremonies are wasting their time.	neg	
		Witches and warlocks can actually curse/cast spells	pos	
		Witches/warlocks can not perform genuine acts of magic.	neg	
		Beliefs about witches spells and magical powers are based on hearsay and superstition	neg	

70

total	64
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C.2. First iteration of the 64-item scale

Type	NEW ITEMS	Number	POS/NEG
Hauntings	Ghosts do not exist	1	neg
Hauntings	Spirits of the dead can be seen by the living	2	pos
Hauntings	Some places are haunted by the souls of people now dead	3	pos
Hauntings	It is not possible to communicate with the spirit world	4	neg
Hauntings	Contrary to scientific belief, some people can make contact with the dead	5	pos
Hauntings	People have genuinely seen "ghosts" or "apparitions"	6	pos
Hauntings	Poltergeists exist	7	pos
Hauntings	Ghosts/poltergeists can cause objects to move, appear (materialisation) or disappear (dematerialisation)	8	pos
Superstition	I have avoided walking under a ladder because it is associated with bad luck	9	pos
Superstition	If you break a mirror, you will have bad luck	10	pos
Superstition	The number "13" is unlucky	11	pos
Superstition	I do say 'touch wood' or actually touch wood to promote good luck	12	pos
Superstition	I do say 'fingers crossed' or actually cross my fingers to promote good luck	13	pos
Superstition	Luck is nothing more than random chance	14	neg
Superstition	It is a mistake to base any decisions on how lucky you feel	15	neg
Superstition	I do not believe that luck exists	16	neg
Religion	I believe in God	17	pos
Religion	There is a heaven and a hell	18	pos
Religion	There is a devil	19	pos
Religion	There is supportive evidence for the existence of life after death	20	pos
Religion	There is no such thing as an afterlife	21	neg
Religion	The soul continues to exist after the death of the body	22	pos
Religion	We will never be reunited with deceased friends and relatives	23	neg
Religion	Earthly existence is the only existence we have.	24	neg
ESP	People have premonitions about the future that come true and are not just coincidences	25	pos
ESP	Extrasensory perception (ESP) is a gift that many people possess and should not be confused with tricks used by entertainers	26	pos
ESP	People have hunches that come true and are not just coincidences	27	pos
ESP	Extrasensory perception (ESP) does not exist	28	neg
ESP	Telepathy (mental communication) between two people is not possible	29	neg
ESP	Some people have visions of the future which come true	30	pos
ESP	When dreams seem to foretell the future, it is just a coincidence	31	neg
ESP	It is possible for people to know about the outcome of an event before it happens	32	pos

Psychokinesis	Humans are not able to exert influence upon the physical world simply through conscious or unconscious intention (psychokinesis)	33	neg
Psychokinesis	People are able to bend metal objects simply by thinking about it (psychokinesis)	34	pos
Psychokinesis	The mind can be used to control the outcome of a random process (e.g., dice rolling or coin tossing)	35	pos
Psychokinesis	The powers of the mind can not be used to cure people	36	neg
Psychokinesis	It is not possible to psychically project images onto photographic film	37	neg
Psychokinesis	A person's thoughts can influence the movement of a physical object	38	pos
psychokinesis	I believe in the existence of psychokinesis, that is, the direct influence of mind on a physical system, without the mediation of any known physical energy	39	pos
Psychokinesis	In spite of the laws of science, some people can use their psychic powers to levitate objects	40	pos
Astrology	Horoscopes prepared by qualified experts can accurately predict the future	41	pos
Astrology	Astrology can not be used to accurately predict the future	42	neg
Astrology	Contrary to scientific opinion, there is some validity in fortune telling	43	pos
Astrology	It is not possible for planetary forces to control personality traits	44	neg
Astrology	Card reading (e.g., tarot cards) can tell a lot about a person and their future	45	pos
Astrology	Astrological predictions, which come true are the result of coincidence	46	neg
Astrology	Some people can actually predict the future by looking at the lines on the palm of your hand	47	pos
Astrology	A person's future has nothing to do with their zodiac sign	48	neg
Witchcraft	Witches/warlocks who can perform genuine acts of magic exist outside the realm of imagination	49	pos
Witchcraft	There are actual cases of witchcraft	50	pos
Witchcraft	Black magic really exists and should be dealt with in a serious manner	51	pos
Witchcraft	Through the use of mysterious formulas and incantations it is possible to cast spells.	52	pos
Witchcraft	People who believe in magical/ritual ceremonies are wasting their time.	53	neg
Witchcraft	Witches/warlocks can actually curse/cast spells	54	pos
Witchcraft	Witches/warlocks can not perform genuine acts of magic.	55	neg
Witchcraft	Beliefs about witches' spells and magical powers are based on hearsay and superstition	56	neg
ET/aliens	Aliens are abducting human beings	57	pos
ET/aliens	People have been taken on board alien spaceships	58	pos
ET/aliens	Alien crafts regularly visit earth	59	pos
ET/aliens	Alien spaceships have not crash landed on earth	60	neg
ET/aliens	Aliens have not implanted objects into people	61	neg
ET/aliens	Alien intelligence is responsible for some UFO sightings	62	pos
ET/aliens	Extra-terrestrials have visited earth throughout history	63	pos
ET/aliens	Unidentified Flying Objects (UFOs) suggest that some kind of extra-terrestrial life form has approached the surface of the Earth	64	pos
Total Items		64/.....