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The Measurement of Superstitiousness as a Component of Paranormal Belief — Some Critical Reflections

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Abstract

The assessment of superstitiousness as a component of paranormal belief has encountered many conceptual and psychometric difficulties. This paper surveys the history of the measurement of superstitiousness, definitional issues, varieties of traditional superstitions evident in folkloric collections, and the relationship between superstitiousness and a belief in luck. Suggestions are offered for the construction of a more effective index of superstitiousness in paranormal belief questionnaires.

Introduction

Popular beliefs known as superstitions have been recorded throughout written history and were presumably a feature of human society even before the advent of the written word (Frazer, 1911; Seligman, 1948/1975). These beliefs embrace underlying notions of magical causation and thus have long been appreciated as a facet of the domain of belief in the paranormal. The psychometric assessment of superstitiousness nevertheless has posed a number of fundamental conceptual and methodological problems, and even widely used contemporary indices of superstitiousness have serious limitations. In this paper I sur-

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vey the background to these limitations and offer some proposals for the future assessment of superstitiousness.

An historical perspective

An appreciation of some of the contemporary methodological issues in the measurement of superstitiousness is usefully set against the historical record. For this reason I begin the paper with a brief survey of this topic. For a much earlier review the interested reader is referred to the paper by Plug (1976).

Historical records contain much information on the practice of superstitious rituals in small communities, and the associated beliefs have been extensively documented by folklorists (see a later section of this paper). Psychometric research, of course, was a rather more recent development. Indeed, the measurement of superstitiousness was to play a pivotal role in the development of interest in the construct of paranormal belief. Thus, the formative measures of belief in the paranormal focused wholly on superstitions (Irwin, 2007). To the best of my knowledge, the first empirical survey of superstitiousness was conducted under the auspices of the American Society for Psychical Research by its Committee on Experimental Psychology (Minot, 1887). This study simply asked participants to confirm or deny the truth of each of three common superstitions, and its fundamental concern was to gauge the popularity of these superstitions rather than the measurement of an underlying dimensional construct of "superstitiousness". Further, the study seems to have had little direct impact on later research into superstitions, as it is rarely cited in subsequent publications. Nonetheless, it would seem the origins of psychometric interest in paranormal belief may fairly be credited to the work on superstitions by early psychical researchers.

A systematic and sustained program of empirical investigation of superstitiousness was subsequently initiated by educationists in the early decades of the twentieth century. At that time there was some concern among educationists and other social commentators over what was deemed profound "ignorance" in the general population. Thus, one writer declaimed, "for the good of the cause of education, we must not fail to recognize the fact that underneath what passes for average culture there lies undisturbed a great mass of irrational predisposition" (Dresslar, 1907, p. 215). On these grounds some educational researchers

began to consider superstitiousness as a potential index of the prevailing level of ignorance in any given community. Particularly in the period between the two World Wars substantial research effort was devoted to the identification of the social origins of superstitiousness and to the development of educational programs that might help to discourage such beliefs (for documentation of this literature see Irwin, 2007).

Initially in this phase of superstitiousness research the usual procedure (e.g., Conklin, 1919; Gould, 1921) was to ask participants first to recall as many superstitions as they could, then to state if they concurred with each belief or had done so at any time in the past. This research technique has several flaws. One source of difficulty lies in the fact that both the number and the variety of superstitions recalled under the procedure may vary with the participants' level of motivation and memory abilities (Grimmer & White, 1990; Plug, 1976). That the sample of superstitions thus elicited would be guaranteed to represent the complete taxonomic range of superstitions is doubtful. In addition, it is difficult to perform the procedure without introducing the term "superstition" (or a very close synonym), yet to do so would run the risk that participants would then be inhibited from acknowledging beliefs that authority figures (such as educationists) may well regard as "foolish" (Plug, 1976).

A major breakthrough in the measurement of superstitiousness came with the work of Nixon (1925). Here it was proposed that superstitiousness could conveniently be assessed using a small but representative sample of beliefs in the form of a self-report questionnaire. Nixon argued that the use of items about black cats, four-leafed clovers and the like would be too transparent; that is, many respondents would be reluctant to admit they believed in propositions that were so readily identifiable as superstitions. By contrast, the 30 questionnaire items constructed by Nixon were designed to have some superficial empirical authenticity but in fact were scientifically unsubstantiated.¹ Thus, Nixon's scale included such items as "A square jaw is a sign of will power" and "The study of mathematics is valuable because it gives one a logical mind". Nixon's avoidance of traditional superstitions certainly was a creative attempt to minimize response reticence, but many of his "unsubstantiated beliefs" pertained to telepathy, astrology, palmistry, and phrenology. By contemporary standards Nixon's question-

¹For an examination of paranormal beliefs in the conceptual context of "scientifically unsubstantiated beliefs", see Irwin (2007, Ch. 8).

naire therefore raises issues about the differentiation of superstitiousness from other forms of paranormal belief. A case nevertheless may be made that Nixon's superstitions questionnaire marked the onset of a truly psychometric approach to the measurement of superstitiousness and that of paranormal belief as more generally conceived. The questionnaire was used by researchers up to thirty years later (e.g., Levitt, 1952; Whitelaw & Laslett, 1932). Gradual improvements to the scale also were introduced. Garrett and Fisher (1926) added more superstition items to the scale to improve its representativeness, and Gilliland (1930) added ten "buffer" items that most people would see as "true" in order to discourage the extreme response bias of answering "false" to all the superstitious items. Some later researchers (e.g., Miller, 1929) also appreciated that the sensitivity of a superstitiousness measure could be enhanced by replacing Nixon's dichotomous (true/false) set of response options with a broader Likert-type (e.g., 4-point) scale that tapped the respondent's *degree* of belief in each superstition.

In the mid 1930s the work of Peatman and Greenspan (1935, 1936) incorporated into the measurement of superstitiousness further methodological advances in test design. The questionnaire designed by these researchers comprised 70 items of which only half addressed superstitiousness; the remaining items were included to elicit "true" responses and to help obscure the test's concern with superstitiousness. More importantly, Peatman and Greenspan (1935) assessed the test-retest reliability of the questionnaire before using it for research into superstitiousness. Although some earlier studies did include the computation of a split-half index of reliability (e.g., Caldwell & Lundeen, 1934), Peatman and Greenspan seem to have been the first researchers to give thorough consideration to the issue of psychometric reliability in the construction of a measure of superstitiousness. It may be noted that of the many measures of superstitiousness devised during this era some did not show satisfactory reliability (e.g., Belanger, 1944).

One researcher also gave close attention to the issue of psychometric validity, that is, the question of whether a superstition questionnaire actually measures what it purports to measure. Zapf (1938) devised two such questionnaires and found a strong correlation ($r = .80$) between scores on the two scales, thus supporting their congruent validity. In a later study Zapf (1945) turned her attention to predictive validity. Twelve items from her own superstitiousness questionnaire were selected on the basis that they could readily be implemented as a

performance test; the items entailed such activities as walking under a ladder and opening an umbrella indoors. Zapf then compared participants' questionnaire responses to their actual behaviour in the practical tests. On the basis of a substantial correlation between the two measures Zapf concluded that the validity of her superstitiousness questionnaire was supported.

Despite these major contributions to the development of a measure of superstitiousness it must be said that the substantial majority of such measures used for research in the first half of the twentieth century had inadequate psychometric foundations. Most researchers relied purely on the face validity of the items in their questionnaires, and the reliability of the measure typically was not assessed (Plug, 1976). Even the more recent measures of superstitiousness (e.g., Killen, Wildman, & Wildman, 1974; Zebb & Moore, 2003) typically have not been subjected to extensive psychometric evaluation.

After World War II research into belief in superstitions became sporadic and largely piecemeal. The study of paranormal belief as more generally conceived shifted to the topics of belief in ESP (e.g., Schmeidler & Murphy, 1946), belief in UFOs (e.g., Saunders, 1968), and belief in the supernatural (e.g., Jahoda, 1970); for a survey of these developments see Irwin (2007, Ch. 3). From the view of parapsychological research interest in the psychometrics of superstitiousness was not revived until the late 1970s, when questions began to arise about the dimensionality of belief in the paranormal.

Largely as a result of the "consciousness explosion" in the late 1960s, social scientists began to investigate *supernatural belief* (e.g., Jahoda, 1970; Salter & Routledge, 1971). Supernatural belief subsumed not only superstitions and ESP, but also belief in such phenomena as ghosts, witchcraft, astrology, fortune-telling, flying saucers, and god. This broad depiction of *paranormal belief* (as it became known from the late 1970s) was reflected in the construction of paranormal belief questionnaires (e.g., Jones, Russell, & Nickel, 1977; Randall & Desrosiers, 1980; Sobal & Emmons, 1982; Tobacyk & Milford, 1983) and has continued to the present day. The increased variety of paranormal beliefs now being surveyed served to raise a very fundamental issue: was the domain of paranormal belief essentially a homogeneous, unitary construct, or was it multidimensional, with a number of discrete, relatively independent facets? Researchers initially assumed that paranormal belief, despite the variety of its expression, was basically a homo-

geneous entity. When factor analyses of paranormal belief questionnaires yielded more than a single factor several researchers (e.g., Jones et al., 1977; Randall & Desrosiers, 1980) engaged in some almost comical contortions in an effort to explain away all “secondary” factors and to identify the single factor with the highest loading as “the” essence of paranormal belief (for a critical review of these studies see Irwin, 2007). With the construction and factor analysis of the *Paranormal Belief Scale*, however, Tobacyk and Milford (1983) provided evidence to suggest that the domain of paranormal belief was indeed multidimensional.

The precise number and identity of the factors of paranormal belief have continued to be the subject of vigorous debate (Hartman, 1999; Lawrence, 1995; Thalbourne, 1995; Tobacyk, 1995). Be this as it may, for our examination of superstitiousness it suffices to say that in investigations where some traditional superstitions were included in the item pool for a paranormal belief questionnaire, the application of factor analysis typically has identified superstitions as a discrete factor of paranormal belief. This systematic trend appears to obtain irrespective of variations in the item pool subjected to analysis (Johnston, de Groot, & Spanos, 1995; Lindeman & Aarnio, 2006; Rudski, 2003) and the type of factor analytic technique utilized (Hartman, 1999; Lawrence, Roe, & Williams, 1997; Lindeman & Aarnio, 2006; Tobacyk & Milford, 1983). Two principal inferences may be drawn from these findings. First, superstitiousness may be held to be an element of paranormal belief, and second, as a concept superstitiousness needs to be differentiated from other elements of paranormal belief rather than subsuming such elements. The latter point raises matters of definition, and it is to a preliminary discussion of these that I now turn.

Definitional issues: Preliminary observations

The empirical investigation of superstitiousness necessarily should be founded on a generally accepted, rigorous definition of the concept. Many researchers unfortunately have either neglected this fundamental requirement or use a statement from a nontechnical dictionary that depicts superstitions simply as irrational beliefs. As the present paper will show, the definition of superstitiousness is more complex than the nontechnical view admits.

Loosely speaking, a superstition is a popular belief that incorporates an element of magical causation. Thus, for the breakage of a mirror

to “cause” seven years’ bad luck an underlying magical process is tacitly assumed: there is no scientifically recognised characteristic of mirrors that could mechanistically produce an era of personal misfortune for any person responsible for shattering one of these objects. The notion of superstition as a “popular” or socially shared belief (Jahoda, 1970) also signifies its presence in the general community. Some psychologists (e.g., Frost et al., 1993) would go further in identifying the magical beliefs of mentally disordered people as superstitions. Consider, for example, an obsessive-compulsive patient who thinks that failure to keep his or her domestic and working environments immaculately neat and symmetrical would lead to some personal disaster; such a person is certainly showing evidence of magical thinking and therefore might well be construed by some readers as superstitious. Nonetheless, the emphasis in the present paper is on superstitions among the general population. This nonclinical focus should not be seen in any sense as an attempt to discount the fact that disturbed reality testing may play a role in the formation of some paranormal beliefs (Irwin, 2003).

A definition of superstitiousness should also make clear the posited conceptual relationship of superstitions to paranormal beliefs in general. To the extent that empirical evidence for the authenticity of paranormal phenomena has yet to be accepted unreservedly by most conventional scientists a case might be made that beliefs in ESP, PK, and post-mortem survival are superstitious, too. Indeed, sceptical commentators (e.g., Vyse, 1997) often use synonymously the terms *paranormal belief* and *superstition*, and even one eminent parapsychologist (Thalbourne, 1997, p. 224) has conceded the legitimacy of this usage in light of the present state of progress in parapsychological research. Some questionnaire measures of superstitiousness accordingly have included items about diverse paranormal phenomena rather than traditional superstitions alone (e.g., Killen et al., 1974; Preece & Baxter, 2000). On the other hand, this approach clearly does not take due account of the factor analytic studies of paranormal belief. If superstitiousness is to be identified more closely with the essence of traditional superstitions there is a need to examine these beliefs more closely. In this regard the contributions of folklorists are an invaluable resource.

Superstitions in folklore

Of all groups of people with an academic interest in superstitions folklorists are probably the most active, judging by their prolific output

both in journals and books. Many traditional social customs, such as the exchange of decorated eggs at Easter or saying “Bless you!” when someone sneezes, are performed with scant appreciation of their original purpose, and one of the objectives of folklorists’ study of superstitions is to track back through written records in an effort to identify the circumstances under which a superstition initially arose and the rationale of the belief at that time. Although superstitions are popularly thought to be thousands of years old, many have much shorter histories and their origins are quite readily traced. The belief that carrying a rabbit’s foot brings luck, for example, arose in the twentieth century (Ellis, 2002); so, too, did the notion that Friday the 13th is in some way fateful (Hirschfelder, 2001). On the other hand, seemingly recent superstitions may also be adaptations of much older beliefs. The twentieth-century belief that it is unlucky to light three cigarettes with the same match is predated by a belief that it is unlucky to light three candles or lamps with the same taper (Radford & Radford, 1948/1995, pp. 102–103).

On the basis of their literature searches several folklorists have compiled comprehensive encyclopaedias or dictionaries of superstitions (e.g., De Lys, 1948; Opie & Tatum, 1989; Radford & Radford, 1948/1995; Roud, 2004). My scrutiny of these sources suggests five major themes in superstitious beliefs. The following descriptions of these themes should not be taken as a proposed taxonomy of superstitions; some superstitions represented in the encyclopaedias entail more than a single theme, and a few isolated cases do not fit readily under any category. Where possible, for the convenience of ready comparison each of the major themes is exemplified by a superstition concerning apples; in many cultural mythologies the apple tree was considered a sacred object (e.g., as in the Garden of Eden myth) and perhaps for this reason the apple became the subject of many different traditional beliefs.

Theme one: Negative superstitions

By far the most frequently described theme relates to circumstances which are said to condemn the experient to personal misfortune or “bad luck”. Cases with this general theme have elsewhere been termed *negative* superstitions (Irwin, 2007; Wiseman & Watt, 2004). By way of illustration, according to an old English belief, if an apple is eaten without first being polished it draws the attention of the Devil to the person concerned (Potter, 1990/1993, p. 9). In the verbal formulation of a negative superstition the nature of the misfortune may be relatively specific or it

may be manifold and unspecified. Thus, in the example of the unpolished apple the forms of diabolical havoc that will be wreaked are left unsaid. By contrast, under the superstition that to take apple blossom into a house will imperil the health of an occupant of the house (Opie & Tatum, 1989, p. 3), the bad luck is rather more specific. The alleged inevitability of the consequent misfortune also may vary across negative superstitions. The outcome usually is taken to be inescapable, but in a few instances one's ill fate reportedly can be avoided by performing some other offsetting superstitious act or so-called "countermagic" (Potter, 1990/1993, p. 52); for example, to break a mirror is said to instigate seven years' bad luck, *unless* the shards of the mirror are buried (Potter, 1990/1993, p. 127). In addition, the circumstances deemed to precipitate misfortune may variously entail the referent person's action (e.g., walking under a ladder), failure to act (not polishing the apple before consumption), or passive involvement as the object of another's act (being the occupant of the house into which apple blossom is brought). At this point it is unclear if each of these variations in the theme of negative superstitions warrants explicit formulation as subthemes, but in any event the variations do call for greater acknowledgment by researchers. The same observation may apply to other major superstitious themes.

Theme two: Positive superstitions

Another common theme among traditional superstitions concerns circumstances deemed to precipitate good fortune or luck for the experient. This category is essentially the converse of Theme one and has been labelled *positive* superstitions (Irwin, 2007; Wiseman & Watt, 2004). An example is the belief that the person who has the "last bite" of an apple (i.e., eats the core) will have good luck (Opie & Tatum, 1989, p. 227). Again, the specificity of the consequent good fortune may vary from one positive superstition to another. As in the case of the last bite of the apple the person's luck is usually global and unspecified. Under another superstition, a sudden inexplicable itch in one's right palm is said to signify the imminent receipt of money (Radford & Radford, 1948/1995, p. 206); here the person's good fortune is made quite specific. Further, as with negative superstitions, there may be variations in the extent to which the recipient of the good luck plays an active role in the supposedly inductive event.

Although the terms positive and negative superstitions at first sight might seem logically to encompass all possibilities there are other super-

stitutions that do not principally concern simply good or bad luck.

Theme three: Divinatory superstitions

A substantial group of superstitions documented by folklorists concern divination or rituals for magically discerning the future. As apples are closely associated with love and sex in western culture, many superstitions about apples are divinatory. If a young woman wishes to know the identity of her future partner, it is said she should throw an apple peel over her left shoulder and it will come to rest in the shape of the initial of her future partner's first name (Radford & Radford, 1948/1995, p. 17); or if she recites the alphabet while twisting the apple by its stem, the letter being voiced at the moment the stem breaks is the initial of the future partner's name (Opie & Tatum, 1989, p. 4). Note that divinatory superstitions essentially are attempts to know rather than actively influence the future. On the other hand these superstitions typically do not indicate the extent to which the prophesied outcome is binding, nor do they indicate possible costs of resisting the outcome. As with some other recorded precognitive experiences (Rhine, 1955; Steinkamp, 2000) people still appear able to exercise free will by intervening in a way that prevents the prophesied event from ever taking place. Thus, presumably one is always free to wed someone with a different initial than that indicated by the rituals of apple divination. In addition, it may be appropriate to discern subthemes within this category. In some cases, for example, the divinatory act may lay not so much in an overt ritual as in the cognitive application of superstitious knowledge. Examples include interpersonal expectations rooted in astrology (e.g., "if I were to meet a Virgoan he or she would be obsessively neat and fastidious") and other characterological superstitions (e.g., "if I were to meet a red-haired person he or she would have a fiery temper"). In any event it is important to appreciate that superstitions about Virgoans, red-haired people, and the like are intrinsically divinatory.

Theme four: Sorcerous superstitions

Another group of superstitions comprise rituals held to modify the (immediate or distant) future in a desired way. Thus, one may chant traditional charms², spells or curses, or wear, carry, or otherwise dis-

²My fellow pedants may be interested in an observation by Potter (1990/1993, p. 145) that in most instances the common contemporary usage of the term *charm* (as in "good luck charm" and "charm bracelet") is inappropriate in that a charm is in fact a recited chant. Items commonly referred to as

play amulets and talismans, each in a magical endeavour to improve one's present lot or to impair the lot of another person against whom there is a grudge. Several subthemes in these so-called sorcerous superstitions are discernible. The focus of some of these superstitions is curative; examples include the old adage, "an apple a day keeps the doctor away", and the belief that warts can be cured by cutting an apple in half, rubbing the wart with each half, tying the two halves together again, and finally burying them (Radford & Radford, 1948/1995, p. 17). Another subtheme is protection; thus, a heart-shaped amulet was said to protect the wearer from heart disease (Potter, 1990/1993, p. 7). A third subtheme of sorcerous superstitions concerns the use of amulets and talismans to ensure personal good fortune or similar personal advantage; many superstitious beliefs evident among professional and collegiate competitive sports players (e.g., wearing one's "lucky" socks in an important game)³ fall in this group (Burger & Lynn, 2005; Womack, 1992) and arguably, so too may the use of herbs in an endeavour to induce magical powers such as clairvoyance (Radford & Radford, 1948/1995, pp. 189–190). Finally, the subtheme in some other sorcerous superstitions is rather more vindictive, with evil or harm wished upon another person (Roud, 2004, p. 163); for example, it is said that a malefic spell may be placed on a person by reciting a traditional curse while pushing pins or thorns into a small model of the person (Haining, 1979/1990, pp. 171–173).

Theme five: Survivalist superstitions

A number of superstitions are associated with death or more generally, with the notion that some element of human existence may survive bodily death. Although they might not come readily to mind when one is asked to give examples of a superstition, these so-called survivalist superstitions are well documented by folklorists (e.g., Roud, 2004, pp. 57–72). Many death customs, such as putting coins on the closed eyes of the deceased, stem from old superstitions about the fate of the soul at the time of death (Opie & Tatum, 1989, pp. 116–17; Potter,

"charms" are most often talismans or amulets.

³Jahoda (1970) discerns an additional subtheme here. That a person opts to wear "lucky socks" in a sporting contest, he argues, is an *idiosyncratic* superstition because there is no socially shared view that this person's socks (or indeed, sporting socks in general) are lucky. Perhaps this deserves consideration as a subtheme in the construction of questionnaire items. On the other hand, there certainly is a socially shared superstition that one can have certain (unspecified) sporting gear that will bring luck during a match, so at least in this instance Jahoda's distinction between idiosyncratic and socially shared superstitions is rather fuzzy.

1990/1993, p. 60; Radford & Radford, 1948/1995, pp. 127–129). An example of a survivalist superstition is the belief that at the time of death the soul leaves the body in the form of a small flame which later may often be seen in the churchyard where the body is buried (Radford & Radford, 1948/1995, pp. 112–114).

As mentioned above, there are a few instances of superstition that do not fit readily within the above themes, but these seem to be the main topics evident in folklorists' compilations. Now, it may strike readers that the categorisation of even some common superstitions under the five themes might not be as straightforward as it might first appear. By way of illustration, consider the popular superstition about the four-leafed clover. An attempt to categorise this belief readily reveals that the specific theme inherent in this superstition will vary according to the wording used to enunciate it. The belief that to pick and keep a four-leafed clover will "bestow luck and prosperity" (Roud, 2004, p. 244) surely is a positive superstition (Theme two). On the other hand, the belief that similar good fortune may be secured by purchasing a commercially grown, laminated four-leafed clover (Haining, 1979/1990, p. 17) is actually a sorcerous superstition (Theme four). Thus, the statement "four-leafed clovers are lucky" resonates with more than one superstitious theme. This example illustrates the inappropriateness of using the above schema as a definitive taxonomy of superstitions (and incidentally, it may also serve as a caution to researchers that the wording of items in a superstition survey requires particular care).

Nonetheless, the primary purpose of my attempt to discern themes in folklorists' encyclopaedias of superstition is to raise awareness of the potential range of items that may warrant inclusion in a questionnaire measure of superstitiousness. It will already be evident that some superstition themes have closer links with other currently recognised factors of paranormal belief than with superstitiousness. Theme three (divinatory superstitions) is already represented in paranormal belief questionnaires by items about precognition and astrology. Further, many beliefs included under Theme four (sorcerous superstitions) are similar to items that tap alternative health practices; admittedly, only a few paranormal belief questionnaires (e.g., Grimmer & White, 1990; Lindeman & Aarnio, 2006) have given due cognizance to alternative health practices, but while acknowledging this deficiency I would suggest that its solution may best be sought in amendments to the way we index the health practices factor rather than in an elaboration of the superstitions factor.

Similarly, the philosophical essence of Theme four (survivalist superstitions) is probably encompassed already by the paranormal belief factor relating to spiritualism and post-mortem existence. Although these issues are surely a matter for future empirical (especially factor analytic) resolution, the measurement of superstitiousness by paranormal belief questionnaires may very likely be enhanced by more rigorous attention to Themes one and two (negative and positive superstitions), including the subthemes associated with these categories.

Superstitiousness and Belief in Luck

Given that positive and negative superstitions pertain to (good and bad) luck, it may be asked if superstitiousness, as a discrete component of paranormal belief, could usefully be defined in terms of a belief in luck. Let us first clarify what is meant by “luck” in this context. Objectively speaking, a lucky or unlucky outcome is governed purely by chance (Darke & Freedman, 1997b), but when people speak of “good luck” or “bad luck” they typically are making subjective attributions about the cause of life events that are difficult to predict or control. Some social psychological research has helped to clarify these attributional processes (Darke & Freedman, 1997a, 1997b; Teigen et al., 1999). Thus, investigators have observed that a person may depict an event as a consequence of their “luckiness” if the event is deemed favourable (or at least, could potentially have been more unfavourable), deserved, and fair; good luck therefore is most often construed by the experient as a relatively stable, personal attribute. On the other hand, if a person regards an experience as unfavourable, undeserved, unfair, and arising in a risky situation, it may be blamed on “bad luck”; in other words, bad luck seems to be taken most commonly as an external force working in opposition to the individual. Certainly these contrasting attributional trends serve to reinforce the call by some parapsychologists (Irwin, 2000, 2007; Wiseman & Watt, 2004) to consider the possibility that positive superstitions and negative superstitions have somewhat different functions, and if only for this reason both of these superstitious themes should be represented in paranormal belief questionnaires.

Now, people in the general population (and indeed, professional philosophers) interpret the notion of “luck” in several complex and subtle ways (for an instructive review see Pritchard & Smith, 2004) and thus there may be various reasons why a person may ascribe some degree of

truth to a superstition. Some see the occurrence of a lucky event as a fortuitous or purely chance outcome (Rescher, 1995); such folk may therefore concede that, for example, Friday the 13th could be fateful simply because at least some of life's tragedies are bound purely by chance to fall on this date. Others interpret lucky (and even unlucky) outcomes in terms of self-fulfilling prophecy (H. Tills, cited in Haining, 1979/1990, p. 10; Wiseman, 2003). Fateful events therefore may arise on Friday the 13th fundamentally because some people expect them to do so and unwittingly behave in ways that make themselves more susceptible to these outcomes. Similarly, the student who carries a four-leafed clover into the examination room may perform well because he or she now feels more assured in taking the examination. In my many surveys of paranormal beliefs over the years I occasionally encounter a participant who concedes an element of truth in a given superstition but feels compelled to insert a marginal rider, "if the person believes it will". If people endorse superstitions for the above reasons they of course are *not* evidencing a belief in the paranormal. On the other hand, some people see luck not so much as a matter of chance but rather, as the product of a more magical or supernaturalistic mechanism (Pepitone & Saffiotti, 1997; Teigen, Evensen, Samoilow, & Vatne, 1999). Thus, Friday the 13th and four-leafed clovers are deemed by some to have consequences that are brought about by unknown magical means. It is under this specifically magical interpretation of luck that superstitions may reasonably be said to constitute a paranormal belief.

In conceptual terms a case may therefore be made for constructing superstitiousness in terms of a belief in magical luck, at least in respect to positive and negative superstitions. The empirical foundation for this view nevertheless is insufficient as yet. Previous research (Irwin, 2000) has demonstrated positive relationships between an index of belief in good luck (Darke & Freedman, 1997a) and all factors of paranormal belief except traditional religious belief, and also between an index of haplessness (an "unlucky life"; Lester, 1998) and four of the seven paranormal belief factors. It must be said the individual correlations were not large ($r = .13$ to $.54$ for *good luck*, $r = .06$ to $.33$ for *haplessness*), but according to independent research (Thalbourne, 1997) typically the correlations between superstitiousness and other paranormal beliefs also fall in this range. Perhaps the available data therefore may be said to provide a little encouragement for the notion that superstitiousness could usefully be indexed by items on the belief in luck. On the other hand

the superstitiousness scale used by Irwin (2000) did not tap the variety of subthemes in positive and negative superstitions identified earlier in this paper. More importantly, the two luck scales in this study did not distinguish between magical and other interpretations of luck. In short, it remains to be shown directly that belief in magical luck provides a measure of superstitiousness that equals or exceeds that yielded by traditional superstitions. If the latter can be achieved there may be some advantage in formulating a definition of superstitiousness in terms of a belief in magical luck and in actualising this definition by way of a measure of superstition as an element of paranormal belief.

Having reviewed the evolution of superstitiousness measures, some definitional issues, the range of traditional superstitions identified by folklorists, and the relationship between superstitiousness and belief in luck, directions for the future development of superstitiousness measures may be addressed.

Thoughts on future measures of superstitiousness

By way of a conclusion to this paper I now survey some issues that warrant consideration in the construction of an improved measure of superstitiousness as an element of paranormal belief. For over two decades the *Paranormal Belief Scale* (PBS; Tobacyk & Milford, 1983) and its subsequent version the *Revised Paranormal Belief Scale* (RPBS; Tobacyk, 1988, 2004) have been the most widely used multidimensional measures of paranormal belief (Goulding & Parker, 2001). The scales' three-item Superstition factor has been used as an index of superstitiousness both in its own right (e.g., Dudley, 1999) and for comparative purposes in multidimensional investigations of paranormal belief. As we shall see, however, there are some major deficiencies in this measure of superstitiousness. The following survey mentions these criticisms of the PBS/RPBS in the context of raising general psychometric issues and pursuing broader points arising from the analyses in previous sections of the paper.

The following suggestions bear upon the measurement of superstitiousness as an element of paranormal belief. It is assumed, therefore, that the items on superstitiousness are to be embedded in a pool of additional items that index the remaining factors of paranormal belief (whatever these may be). This is essential to the psychometric assessment of the superstitiousness items, as (at least a subset of) these items must be

shown to form a discrete factor that loads on the domain of paranormal belief tapped by the questionnaire as a whole. That the other factors of the PBS or RPBS could serve this purpose deserves critical scrutiny but is an issue beyond the focus of this paper.

Item content

The foregoing review has identified three potential types of superstitiousness measure. One was advocated by Nixon (1925), that is, that superstitiousness might best be indexed by items that seem to have some superficial empirical authenticity but in fact are scientifically unsubstantiated. The use of scientifically unsubstantiated beliefs instead of traditional superstitions would help to reduce the reticence of respondents in admitting to their superstitious beliefs. As is evident in Nixon's own questionnaire, however, it is difficult to devise statements of scientifically unsubstantiated beliefs without mentioning other paranormal beliefs. Indeed, if Nixon's items were included in a paranormal belief pool most would be lost from a potential superstitiousness factor because of their strong loading on the other paranormal belief factors. The measurement of superstitiousness as an element of paranormal belief may therefore not be practicable using Nixon's criterion for item content.

Another style of superstitiousness measure was tentatively mooted above; it focuses on the belief in luck as a magical mechanism. Items probing the respondent's notions of good luck and bad luck might be capable of tapping the essence of traditional (positive and negative) superstitions without so strongly evoking the reticence associated with questions about belief in superstitions. Previously developed measures such as the *Belief in Good Luck* scale (Darke & Feedman, 1997a) and the *Haplessness* scale (Lester, 1998) may provide some inspiration in this regard, but a new superstitiousness measure should focus more closely on the magical thinking inherent in the belief in luck. That is, the new items should stress not so much luck as a personal characteristic but rather, luck as an external force that is deemed to be influenced by either (intentional) rituals (e.g., crossing one's fingers) or the (unintentional) occurrence of freakish events (e.g., finding a four-leafed clover). By including items on belief in luck as well as traditional superstitions in the paranormal belief item pool, the relative utility of these two sets of items could conveniently be assessed.

The third type of superstitiousness measure is the most familiar

one, that comprising statements of traditional superstitions (e.g., the luckiness of finding a four-leafed clover, the unluckiness of walking under a ladder, divining the identity of one's future partner by twisting an apple by its stem). In terms of item content, a serious deficiency in the PBS/RPBS Superstitions subscale needs to be redressed: this subscale surveys negative superstitions only (viz., "Black cats can bring bad luck", "If you break a mirror, you will have bad luck", and "The number '13' is unlucky"). If traditional superstitions are to be used to index superstitiousness the scale should also include some positive superstitions (Wiseman & Watt, 2004).⁴ In an initial investigation the item pool might also include divinatory, sorcerous, and survivalist superstitions but as mentioned previously, I suspect that these items also would typically be lost from the superstitiousness factor because of their loading on the remaining paranormal belief factors.

In addition, for the sake of comprehensiveness the formulation of traditional superstitions for an improved scale should take some initial cognizance of the various subthemes I deduced earlier from folkloric compilations. Some of these may well prove rather too subtle to add much to the measurement of superstitiousness, but this would be sorted out in the preliminary factor analysis, and any redundant or superfluous items then could be discarded.

As noted earlier, one of the drawbacks in using traditional superstitions as an index of the superstitiousness dimension of paranormal belief is that some people endorse these statements for reasons other than a belief in *magical* luck. It may be necessary to clarify, either in the wording of the items themselves or perhaps by way of a general prefatory statement, the sense in which "luck" is used in these items. For example, the item "The number '13' is unlucky" could be reworded as "The number '13' in some magical way can lead to bad fortune"⁵.

The paranormal belief questionnaire ideally should have interna-

⁴Editor's note: See also Dagnall, Parker and Munley's (2007) paper in this issue.

⁵Again, in the rewording of superstition items the pedant may find some advantage in taking account of the distinction between luck and fortune. Luck entails *chance* processes that, according to paranormal believers, can magically be biased by certain circumstances or rituals. Fortune, on the other hand, simply refers to an emotionally significant (good or bad) outcome, whether or not it depends in any way on chance. By way of illustration consider the following scenario. I apply to a research funding body for funds to sustain my ongoing research. After due deliberation the funding committee informs me that I have been granted £100,000. Some people may then be moved to exclaim, "Wasn't that lucky!" In a strict sense, however, this outcome actually was not a product of luck, for the reason that no chance processes were at play; the decision by the committee was reached through critical scrutiny of my application and an objective assessment of its merits. The grant therefore was an instance of good fortune rather than good luck. For further discussion of this distinction see Pritchard and Smith (2004).

tional appeal, that is, the traditional superstitions included in the items pool should be meaningful to people of many nations. English superstitions about acorns and rooks, for example, may signify little to respondents in some other countries (see also Díaz-Vilela and Álvarez-González, 2004). To this end also, potentially idiosyncratic superstitions can be worded in a general way. Rather than referring to “lucky cricket boots”, for example, an item may address “lucky sports gear” that the respondent might be inclined to wear when playing in an important competitive sporting match.

Some consideration should also be given to the various psychological facets of belief (both for superstitions and for paranormal beliefs as more generally conceived). Although a distinction between beliefs and attitudes was once hotly debated (Fishbein and Ajzen, 1975; Oskamp, 1977), the distinction is no longer rigidly enforced; thus, beliefs are now deemed to have cognitive, affective (or emotional), and behavioural components. The measurement of paranormal belief has tended to focus almost exclusively on the cognitive facet, that is, whether or not a given proposition is intellectually accepted. Much more rarely tapped is the behavioural component, that is, whether the respondent acts upon his or her belief. To their particular credit, Zebb and Moore’s (2003) superstitiousness scale includes items on both cognitive and behavioural aspects of the construct; thus, two of its items are “I believe that walking under ladders will bring bad luck” and “I avoid walking under ladders”. This strategy could usefully be applied in any new measure of superstitiousness (whether in terms of traditional superstitions or a belief in luck). Thus, Campbell (1996) has observed that while many people publicly deny that a superstition could have any validity whatsoever, they may still admit to performing superstitious acts (e.g., saying “touch wood” or actually knocking on wood), whether it be as a social convention or observed just in case there is some truth in the traditional belief. Affective facets of paranormal beliefs could also be assayed; that is, some people may invest considerable emotional energy in a paranormal belief, and this could help to differentiate the person for whom such a belief is intellectually endorsed from the person for whom the same belief is the very basis of their sense of reality. Although this consideration may have greater bearing on religious paranormal beliefs, it may be pertinent also to superstitiousness, especially if this construct is indexed via a belief in luck.

I turn now from item content to some more general psychometric

considerations.

Other psychometric issues

The problem of reticence in acknowledging superstitiousness beliefs has been noted at several points in the paper. Such reticence may be at least one of the factors underlying the observation that among all paranormal belief factors the Superstitions subscale of the PBS and RPBS shows by far the lowest of mean scores. With responses made on a 7-point Likert-type scale (1 = "Strongly Disagree", to 7 = "Strongly Agree"), the mean RPBS Superstitions score is reported to be 1.6 (Tobacyk, 2004). A new superstitiousness scale must therefore incorporate prefatory instructions to respondents that will foster frankness in responses to the items. The only concession to this requirement in the RPBS appears to be the statement, "This is a sample of *your own* beliefs and attitudes" (Tobacyk, 1988). Although it is important to remind respondents that personal rather than societal beliefs are being surveyed, a somewhat more facilitatory preface is called for. Thus, it would be appropriate to include to a more explicit statement that responses should be as frank as possible without reference to other people's attitudes to the paranormal. In addition, some mention might be made of the fact that according to Gallup and other national polls a majority of the population endorses at least some paranormal beliefs (e.g., Newport and Strausberg, 2001).

The presence of response reticence might also prompt the use of some type of "lie scale" in conjunction with the paranormal belief items (see Irwin, 2007). One of my previous surveys of paranormal belief (Irwin, 2003) yielded small but significant correlations between these beliefs and a tendency to give inconsistent responses to items in a separate questionnaire. It seems a (possibly small) number of respondents may show slightly higher paranormal belief scores in part because they complete questionnaires in a rather frivolous manner. The inclusion of "lie scale" items or some such index of conscientiousness of responding is worth consideration.

RPBS Superstitions scores not only have a low mean but also low dispersion ($SD = 1.2$; Tobacyk, 2004). Whether or not this is a consequence of response reticence it is responsible for some awkwardness in statistical analyses. Superstitions scores essentially are distributed as a continuously declining curve, with a high number of people showing the lowest possible score and progressively fewer people yield-

ing higher scores. As the distribution of scores is not normal or “bell shaped” mathematical transformations of Superstitions scores should strictly be applied before they are subjected to parametric statistical analyses. Alternatively, a nonparametric analysis should be used. In either event there is a loss of statistical sensitivity, decreasing the likelihood of significant findings. If response reticence can not be sufficiently attenuated through the use of conducive instructions, the solution may lie in changing the item content, namely, from traditional superstitions to belief in luck. Certainly severe skewness of the distribution does not appear to be as great a problem with the currently available measures of belief in luck (Darke and Feedman, 1997a; Lester, 1998).

The range of response options can be an important consideration in the design of a questionnaire. Generally speaking, a choice between 6 or 7 possible responses seems to give sufficient breadth without leaving rarely used or redundant options. The main other issue is whether to offer an even or an odd number of options. Use of an odd number allows respondents to choose the middle “neutral” position (e.g., “neither believe nor disbelieve, or can’t decide”). By contrast, an even number of options forces commitment to a choice in one direction or the other (e.g., either “tend slightly to believe” or “tend slightly to disbelieve”). In my own experience of conducting surveys, the lack of a middle option irritates many participants and some may circle *both* options either side of the middle or circle in between them, thereby creating a dilemma for the investigator during data entry and a potential loss of data. The choice between an even and an odd number of response options might not be unduly problematic in the case of traditional superstitions, given the highly skewed pattern of responses, but it becomes an issue when designing response options that will also accommodate other (more normally distributed) paranormal beliefs or for use with “belief in luck” items.

Another criticism to be levelled at the PBS and the RPBS is their susceptibility to response sets. All but one of the 25 or 26 items in these questionnaires are so worded that choosing a higher response option signifies stronger belief in the paranormal; thus, some respondents quickly decide that they do not have any belief in the paranormal and circle the lowest response option for all items, I suspect without even reading the later items. The one item that is worded in the opposite direction (and thus has to be reverse scored) is Item 21 or 23; occurring so late in the scale many participants still select the lowest response op-

tion (in this instance signifying strong paranormal belief), despite the trend in their earlier responses being toward very strong disbelief.⁶ In the construction of a new measure of superstitiousness it is highly desirable, therefore, to mix the direction of the items, with some worded in favour of superstitious belief (e.g., “The number 13 is unlucky”) and others in opposition to such belief (“In itself a four-leafed clover can not be lucky”). Such a mix should be particularly evident at the beginning of the questionnaire in order to discourage the formation of a response set.

If the new superstitiousness items are embedded in a broader set of items about paranormal belief the questionnaire as a whole should be reasonably diverse, ranging from frankly crackpot ideas to notions that are given serious scrutiny by scientists. In this case the insertion of buffer items would serve little purpose. On the other hand, if the superstitions are to be surveyed separately, it may be advisable to mix them with buffer items that have a similar tenor but which do not pertain to superstitions and which may have a grain of truth. Such old saws as “A stitch in time saves nine” may be useful in this regard.

The PBS and the RPBS have also been criticised for the low numbers of items in their individual subscales; it will be recalled that the Superstitions subscale, for example, comprises only three items. As Lawrence (1995) and Hartman (1999) have noted, so few items are hardly likely to provide a rigorous measure of any psychological construct. A new superstitiousness scale therefore should be more extensive. This criterion should be met if cognitive, affective and behavioural facets of superstitiousness are surveyed and if the previously identified themes and sub-themes in traditional superstitions are represented, at least in the initial item pool compiled for factor analysis.

All three of the Superstitions items in the RPBS have also been found to evidence differential item functioning (DIF) for gender (Lange, Irwin, and Houran, 2000). That is, men and women respond differently to the individual Superstitions items, even after the level of their overall paranormal belief is taken into account. DIF has serious ramifications for the validity of measurement because it violates the assumption of local independence under which items’ measurement properties should

⁶Díaz-Vilela and Álvarez-González (2004) query the reliability of Item 23, given their finding of a lack of correlation between this item and the total scale; this outcome is probably a consequence of a response set operating in some participants so as to generate a response to this item at odds with their actual belief.

not be affected by extraneous factors such as gender and age. Any items that demonstrate DIF must be excluded before factor analysis is applied; thus, in the view of Lange et al. (2000), it remains to be shown rigorously that superstitiousness is indeed a component of paranormal belief. The basis of DIF in this case is not immediately evident. Certainly DIF can occur when questionnaire items are interpreted differently depending on the respondent's gender and age. Thus, if this process underlies the data of Lange et al. men and women appear to draw different meanings from an item such as "Black cats can bring bad luck". The formation of paranormal beliefs is known to be governed by thinking style (Irwin and Young, 2002), so the meaning drawn from a questionnaire item on paranormal belief may be affected by the differential application of intuitive and analytical thought processes which in turn may vary between men and women (Aarnio and Lindeman, 2005). In any event, when items for a new measure of superstitiousness are being generated, it would be difficult to anticipate which will be free from DIF; apparently the basic strategy needed here is to include a large number of items in the initial item pool and then administer these to a large, heterogeneous sample of people in order to identify *post hoc* the DIF-free items.

As with any rigorous psychological test a new superstitiousness subscale should be assessed extensively for its psychometric validity and reliability. The construction of the PBS (Tobacyk and Milford, 1983) was reasonably comprehensive in this regard and might profitably be used as a model.

The construction of a psychometrically adequate index of superstitiousness as a component of paranormal belief would therefore be a challenging project but not a daunting one. Had I the funds, statistical resources, and youthful energy I would happily undertake this work myself, but now in semi-retirement I live in the hope that other researchers will take up the challenge.

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Superstitious Belief — Negative and Positive Superstitions and Psychological Functioning

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Abstract

This study investigated Wiseman and Watt's (2004) finding that negative and positive superstitious beliefs were underpinned by different psychological mechanisms. 321 participants completed a self-report measure of neuroticism, the Revised Paranormal Belief Scale (R-PBS), negative and positive superstition scales, and the Positive and Negative Affect Scale (PANAS). Median splits were conducted on neuroticism, negative and positive affect. Endorsement of negative and positive superstitions was then compared across each variable. Positive superstitious belief items were endorsed more strongly than negative superstitious belief items across all measures. Main effects were observed for gender (women endorsed superstitious beliefs to a greater extent than men), neuroticism (high neuroticism group endorsed superstitious beliefs to a greater extent than the low neuroticism group) and affect (high negative and positive affect groups endorsed superstitious beliefs to a greater extent than low negative and positive affect groups). Crucially, this study failed to replicate the interactions reported by Wiseman and Watt (2004); where differences between groups narrowed for superstitious belief type. Correlations were found between: negative and positive superstitious belief items, the superstition sub-scale of the PBS and each measure of superstitious belief, and neuroticism. This pattern of results provided no support for Wiseman and Watt's (2004) findings.

Introduction

This study is concerned with exploring superstitious belief. In the context of this paper, superstition refers to the belief that certain events or omens are associated with bad luck or harmful consequences. This definition is further extended to include engaging in behaviours/actions that attempt to promote good luck and/or ward off bad luck (Wiseman and Watt, 2004). More generally, superstition implies a belief in fate and a lack of control (Dag, 1999).

Superstitious belief has frequently been measured using a sub-scale of the *Paranormal Belief Scale* (PBS) (Lange, Irwin, and Houran, 2000; Tobacyk, 2004; Tobacyk and Milford, 1983). This sub-scale contains three items on superstition. These items have been used in previous research to index superstitiousness as a distinct component of paranormal belief. Studies using the superstition sub-scale have found correlations between superstitious belief and poor psychological adjustment (Diaz-Vilela and Alvarez-Gonzalez, 2004; Wiseman and Watt, 2004); *Symptom Check List-90* (SCL-90-R), a global index of psychiatric symptomatology (Dag, 1999); dissociative experiences (Wolfradt, 1997); irrational beliefs (Roig, Bridges, Renner, and Jackson, 1998); low self-efficacy (Tobacyk and Shrader, 1991); high trait anxiety (Wolfradt, 1997); and neuroticism (Vyse, 1997). These findings are consistent with other studies of superstitious belief that report correlations between superstitious belief and emotional instability (Maller and Lundeen, 1934). Generally, research suggests that superstitious beliefs have their greatest influence when negative emotions are heightened (Dudley, 2000). Dudley (2000) found this to be true of paranormal beliefs as a whole, reporting that negative affect was positively correlated with level of paranormal belief.

The relationship between negative affect and superstitious belief is well documented. Padgett and Jorgenson (1982) observed that in Germany between 1918 and 1940 measures of economic threat were found to be directly related to measures of superstition. Overall, the body of research suggests that there is a clear relationship between poor psychological adjustment and paranormal belief. Persinger (1985) suggests that paranormal beliefs may serve to reduce anxiety. Superstitious belief may develop in anxious individuals in an attempt to overcome perceived uncertainties in the environment (Irwin, 2000; Jahoda, 1969; Malinowski, 1948). This notion is supported by Frost et al. (1993), who suggest that magical thinking (superstition) and other coping strategies are

likely to be employed in situations where individuals believe they have little or no control. In this context repetitive superstitious behaviour (i.e., carrying a lucky charm) may provide an illusion of control and consequently, reduce anxiety.

Although, numerous published studies have employed the superstition sub-scale (e.g., Dag, 1999; Roig et al., 1998; Rudski, 2004) the sub-scale is not without criticism. Particularly, Wiseman and Watt (2004) argue that the scale is potentially biased because it contains items which measure only “negative” superstitious beliefs. The sub-scale contains three items: black cats can bring you bad luck; if you break a mirror, you will have bad luck; and the number 13 is unlucky. These questions link superstition to bad luck, “they reflect the notion that certain behaviours (e.g., breaking a mirror) or omens (e.g., seeing a black cat) are magically associated with unlucky and potentially harmful consequences” (Wiseman and Watt, 2004, p. 1534).

On the basis of this observation Wiseman and Watt (2004) argue that the PBS sub-scale provides a narrow definition of superstition that may potentially restrict the study of superstition. Wiseman and Watt (2004) explicate that superstition is not simply associated with bad luck; some superstitions reflect a desire to bring about positive consequences by actively promoting good luck, or by avoiding bad luck. Wiseman and Watt (2004) contend that these beliefs may be adaptive and different from the maladaptive ones associated with unlucky and potentially harmful consequences. Consequently, Wiseman and Watt (2004) concluded that research on superstition using the PBS was limited and that a vital part of superstitious thinking had not been explored. To test this idea Wiseman and Watt (2004) conducted two studies.

Study one was a two-month long internet based study into superstitious beliefs. 4339 participants completed a single-item measure of self-perceived neuroticism, three negative superstitious beliefs and three positive superstitious beliefs. The superstitious belief items differed from those used in the PBS. The three negative items concerned: walking under a ladder (“Have you avoided walking under a ladder because it is associated with bad luck?”), breaking a mirror (“Would you be anxious about breaking a mirror because it is thought to cause bad luck?”), and the number 13 (“Are you superstitious about the number 13?”). The three positive concerned: crossing fingers (“Do you say ‘finger crossed’ or actually cross your fingers?”), touching wood (“Do you say ‘touch wood’ or actually touch or knock on wood?”), and carrying

a lucky charm (“Do you sometimes carry a lucky charm or object?”).

Wiseman and Watt (2004) found that women tended to endorse both types of superstition more than men. Also, positive superstitions were endorsed more strongly than negative superstitions. There was an interaction between gender and superstitious belief; the difference between genders narrowed for negative superstitions. Although this result was highly significant, only a medium effect size was reported ($\eta_p^2 = .07$).

In addition to this, Wiseman and Watt (2004) looked at the relationship between self-perceived neuroticism and superstitious belief. Only participants at the extremes of the self-perceived neuroticism scale (i.e., responding “Strongly Agree” or “Strongly Disagree”) were included in this analysis. Wiseman and Watt (2004) found that high neurotics endorsed both types of superstition more strongly than low neurotics. There was an interaction between neuroticism and superstition; the difference between high and low neurotics narrowed for positive superstitions.

Wiseman and Watt (2004) undertook a second study ($n = 116$) to further explore the findings of study one. Study two used an established questionnaire measure of neuroticism, the *Revised Eysenck Personality Questionnaire* short scale (EPQ-R: Eysenck and Eysenck, 1991), and a measure of “positive” psychological adjustment, the Life Satisfaction Scale (Diener, Emmons, Larson, and Griffin, 1985).

The results of study two were similar to those of study one. Positive superstitions received higher levels of endorsement than negative superstitions. An interaction was found between superstition type and gender; the difference between men and women narrowed for negative superstitions. High neurotics endorsed both types of superstitious belief more highly than low neurotics. However, no interaction was found between neuroticism and superstitious belief. This finding may be explained by the large sample size and extreme scores used in study one. For life satisfaction a significant interaction was found between life satisfaction groups (high and low) and superstitious belief; the difference between high and low satisfaction groups was reduced for positive superstitions.

On the basis of these findings Wiseman and Watt (2004) concluded that previous research using the PBS sub-scale has questionable validity. They argue that future research needs to broaden the definition of superstition to include both positive and negative superstitions.

The present study

Whilst Wiseman and Watt's (2004) paper usefully explored differences between positive and negative superstitious beliefs, their research poses a number of questions of which two are investigated in the current paper. Firstly, how do their superstition items function in relationship to the PBS superstition sub-scale? If, as they suggest, the PBS superstition sub-scale measures negative superstitions, then it would be predicted that their negative superstition items would correlate much more strongly with the superstition sub-scale of the PBS than their positive superstition items. Secondly, the relationship between the Wiseman and Watt (2004) negative and positive items needs to be explored. More specifically, negative and positive superstitions as identified by Wiseman and Watt (2004), should be dissociated by participants' scores for neuroticism and affect (negative and positive). According to Wiseman and Watt (2004) positive superstitious beliefs reflect a desire to bring about beneficial consequences by actively courting good luck, or avoiding back luck, whilst negative superstitious beliefs reflect the notion that certain behaviours are associated with unlucky and potentially harmful consequences. This distinction is not clearly defined, nor is the independence of the items fully demonstrated in the Wiseman and Watt (2004) paper. The current paper intends to investigate this further.

In addition to exploring the inter-scale correlations the independence of scales will be investigated by attempting to replicate Wiseman and Watt's (2004) interactions for gender and neuroticism and by examining the performance of the superstition items in relation to another psychological variable; affect. Affect has been selected because it has been found to be associated with paranormal belief (Dudley, 2000; King, Burton, Hicks, and Drigotas, 2007). Dudley (2000) found negative affect to be positively correlated to paranormal belief. Similarly, King et al. (2007) report that positive affect is related to increased belief in superstitious and magical beliefs. King et al. (2007) believe that participants in a good mood are more intuitive, open-minded, creative, and engaged with what appears to be reality; a mode of thinking that increases the production of non-rational associations. The *Positive and Negative Affect Scale* (PANAS) (Watson, Clark, and Tellegan, 1988) contains measures of both positive and negative affect, for this reason PANAS will be included in the current study alongside Wiseman and Watt's (2004) self-report measure of neuroticism.

In line with Wiseman and Watt (2004) the following hypotheses were tested: Females will endorse superstitious belief more than males with differences in belief narrowing for negative beliefs. Participants high in neuroticism will endorse superstitious belief more than those low in neuroticism with differences in belief narrowing for positive beliefs. If Wiseman and Watt (2004) are correct and negative and positive superstitions are dissociable then interactions should also be observed for affect (negative and positive).

Method

Participants

321 participants took part in the study, 110 males and 202 females (nine participants chose not to indicate their gender). The mean age was 27 years, $SD = 10.87$, range 17–62. The sample comprised of full and part-time undergraduate students enrolled on a Psychology programme (28%) and adults from the general population (72%). Members of the general population were recruited via research students using snowball sampling. 53 participants failed to complete the self-perceived neuroticism measure.

Materials and procedure

Participants were first asked to specify demographic information about themselves; age and gender. They were then asked to indicate their agreement with a single-item measure of self-perceived neuroticism (“I tend to worry about life”). The measure contained five response options (anchored with “Strongly Agree” and “Strongly Disagree”). This measure of neuroticism has face validity and was used in study one of the Wiseman and Watt (2004) paper; a similar pattern of results was observed in study two using the Revised Eysenck Personality Questionnaire short scale (EPQ-R) (Eysenck and Eysenck, 1991).

Participants were also asked to complete the *Revised Paranormal Belief Scale* (R-PBS) (Tobacyk and Milford, 1983; Tobacyk, 1988; Lange et al., 2000). The R-PBS has been demonstrated to possess adequate validity (Tobacyk, 2004; Tobacyk, 1995a, b). The R-PBS is a 26-item self-report questionnaire. Participants are presented with statements such as: “There is a devil”, and “Witches do exist” and respond on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Within the R-PBS is a three item sub-scale measuring superstition: “Black cats can

bring bad luck"; "If you break a mirror, you will have bad luck"; and "the number 13 is unlucky". The superstition sub-scale has been found to have good internal reliability (Cronbach's $\alpha = .80$) (Lange et al., 2000). Overall, the R-PBS is considered to be a conceptually and psychometrically satisfactory measure of paranormal belief (Tobacyk, 2004).

Next, participants indicated the degree to which they endorsed three negative and three positive superstitious beliefs using five response options (anchored with "Definitely Yes" and "Definitely No"). The items were designed by Wiseman and Watt (2004). The three negative items concerned: walking under a ladder ("Have you avoided walking under a ladder because it is associated with bad luck?"), breaking a mirror ("Would you be anxious about breaking a mirror because it is thought to cause bad luck?"), and the number 13 ("Are you superstitious about the number 13?"). The three positive items concerned: crossing fingers ("Do you say fingers crossed or actually cross your fingers?"), touching wood ("Do you say touch wood or actually touch wood?"), and carrying a luck charm or object ("Do you sometimes carry a lucky charm or object?").

Finally, participants completed the Positive and Negative Affect Scale (PANAS) (Watson, Clark, and Tellegan, 1988). The PANAS consists of two 10-item mood scales and provides a measure of *negative* (NA) and *positive* affect (PA). The scale items are comprised of words that describe different emotions and feelings (e.g., afraid, enthusiastic). NA reflects negative feelings and emotions (e.g., shame, distress, fear and hostility). PA reflects positive feelings and emotions (e.g., enthusiasm, pride, determination and interest). Participants were asked to rate the extent to which they were experiencing the emotions and feelings at the present moment. Responses ranged from 1 (very slightly or not at all) to 5 (extremely). PANAS has been found to have good internal consistency; NA (Cronbach's $\alpha = .85$) and PA (Cronbach's $\alpha = .89$) (Crawford and Henry, 2004).

Results

Responses to each of the superstition items was transformed into a 5-point scale (ranging from 5 = "Definitely Yes", to 1 = "Definitely No"). Scores for the three positive and three negative items were averaged to provide an overall mean score for each superstition type.

The internal reliability for the scales was assessed using Cronbach's

alpha (α): negative superstition items had good reliability ($\alpha = .84$), positive superstition items had acceptable ($\alpha = .68$)¹, and overall the superstition items had good reliability ($\alpha = .83$). The R-PBS superstition sub-scale demonstrated good reliability ($\alpha = .83$), and both PANAS mood scales were found to have good reliability; Negative Affect (NA) ($\alpha = .82$) and Positive Affect (PA) ($\alpha = .83$). Scale means and standard deviations (*SD*) appear in Table 1.

Table 1: Scale means and standard deviations

Scale	<i>N</i>	Mean	<i>SD</i>
Negative Superstitions	320	2.82	1.30
Positive Superstitions	320	3.15	1.14
R-PBS Superstition	320	2.57	1.48
Negative Affect	320	1.50	0.54
Positive Affect	320	2.91	0.82
Neuroticism	268	2.58	1.09

Wiseman and Watt (2004) failed to validate the superstition items in their study. They did not report the relationship between their items and those on the R-PBS, or the relationship between the two sets of superstitious belief items. These comparisons are necessary in order to discriminate between positive and negative superstitions. If positive and negative superstitions are driven by different psychological processes then it would be expected that negative items demonstrate a higher correlation with the R-PBS than positive items. In order to test this relationship a series of correlations were conducted. Significant correlations were found between: the superstition sub-scale of the R-PBS and Wiseman and Watt's negative superstition items, $r = .68$, $df = 318$, $p \leq .001$; the superstition sub-scale of the R-PBS and Wiseman and Watt's positive superstition items, $r = .40$, $df = 318$, $p \leq .001$; and between Wiseman and Watt's negative and positive superstition items, $r = .58$, $df = 318$, $p \leq .001$. The difference between the positive items and the negative items was analyzed, $Z = -5.11$, $N_1 = 320$, $N_2 = 320$, $p \leq .001$. This suggests that the relationship between the negative items and the superstition sub-scale of the R-PBS is stronger than for the positive items.

Although the negative Wiseman and Watt (2004) have a stronger correspondence to the superstition sub-scale of the R-PBS than the pos-

¹Given that ($\alpha = .68$) indicates acceptable reliability all three items were used in the analyses. Further examination of the positive Wiseman and Watt (2004) items found that removing Item 3 ("Do you sometimes carry a luck charm or object?") produced a good reliability ($\alpha = .83$).

itive items the two item types were found to share considerable variance. This was explored using a principal component analysis, which revealed the presence of one component (see Appendix A).

The self-report measure of neuroticism was found to correlate with: the superstition sub-scale of the R-PBS, $r = -.18$, $df = 265$, $p \leq .002$; Wiseman and Watt's negative superstition items, $r = -.23$, $df = 265$, $p \leq .001$; and Wiseman and Watt's positive superstition items, $r = -.28$, $df = 265$, $p \leq .001$.

In order to determine if responses to negative and positive superstition items could be dissociated, two-factor mixed analysis of variance (ANOVA) analyses were computed for: gender and superstition type, neuroticism and superstition type, negative affect and superstition type, and positive affect and superstition type. All statistically significant results (alpha level of .05) are presented below. Effect sizes are reported for all significant probability values; the values of *Partial Eta Squared* (η_p^2) are provided after each statistically significant F ratio. Median splits were performed on the scores for neuroticism and PANAS scales (negative affect and positive affect) to produce low (below median) and high conditions (above median) (see Table 2).

Table 2: Participant (N) endorsement of superstition by gender, level of neuroticism and level of negative and positive affect (SD in parentheses)

	N^a	Positive Superstitions	Negative Superstitions
<i>Gender</i>			
Male	110	2.77 (1.12)	2.53 (1.33)
Female	201	3.34 (1.10)	2.97 (1.26)
<i>Neuroticism</i>			
Low Neuroticism	123	2.86 (1.15)	2.57 (1.28)
High Neuroticism	144	3.44 (1.06)	3.03 (1.28)
<i>Negative Affect</i>			
Low Negative Affect	169	2.97 (1.13)	2.63 (1.25)
High Negative Affect	151	3.35 (1.11)	3.03 (1.33)
<i>Positive Affect</i>			
Low Positive Affect	169	3.04 (1.15)	2.66 (1.26)
High Positive Affect	151	3.27 (1.11)	3.00 (1.33)

^aOf the 321 participants who responded, nine chose not to indicate their gender and 53 chose not to complete the neuroticism measure and one did not provide superstitious belief scores.

Gender

2 (Superstition Type: within) \times 2 (Gender: between) mixed ANOVA revealed a significant main effect of gender; women endorsed superstitions to a greater extent than men, $F_{(1,309)} = 16.32, p \leq .001, \eta_p^2 = .05$. Also, there was a significant main effect of superstition type; positive superstitions were endorsed to a greater extent than negative, $F_{(1,309)} = 19.90, p \leq .001, \eta_p^2 = .061$. No interaction was observed between superstition type and gender, $F_{(1,309)} = 0.93, p > .05$.

Neuroticism

2 (Superstition Type: within) \times 2 (Neuroticism: between) mixed ANOVA revealed a significant main effect of neuroticism; participants high in neuroticism endorsed superstitions to a greater extent than participants low in neuroticism, $F_{(1,265)} = 25.22, p \leq .001, \eta_p^2 = .087$. Also, there was a significant main effect of superstition type: positive superstitions were endorsed to a greater extent than negative, $F_{(1,265)} = 16.45, p \leq .001, \eta_p^2 = .058$. No interaction was observed between superstition type and neuroticism, $F_{(1,265)} = 0.69, p > .05$.²

Negative affect

2 (Superstition Type: within) \times 2 (Negative affect: between) mixed ANOVA revealed a significant main effect of negative affect; high negative affect endorsed superstitions to a greater extent than low negative affect, $F_{(1,318)} = 10.84, p = .001, \eta_p^2 = .033$. Also, there was a significant main effect of superstition type: positive superstitions were endorsed to a greater extent than negative, $F_{(1,318)} = 26.78, p \leq .001, \eta_p^2 = .078$. No interaction was observed between superstition type and negative affect, $F_{(1,318)} = .04, p > .05$.

Positive affect

2 (Superstition Type: within) \times 2 (Positive Affect: between) mixed ANOVA revealed a significant main effect of positive affect; high positive affect endorsed superstitions to a greater extent than low positive affect, $F_{(1,318)} = 5.42, p = .021, \eta_p^2 = .017$. Also, there was a significant main effect of superstition type: positive superstitions were endorsed to a greater extent than negative, $F_{(1,318)} = 26.43, p \leq .001, \eta_p^2 = .077$. No

²Wiseman and Watt (2004) used the two extreme ends of the self-perceived neuroticism scale. To ensure parity between their study and the current one this procedure was replicated, and the above pattern of results was again observed (see Appendix B).

interaction was observed between superstition type and positive affect, $F_{(1,318)} = 0.86, p > .05$.

Discussion

The results of this study fail to support those of Wiseman and Watt (2004). Although positive superstitions were more highly endorsed than negative superstitions there was no evidence to suggest that participants (men vs. women; high neuroticism vs. low neuroticism; high negative affect vs. low negative affect; high positive affect vs. low positive affect) differ in the way they endorse positive and negative superstitions. The interactions reported by Wiseman and Watt (2004), where differences narrowed for superstition type were not observed in the current study.

Wiseman and Watt (2004) were critical of the superstition sub-scale of the R-PBS arguing that the sub-scale items tap only into negative beliefs. They noted that not all superstitions fall into this category and that some superstitions reflect a desire to bring about beneficial consequences by promoting good luck, or by avoiding bad luck. Whilst the difference between positive and negative superstitions is an important one to consider, this paper finds no evidence to support the contention of Wiseman and Watt (2004) that positive superstitions differ in function from negative superstitions. In the current study a higher positive correlation was found between the R-PBS superstition sub-scale and Wiseman and Watt's (2004) negative superstition items than between the R-PBS superstition sub-scale and the positive superstition items. However, both negative and positive superstition items were found to be positively correlated and share significance variance.

The results of this study are consistent with previous research, which has reported a relationship between paranormal belief and poor psychological functioning (Dudley, 2000; Padgett and Jorgenson, 1982; Maller and Lundeen, 1934). This study provides further support for this notion; measures of neuroticism and negative affect were found to correlate with superstitious belief. This study also found support for King et al. (2007), participants high in positive affect more readily endorsed superstitious beliefs. As with neuroticism and negative affect no interaction was observed for superstition type; endorsement of superstition was not found to vary as a function of belief type. The overall pattern of results suggests that superstitious beliefs (whether positive or negative)

have a similar psychological function.

The finding that women endorsed superstitious beliefs to a greater extent than men needs to be treated cautiously. It is unclear whether women are more superstitious, or simply interpret items differently to men. Lange et al. (2000) found that differential item functioning (DIF) produced differences on the superstition sub-scale of the R-PBS. Close inspection of the Wiseman and Watt (2004) negative items reveals that two of their negative superstition items are similar in content to those incorporated in the R-PBS subscale (e.g., breaking a mirror and the number 13). Thus the current findings do not necessarily imply that women are “more superstitious” than men. Lange et al. (2000) contend that when a measure has not been purified and group differences exist these remain open to alternative explanations (e.g., DIF). For this reason Lange et al. (2000) advocate using their two factor cluster formulation (New Age Philosophy and Traditional Paranormal Belief) over the original R-PBS scoring. Unfortunately, this does not provide a discrete measure of superstitiousness. The important finding in the context of the current study was that differences in superstitious belief were not found to narrow as a function of superstition type, as predicted by Wiseman and Watt (2004).

Similarly, the overall difference between positive and negative superstition items must be interpreted cautiously. Mean differences may reflect scale differences rather than being indicative of strength of belief. Although the items appear to have face validity, Wiseman and Watt (2004) failed to norm the items and assess them for frequency of occurrence. Whilst this does not invalidate the items, their psychometric integrity has yet to be authenticated; a factor that clearly limits the usefulness of findings produced. Fortunately, as with gender, the current results are still of worth because the dissociation of negative and positive superstitions is assessed via interaction and not main effects.

The current study used the same single-item self-perceived measure of neuroticism as Wiseman and Watt (2004). This measure was used to ensure that the current study was directly comparable to Wiseman and Watt (2004). In addition to this the single-item measure had the benefits of being quick to complete (reduced respondent fatigue, boredom and frustration), and minimised respondent refusal (Bergkvist and Rossiter, 2007; Robins, Hendin, and Trzesniewski, 2001). This item has face validity being similar to items on commonly used personality measures (e.g., *Revised NEO Personality Inventory*, NEO-PI-R; Costa

and McCrae, 1992). Whilst the validity of single item measures can be questioned, single items have been used in numerous published articles to measure a range of constructs: subjective well-being (Diener, 1984; Sandvik, Diener, and Seidlitz, 1993); life satisfaction (Campbell, Converse, and Rodgers, 1976); attachment style (Hazan and Shaver, 1987); affect; (Russell, Weiss, and Mendelsohn, 1989); relationships (Aron, Aron, and Danny, 1992); and self-esteem (Robins et al., 2001). One way of assessing the validity of the item in the current study was to examine the pattern of correlations across the neuroticism measure, the R-PBS superstition measure and PANAS. Published studies have frequently reported there to be a small positive correlation between: neuroticism and traditional superstitious belief (Sjöberg and Wahlberg, 2002), and between neuroticism and magical thinking (Lindeman, Keski-Vaara, and Roschier, 2000). With regard to affect small-moderate correlations have been reported between neuroticism and negative affect (NA) and zero correlations between neuroticism and positive affect (Larsen and Ketterlar, 1989; 1991).

The current study found a similar pattern of correlations to these previous studies: a small positive correlation between neuroticism and the R-PBS superstition sub-scale³, small/moderate correlation between neuroticism and negative affect, and a zero correlation between neuroticism and positive affect. With regard to neuroticism, although Wiseman and Watt (2004) found a significant interaction between this variable and superstitious belief type in study one this was not replicated in study two. These findings taken as a whole suggest that the single-item self-perceived measure of neuroticism used in the current study is valid. In the context of the current study it would appear that the single item measure of self-reported neuroticism provided an acceptable balance between practical needs and psychometric concerns (Robins et al., 2001).

The results of the current paper fail to confirm Wiseman and Watt's (2004) contention that positive and negative superstitious beliefs serve different psychological functions. However, their broader claim that current measures of superstition are restricted is still valid. For this reason future studies need to adopt a wider definition of superstition than that provided by the R-PBS sub-scale in order to develop a more

³The self-report neuroticism scale in the current paper was scaled in such a way that 1 indicated 'Strongly Agree' and 5 indicated 'Strongly Disagree'. The reversed nature of this scale explains why the correlations in the results section are negative, and yet effectively represent a positive correlation here.

sophisticated measure of superstitious belief. This definition for example could include negative (events and omens associated with bad luck or harmful consequences) and positive superstitious beliefs (behaviours/actions that attempt to promote good luck and/or ward off bad luck). Clearly, the constructs of positive and negative superstitions deserve further research and more comprehensive scales of measurement need to be constructed and validated. The current Wiseman and Watt (2004) items like the R-PBS sub-scale provide only limited insights into the nature and function of superstitious belief.

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Appendix

Appendix A: Principal components analysis of the superstition items

The six superstitious belief items from the Wiseman and Watt (2004) paper were subjected to principal components analysis, with varimax rotation (Superstition Items: $N = 320$, Mean = 2.98, $SD = 1.08$). Prior to principal components analysis the data was found to be suitable for factor analysis. The correlation matrix revealed correlations of 0.3 and above for all items except positive superstition item 3 (correlations for this item ranged between .31 and .24). The Kaiser-Meyer-Okin value was 0.79, exceeding the recommended value of 0.60 (Kaiser, 1970, 1974) and Bartlett's test of Sphericity was found to be significant (Chi-square, $X_{15} = 811.03$, $p \leq .001$).

The scree slope and principal components analysis revealed the presence of one component with an eigenvalue exceeding 1 (3.30). This component explained 54.93 of the variance. The individual item loadings for the principle components analysis are shown in table 3.

Table 3: Loadings of principal components analysis of the superstition items

Item	Loading
Item 1	.829
Item 2	.829
Item 3	.743
Item 4	.742
Item 5	.763
Item 6	.486

Appendix B: Analysis of neuroticism using the extreme ends of the self-report scale

Similarly to Wiseman and Watt (2004) only those who responded at the extreme ends of the self-perceived neuroticism measure were included in the analysis (i.e., responding "Strongly Agree" or "Strongly Disagree"). There were 15 participants in the "low" self-perceived neuroticism group, and 36 in the "high" group. A 2×2 ANOVA (superstition type \times neuroticism) revealed a significant main effect of neuroticism; participants high in neuroticism endorsed superstitions to a greater extent than participants low in neuroticism, $F_{(1,49)} = 14.65$, $p \leq .001$, $\eta_p^2 = .23$. Also, there was a significant main effect of superstition type: positive superstitions were endorsed to a greater extent than negative, $F_{(1,49)} = 13.54$, $p \leq .001$, $\eta_p^2 = .22$. No interaction was observed between superstition type and neuroticism, $F_{(1,49)} = .001$, $p > .05$.

The Mediating and Moderating Effects of Loneliness and Attachment Style on Belief in the Paranormal

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Abstract

Previous research suggests that belief in the paranormal (BIP) is a response to trauma or a perceived lack of control in childhood (Irwin, 1992; in press). The present study extends this work by examining the degree to which loneliness and attachment style predict paranormal beliefs. A community sample of 253 respondents completed self-report measures of childhood trauma, fantasy proneness, loneliness and adult attachment style, plus Tobacyk's (1988) Revised Paranormal Belief Scale. Structural Equation Modelling (SEM) revealed that childhood trauma significantly predicts a global paranormal belief, with both fantasy proneness and social loneliness mediating this relationship. In contrast, neither emotional loneliness nor attachment style were associated with such beliefs. Subsequent examination of predictor interactions suggests fantasy proneness had a moderating effect on the relationship between childhood trauma and paranormal belief, with survivors of childhood trauma more likely to endorse paranormal beliefs if they, as adults, were also prone to fantasizing. Whilst a similar pattern of results was found for New Age Philosophy, Traditional Paranormal Beliefs (Lange, Irwin and Houran, 2000) were also moderated by feelings of loneliness caused by the absence of peer relationships. Results are discussed in relation to their support for Irwin's (1992) psychodynamic functions hypotheses of paranormal belief.

Introduction

Academic interest in the origins, maintenance and function of paranormal belief has grown steadily in recent years with researchers exploring numerous demographic, attitudinal, personality and cognitive correlates (Irwin and Watt, 2007). To date, no studies have examined the relationship between paranormal belief and either loneliness or attachment style.

Loneliness and paranormal belief

There are several reasons to expect loneliness will be associated with a more pronounced belief in paranormal phenomena. First, there is some evidence to suggest paranormal believers are more likely to be unmarried, separated, divorced or widowed, poorly educated, unemployed, of low socioeconomic status, or from an ethnic minority group (e.g., Emmons and Sobal, 1981). The implication here is that people belonging to these socially marginalised groups feel more alienated and more alone than those in non-marginalised cohorts (Bainbrige, 1978; Letts, 1992; Wuthnow, 1976). But, evidence for these trends is at best mixed (see Irwin and Watt, 2007). Moreover, people who are identified as belonging to apparently marginalised groups may not actually *feel* more marginalised or lonely. For instance, recent divorcees may relish their new freedom as an opportunity to rekindle old, and develop new, friendships (Pinquart, 2003). Similarly, members of ethnicity minorities may not feel isolated if they live in areas highly populated by people from their own ethnic background (Roe and Martin, 2007).

Researchers have traditionally viewed loneliness as a unidimensional construct reflecting the quantity, type and intimacy of peoples' interpersonal relationships (Rotenberg, 1999). Weiss (1989) argues there are distinct types of loneliness — social versus emotional — which relate to different relationships deficits. According to Weiss, social loneliness reflects a quantitative lack of social networks whereas emotional loneliness reflects a subjective lack of attachment. Further, social loneliness is alleviated by social integration with peers whilst emotional loneliness may be alleviated by satisfying attachment relationships with, for example, a best friend, romantic partner, or parent. These distinctions apply to adults, adolescents and children (DiTomasso and Spinner, 1997; Green, Richardson, Schatten, Lago, and Sorenson, 2001; Qualter and Munn, 2002). Subjective feelings of loneliness have so far been over-

looked as a potential predictor of belief in the paranormal with Weiss's argument having important consequences for any such relationship. If belief in the paranormal is a response to membership of a socially marginalised cohort (Emmons and Sobal, 1981), then social — but not emotional — loneliness should be predictive of paranormal belief. But, if such beliefs reflect a mechanism for coping with perceived (subjective) aloneness, then emotional loneliness should be a predictor too.

A second reason to suspect (feelings of) loneliness may be a significant predictor of belief in paranormal phenomena lies in their joint association with childhood trauma. Previous studies suggest loneliness is more pronounced in adults who claim to have been traumatised as children. Adult survivors of child sexual abuse, for instance, often have great difficulty forming close personal relationships and thus are more likely to feel lonely than those who have not been abused (Gibson and Hartshorne, 1996; Rew, 2002; see also Davis and Petretic-Jackson, 2000; Fergusson and Mullen, 1999; Tyler, 2002). Likewise, survivors of physical and/or sexual abuse (French and Kerman, 1996; Irwin, 1992; Lawrence, Edwards, Barraclough, Church and Hetherington, 1995; Perkins, 2000; Ross and Joshi, 1992), alcoholic parents (Irwin, 1994) and unsettled home environments (Lawrence et al., 1995) in childhood all report higher levels of paranormal belief in adulthood. One possibility is that adult survivors of childhood trauma will, in the absence of more active behavioral coping strategies (Rogers, Qualter, Phelps and Gardner, 2007), utilise paranormal beliefs as a mechanism for coping with feelings of social isolation (e.g., through spell-work or seeking advice from fortune tellers). In this case, subjective loneliness would moderate the positive relationship between childhood trauma and belief in the paranormal.

According to Irwin's (1992) *Psychodynamic Functions Hypothesis* (PFH) traumatic childhood experiences engender feelings of insecurity and helplessness, leaving survivors with a heightened need for control over unpredictable life events. This need for control, coupled with familial encouragement towards imaginative play¹ leads to an increased use of fantasy, and ultimately to belief in the paranormal as a means of coping with everyday uncertainty. Evidence that (adult) paranormal believers have a more pronounced illusion of control (Blackmore and

¹Irwin's (1992) full model includes other sociocultural factors such as family, peer and media attitudes and/or personal experiences of ostensibly paranormal events. These factors help determine the precise nature of paranormal beliefs (see also Irwin and Watt, 2007).

Troscianko, 1985; Rudski, 2004), a greater need for interpersonal control (Irwin, 1992) and a greater need for control, order and personal meaning in everyday life (Irwin, 2000; see also Schumaker, 1990) is consistent with the PFH.

Irwin has recently expanded his PFH by suggesting paranormal belief serves as a way of coping, not just with trauma, but with *any* perceived lack of control in childhood (Irwin, in press; Irwin and Watt, 2007). Accordingly, individuals who experience long periods of diminished control as children will develop an enduring need for mastery (control) over their lives which, as adults, leaves them compelled to explain all anomalous events by recourse to scientifically unacceptable beliefs. In this sense, the paranormal offers a framework by which unpredictable and uncontrollable life events can be cognitively reframed into a comprehensible and intellectually controllable schema (Irwin, in press). Evidence that paranormal belief correlates negatively with perceived childhood control based on interpersonal concepts such as parent dominance and co-dependence offers direct empirical support for Irwin's revised PFH (Watt, Watson and Wilson, 2007).

As yet, no research has examined the potentially mediating effect of loneliness within Irwin's (revised) PFH. One possibility is that childhood trauma increases the likelihood of poor interpersonal relating and feelings of loneliness which in turn leads to survivors adopting paranormal based coping strategies (e.g., visiting a fortune teller or medium). Using Structural Equation Modelling (SEM), the present study will investigate whether social and/or emotional loneliness has a mediating impact on the relationship between childhood trauma and paranormal belief.

Attachment style and belief in the paranormal

Another factor that impacts on loneliness, as well as mediating the negative effects of childhood trauma, is an individual's attachment style (Ernst and Cacioppo, 1998; Shapiro and Levendorsky, 1999). Attachment theorists argue that relational expectations in adulthood reflect a person's 'internal working model' of the self (as worthy of love, care and protection) and of others (as consistent, available and responsive caregivers) which itself stems from the nature and quality of attachment with primary caregivers during infancy (Cassidy and Shaver, 1999). Attachment style thus refers to the way in which individuals differ in their internal working models. According to Ainsworth, Blehar, Waters and

Wall's (1978) three-fold taxonomy, individuals with a 'secure' attachment style are generally comfortable sharing intimacy and relational inter-dependency. Those with an 'avoidant' attachment style, in contrast, tend to be mistrustful, feel uncomfortable with intimacy and prefer to shun close personal relationships. Finally, individuals possessing an 'anxious/ambivalent' attachment style tend to crave intimacy and inter-dependency whilst simultaneously fearing interpersonal rejection.

There are several reasons to suspect attachment style may impact on the development and/or maintenance of paranormal beliefs. First, avoidant attachment mediates the negative effects of child abuse and neglect on levels of psychological distress in later life (Roche, Runtz and Hunter, 1999; Shapiro and Levendosky, 1999). Thus, avoidant attachment may also have an indirect effect on the use of paranormal beliefs as a mechanism for coping with childhood trauma. Second, attachment style has a mediating relationship with fantasy proneness (Wheeler, 1999). Thus, an insecure attachment style could promote paranormal beliefs indirectly through its impact on a person's tendency to fantasise. Finally, a non-secure attachment style also has a mediating effect on chronic feelings of loneliness in both adolescence (Goosens, Marcoen, van Hees and van de Woestijne, 1998) and adulthood (Ernst and Cacioppo, 1998), with non-secure individuals experiencing more severe loneliness than their secure counterparts. Thus, if belief in the paranormal is a response to feelings of social isolation, then a non-secure attachment style should also be associated with greater paranormal belief.

Overview and hypotheses

The present study extends the PFH by investigating the possible associations that paranormal belief, childhood trauma and fantasy proneness have with loneliness and (adult) attachment style. Further, by emphasising subjective feelings of loneliness, rather than one's objective status as a member of a marginalised cohort and then examining these variables in relation to both childhood trauma and fantasy proneness, the present study also attempts to bridge the gap between Irwin's (1992) psychodynamic functions hypothesis and earlier social marginality accounts of paranormal belief (e.g., Bainbridge, 1978). Several hypotheses are forwarded.

First, childhood trauma should be mediated by fantasy proneness which in-turn should predict higher levels of paranormal belief (Irwin,

1992). Second, and in an extension to the PFH, (adult) loneliness should mediate the impact of childhood trauma and thus be proximally associated with paranormal beliefs. A similar argument can also be forwarded for a proximal link between attachment style and belief in the paranormal. Alternatively childhood trauma, loneliness and attachment style might have separate but interactive effects on paranormal belief, such that greater childhood trauma and adult loneliness interact with insecure attachment to create the psycho-social state most conducive to belief in paranormal phenomena. A final possibility is that childhood trauma, loneliness and attachment style all exert independent effects on belief in the paranormal, with loneliness also having a mediating effect on the relationship between these beliefs, childhood abuse and attachment style.

Method

Participants

Volunteer participants were sampled from randomly selected suburbs of two UK cities (Preston and Birmingham). A total of 300 questionnaires were distributed of which 253 participants returned useable questionnaires; a response rate of 84.3%. Respondents were predominantly male (61.3%) whose age ranged from 17 to 82 years (mean = 38.4 years; $SD = 12.4$ years). Whilst most were Caucasian (88.2%) a sizeable number of Afro-Caribbean (8.4%) and Asian (2.0%) respondents were also present. Finally, the vast majority of participants were employed (92.8%) although some (5.2%) were full-time students.

Materials

A booklet containing standardised instructions plus five psychometrically sound questionnaires and a debriefing sheet was constructed. Unless otherwise stated all items were measured along a 7-point Likert scale from 1 'strongly disagree' to 7 'strongly agree'. The five questionnaires were as follows:

The *Revised Paranormal Belief Scale* (RPBS; Tobacyk 1988) comprises 26-items assessing peoples' acceptance of a wide range of (ostensibly) paranormal phenomena with higher scores reflecting greater general acceptance of paranormal phenomena. Despite its critics, the RPBS remains one of the most widely used measure of paranormal belief currently available (Irwin, in press). According to its author, the RPBS

contains seven orthogonal factors reflecting beliefs in Psi, Witchcraft, Superstition, Spiritualism, Extraordinary Life Forms, and Precognition plus traditional religious beliefs (Tobacyk, 1988). Other have since argued it contains five (Lawrence and De Cicco, 1997; Lawrence, Roe and Williams, 1997), four (Hartman, 1999) and even two (Lange, Irwin and Houran, 2000) latent factors. The present study follows the most recent two-factor model in which global belief in the paranormal (BIP) is divided into 'new age philosophy' (NAP) which reflects beliefs about the validity of extrasensory perception, psychokinesis, astrology and out-of-body experiences versus 'traditional paranormal beliefs' (TPB) which explores beliefs about the existence of Heaven, Hell, the Devil, witchcraft and the efficacy of spells.

The *Child Abuse and Trauma Scale* (CATS; Sanders and Becker-Lausen, 1995) is a 38-item scale measuring an individual's self-reported experiences of childhood trauma (physical, emotional and sexual abuse plus neglect), with higher scores representing more abuse and trauma. According to its authors, the full CATS scale has a very high level of internal reliability ($\alpha = .90$).

The *Creative Experiences Questionnaire* (CEQ; Merckelbach, Horse- lenberg and Muris., 2001) is a 25-item measure of fantasy proneness which includes items such as 'many of my fantasies have a realistic intensity' Higher scores reflect a greater propensity to fantasize. Merckelbach et al. report an acceptably high level of internal consistency for the full CEQ ($\alpha = .78$).

The *Social and Emotional Loneliness Scale for Adults: Short Form* (SELSA-S; DiTommaso, Brannen, and Best, 2004) is a 15-item scale measuring adults' experiences of loneliness and includes items such as 'in the last year I felt alone when I was with my family', with higher scores reflecting greater loneliness. The SELSA-S comprises three highly reliable sub-scales representing 'social loneliness' ($\alpha = .90$), and 'family loneliness' ($\alpha = .89$), and 'romantic loneliness' ($\alpha = .87$). In the present study, family and romantic loneliness subscales were combined to form a new, internally reliable ($\alpha = .89$) sub-scale for 'emotional loneliness'

The *Attachment Style Questionnaire* (ASQ; Hazan and Shaver, 1987) consists of 3 statements describing secure, avoidant and anxious/ambivalent attachment styles. Secure attachment is defined as when "I find it relatively easy to get close to others and am comfortable depending on them and having them depend on me. I don't worry about being abandoned or about someone getting too close to me." By

comparison, avoidant attachment is described as when “I am somewhat uncomfortable being close to others; I find it difficult to trust them completely, difficult to allow myself to depend on them. I am nervous when anyone gets too close, and often, others want me to be more intimate than I feel comfortable being”. Finally, anxious/ambivalent attachment is when “I find that others are reluctant to get as close as I would like. I often worry that my partner doesn’t really love me or won’t want to stay with me. I want to get very close to my partner, and this sometimes scares people away.” Instead of using a seven point Likert scale, participants are simply asked to indicate which one of the 3 attachment styles best represents their own feelings about relationships with other people. This is done by ticking a box to the right of each description. Research suggests the ASQ is both a reliable and valid predictor of relational behaviour, cognitions and experiences (Crowell, Fraley and Shaver, 1999).

Demographics: Finally, participants were asked to indicate their age, gender, ethnicity, and occupational status.

Procedure

Questionnaires were distributed to randomly selected houses and businesses via ‘cold calling’ with participants given both written and if possible, verbal briefing. A detachable debrief sheet incorporating several trauma help line numbers was also included. Completed questionnaires were collected one day after distribution with no form of payment made. Anonymity and confidentiality was assured throughout, with all aspects of the study adhering to departmental and BPS ethics.

Results

Preliminary analyses

Mean and standard deviation scores, frequency data and internal reliability (alpha) coefficients for all variables are given in Table 1.

Criterion Variables: As table 1 shows, the global paranormal belief scale had a high degree of internal consistency with respondents reporting moderate level of global paranormal beliefs, new age philosophy and traditional paranormal beliefs. No outliers were identified with the scale normally distributed ($K-S = 1.06; p = .214; ns$) rendering it suitable for multiple regression analysis. This was also true of the two paranor-

Table 1: Means, standard deviations and reliability (α) coefficients for all variables ($n = 250$)

Variable ^a	Mean	(SD)	α^b
Global Belief in Paranormal	3.15	(1.23)	.95
New Age Philosophy	3.06	(1.32)	.91
Traditional Paranormal Beliefs	3.27	(1.47)	.83
Childhood Trauma	2.11	(.83)	.95
Fantasy Proneness	3.00	(.93)	.90
Insecure Attachment Style	23.20	%	n/a
Social Loneliness	2.58	(1.15)	.91
Emotional Loneliness	2.63	(1.26)	.89

^aRange from: 1 'strongly disagree' to 7 'strongly agree', except for *Insecure Attachment Style* where frequency (%) figures shown.

^bFinal alpha figures shown.

mal belief subscales, namely NAP ($K-S = 1.03$; $p = .236$; *ns*) and TPB ($K-S = 1.32$; $p = .061$; *ns*).

Predictor Variables: Those predictor variables for which alpha coefficients could be calculated all presented at least moderately high reliability coefficients (see table 1). Moderate levels of fantasy proneness and comparably low levels of childhood trauma, social loneliness and emotional loneliness were reported. All measures except (adult) attachment style were normally distributed with no outliers removed from any variable. Because of low numbers, avoidant and anxious/ambivalent attachment styles were merged to form a new 'insecure' attachment measure. Overall, 23.2% of respondents reported having an insecure attachment style.

Correlations

Correlations between criteria and predictor variables are presented in table 2. As this shows, global paranormal belief correlated positively with all predictor measures (r values from .15 to .34; all $p < .05$). Similar trends were found for the two paranormal sub-scales of New Age Philosophy and Traditional paranormal Beliefs with one exception; respondent gender did not correlate with NAP ratings. All predictor inter-correlations were all less than .80 implying an absence of multicollinearity.

Mediation effects

The potential mediating effects of social and emotional loneliness, insecure attachment, and fantasy proneness were examined via Structural Equation Modelling (SEM) using Maximum Likelihood estimation. Preliminary SEM showed that global belief in paranormal was not significantly predicted by either insecure attachment or emotional loneliness. SEMs that included these variables were not a good fit of the data.

The final SEM for global paranormal belief, illustrated in figure 1, provided an adequate fit of the data (CFI = .98; RMSEA = .06; $\chi^2 = 47.57$; $df = 24$; $p < .001$; $n = 250$).² All paths and covariances in figure 1 are statistically significant at $p < .001$ and confirm that belief in the paranormal is predicted by childhood trauma, fantasy proneness and social loneliness, with childhood trauma the strongest single predictor. Highly significant pathways between childhood trauma and both (a) fantasy proneness and (b) social loneliness were also found. Interestingly, the pathway between fantasy proneness and social loneliness was not significant.

Further SEM analyses were conducted for the two sub-factors of global paranormal belief (Lange et al, 2000). The final SEMs for both New Age Philosophy (CFI = .98; RMSEA = .06; $\chi^2 = 48.06$; $p < .001$; $n = 250$) and Traditional Paranormal Beliefs (CFI = .98; RMSEA = .05; $\chi^2 = 39.60$; $p < .001$; $n = 250$) factors provided adequate fits of the data. The significant paths for New Age philosophy are the same as for global paranormal belief (see figure 2). For traditional paranormal belief, social loneliness is no longer a significant mediator (see figure 3), and removal of the path from social loneliness to traditional paranormal belief provided a better fit to the data in this instance (CFI = .99; RMSEA = .04; $\chi^2 = 28.20$; $p < .001$; $n = 250$).

Interaction effects

To examine the moderator effects of fantasy proneness and social loneliness for global paranormal belief, four interaction terms were created by multiplying (a) trauma \times fantasy proneness, (b) trauma \times social loneliness, (c) fantasy proneness \times social loneliness and finally (d) trauma \times fantasy proneness \times social loneliness (Baron and Kenny,

²Researchers regard CFI $> .90$ and RMSEA $< .080$ as demonstrating an adequate fit of data in SEM (Bentler, 1990; Browne and Cudeck, 1993).

1986; Holmbeck, 1997). Consistent with these methodological guidelines all continuous variables were 'centred' to eliminate potential multicollinearity. Dichotomous measures were also subjected to 'effects coding' (i.e., recodes of -1, 1) prior to being entered into regression analysis.

A single hierarchical multiple regression examined the unique contribution of these four interaction terms on global paranormal belief ratings. Childhood trauma, fantasy proneness and social loneliness were entered on the first block as main effects. These were followed by the above interaction terms on the block two (see table 3). Inspection of tolerance statistics confirmed the absence of multicollinearity (all T's > 5.0). As table 3 shows, regression analysis revealed a highly significant three predictor model ($F_{(7,242)} = 9.19; p < .001$) which accounted for 21.0% of the total variance in global BIP scores ($adj R^2 = 18.7\%$). Of the four interaction terms only one — trauma \times fantasy proneness — was a significant predictor of global BIP ratings. Together, these four interaction terms explained 4.7% of global BIP variance which when combined represents a significant step in the final model ($F_{(4,242)} = 3.65; p = .007$).

Corresponding regression analyses were also performed to investigate the unique contribution of interaction terms on both New Age Philosophy (NAP) and Traditional Paranormal Belief (TPB) ratings (see tables 4 and 5 respectively). As table 4 shows, analysis again revealed a highly significant, albeit slightly different, three predictor model for New Age Philosophy ($F_{(7,242)} = 8.22; p < .001$) which explained 19.2% of the total variance in NAP ratings ($adj R^2 = 16.9\%$). This time, no interaction term was a significant predictor of NAP scores although one — trauma \times fantasy proneness — did approach significance. Together, the four interaction terms explained 1.8% of NAP variance which when combined was not a significant step in the final model ($F_{(4,242)} = 1.32; p = .263; ns$). Table 5 shows a highly significant two predictor model existed for Traditional Paranormal Beliefs ($F_{(7,242)} = 7.80; p < .001$) which explained 18.4% of the total variance in TPB scores ($adj R^2 = 16.0\%$). Here, two of the four interaction terms — trauma \times fantasy proneness *and* trauma \times social loneliness — were significant predictors. Together, the four interaction terms explained 4.8% of TPB variance which when combined was a significant step in the final model ($F_{(4,242)} = 3.53; p = .008; ns$).

Table 2: Correlations (r) between all paranormal belief (sub-)scales and all predictor variables ($n = 246$)

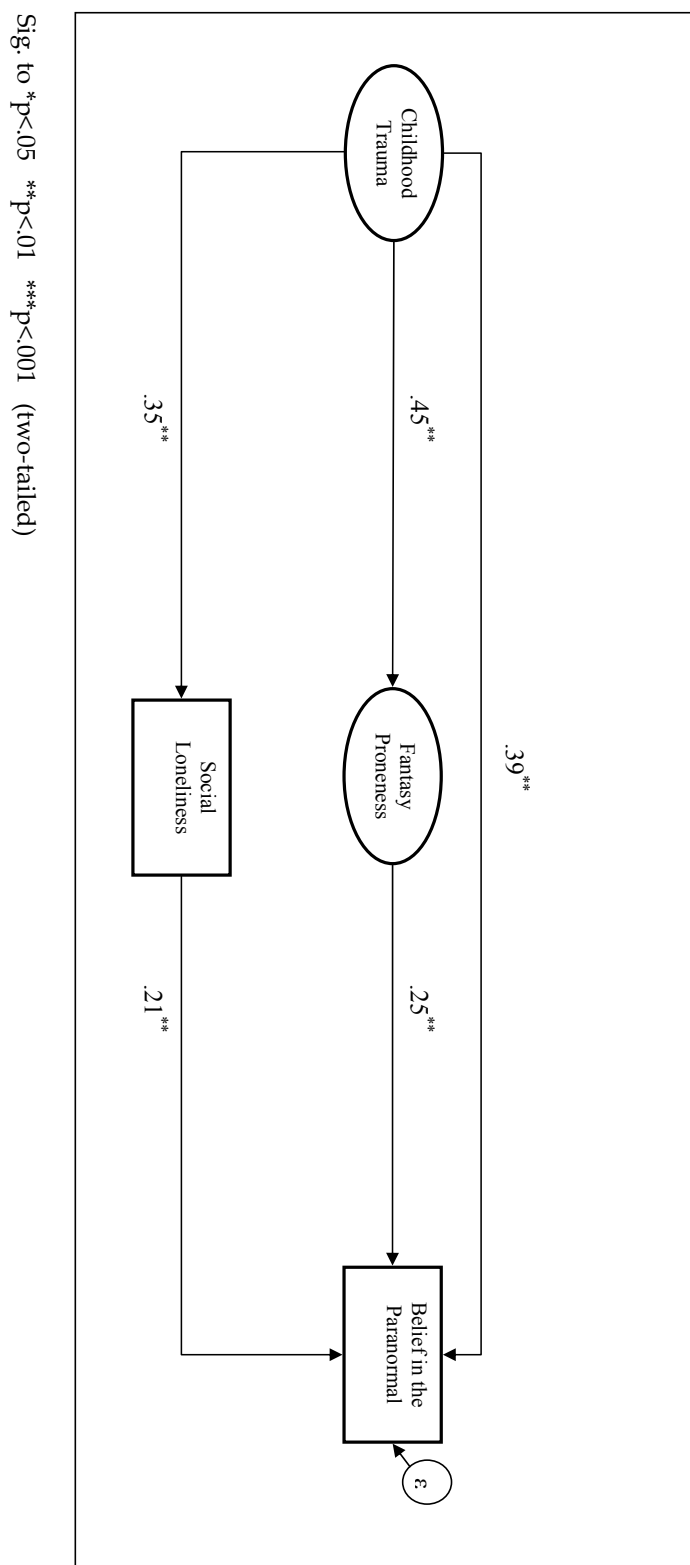
	Belief in para.	New Age philosophy	Trad. Para. beliefs	Gender	Age	Ethnicity	Childhood trauma	Fantasy proneness	Insecure attach.	Social loneliness	Family loneliness
BIP											
NAP	.95 ^{***}										
TPB	.92 ^{***}	.81 ^{***}									
Gender ^a	.16 [*]	.12	.18 ^{**}								
Age	.01	.03	.00	-.17 ^{**}							
Ethnicity ^a	.03	.05	.01	-.04	.26 ^{***}						
Child. traum.	.28 ^{***}	.32 ^{***}	.24 ^{***}	-.01	.02	.03					
Fant. prone.	.33 ^{***}	.30 ^{***}	.34 ^{***}	.23 ^{***}	-.17 ^{**}	-.08	.38 ^{***}				
Attach. style ^a	.23 ^{***}	.27 ^{***}	.15 [*]	.05	-.09	.04	.38 ^{***}	.29 ^{***}			
Soc. lone.	.27 ^{***}	.31 ^{***}	.20 ^{**}	.04	-.06	-.08	.34 ^{***}	.27 ^{***}	.39 ^{***}		
Fam. lone.	.18 ^{**}	.23 ^{***}	.10	.03	-.03	-.02	.47 ^{***}	.33 ^{***}	.35 ^{***}	.67 ^{***}	
Rom. lone.	.19 ^{**}	.19 ^{**}	.15 [*]	.07	-.05	-.07	.30 ^{***}	.26 ^{***}	.21 ^{**}	.54 ^{***}	.50 ^{***}

* $p < .05$ (one-tailed).

** $p < .01$ (one-tailed).

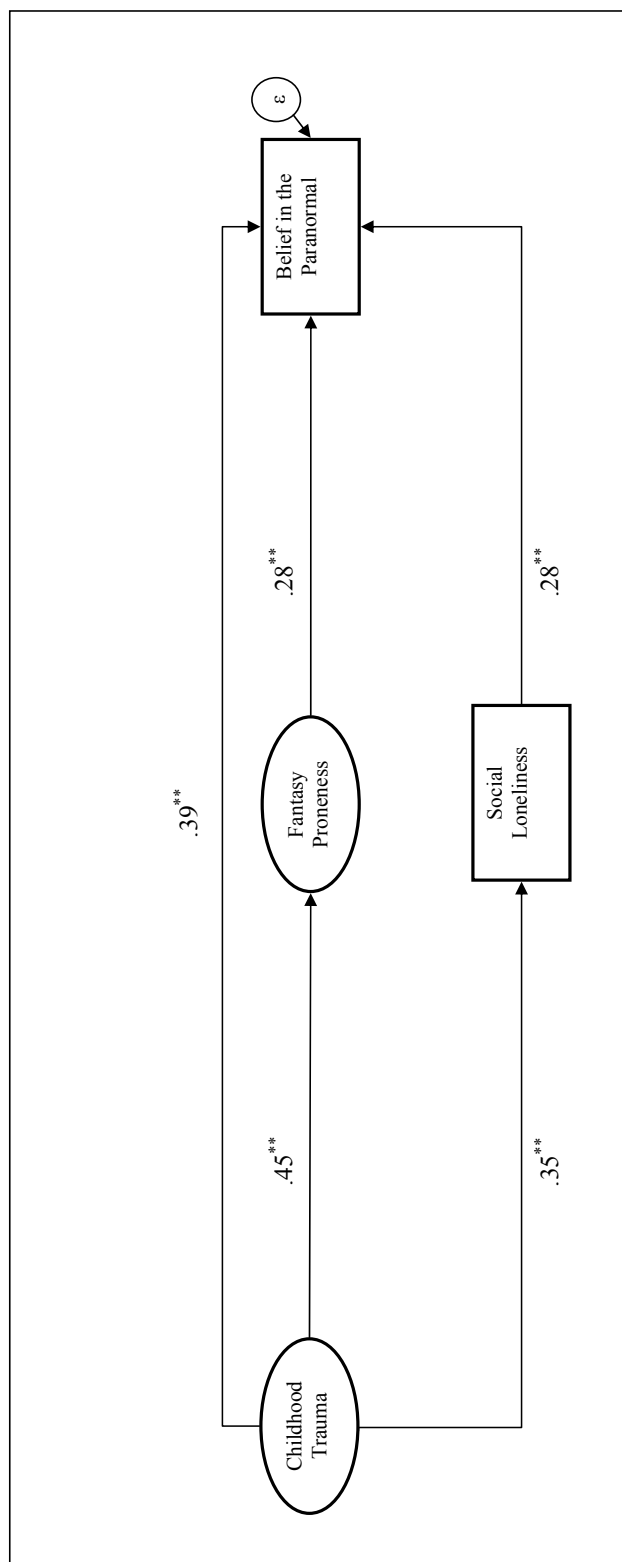
*** $p < .001$ (one-tailed).

^aDichotomous variables, hence r_{pb} ; positive scores reflect female gender, Caucasian ethnicity and insecure attachment.



Sig. to * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed)

Figure 1. Final SEM showing significant predictor and mediating variables for global belief in the paranormal (BIP)



Significant to **p < .01, ***p < .001 (two-tailed).

Figure 2. Final SEM showing significant predictor and mediating variables for New Age Philosophy (NAP)

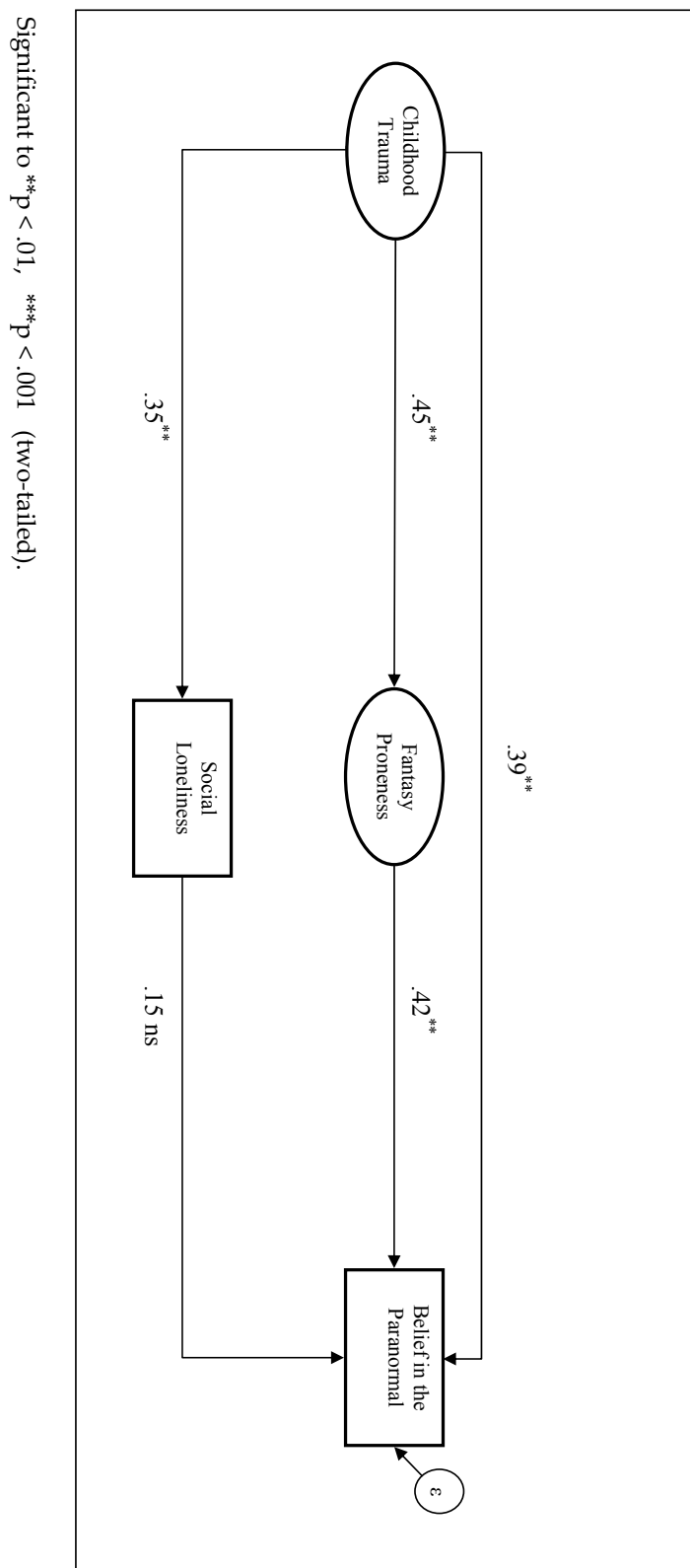


Figure 3. Final SEM showing significant predictor and mediating variables for Traditional Paranormal Belief (TPB)

Table 3: Predictors of global belief in paranormal (BIP) ratings: Final Model ($n = 250$, ANOVA: $F_{(7,242)} = 9.19$; $p < .001$)

Step	Predictor	b	($s.e._b$)	β	t	p	Cum. R^2	Cum. Adj. R^2	Change R^2
1.	Trauma	.31	.11	.21	2.79	.006	.16	.15	.16**
	Fantasy proneness	.36	.09	.28	3.95	<.001			
	Social loneliness	.12	.07	.12	1.83	.068 ^a			
2.	Trauma \times Fantasy proneness	-.27	.08	-.25	-3.35	.001	.21	.19	.05*
	Trauma \times Social loneliness	.08	.06	.09	1.38	.168			
	Fantasy \times Social loneliness	.00	.09	.00	.02	.982			
	Trauma \times Fantasy proneness \times Social loneliness	.04	.06	.05	.65	.517			

* $p < .01$ (two-tailed).

** $p < .001$ (two-tailed).

^a Approaches significance (two-tailed).

Table 4: Predictors of New Age Philosophy (NAP) ratings: Final Model ($n = 250$, ANOVA : $F_{(7,242)} = 8.22$; $p < .001$)

Step	Predictor	b	$(s.e.b)$	β	t	p	Cum. R^2	Cum. Adj. R^2	Change R^2
1.	Trauma	.36	.12	.22	2.94	.006	.17	.16	.17**
	Fantasy proneness	.28	.10	.19	2.80	.005			
	Social Loneliness	.19	.07	.17	2.50	.013			
2.	Trauma \times Fantasy proneness	-.17	.09	-.14	-1.90	.058	.19	.17	.02*
	Trauma \times Social Loneliness	.06	.06	.06	.98	.326			
	Fantasy \times Social Loneliness	-.03	.09	-.03	-.36	.717			
	Trauma \times Fantasy proneness \times Social Loneliness	.06	.07	.07	.85	.398			

*Not significant (two-tailed).

** $p < .001$ (two-tailed).

Table 5: Predictors of Traditional Paranormal Belief (TPB) ratings: Final Model ($n = 250$, ANOVA: $F_{(7,242)} = 7.80$; $p < .001$)

Step	Predictor	b	($s.e.b$)	β	t	p	Cum. R^2	Cum. Adj. R^2	Change R^2
1.	Trauma	.26	.14	.15	1.91	.058	.14	.13	.14**
	Fantasy proneness	.51	.11	.32	4.64	<.001			
	Social loneliness	.05	.08	.04	.61	.545			
2.	Trauma \times Fantasy proneness	-.28	.10	-.21	-2.80	.006	.18	.16	.05*
	Trauma \times Social loneliness	.14	.07	.13	2.03	.043			
	Fantasy \times Social loneliness	-.01	.10	-.01	-.11	.914			
	Trauma \times Fantasy proneness \times Social loneliness	.03	.07	.03	.40	.689			

* $p < .01$ (two-tailed).

** $p < .001$ (two-tailed).

Discussion

The aim of the present study was to investigate relationships between childhood trauma, fantasy proneness, loneliness, (adult) attachment style and belief in the paranormal with both mediator and interactive relationships explored. Overall, our model was significant and explained just under a fifth of total variance in global paranormal belief scores (Tobacyk, 1988); a sizeable amount given the diversity of such beliefs (Irwin, in press; Irwin and Watt, 2007). This was also true of two paranormal sub-scales (Lange et al, 2000) reflecting first adherence to a New Age philosophy (i.e., acceptance of ESP, PK, astrology and OBEs as genuine paranormal phenomena) and second, to the endorsement of traditional paranormal beliefs (i.e., the belief that Heaven, Hell, the Devil, witchcraft and spell-work really do exist/work).

As expected, childhood trauma was a significant, positive predictor of global paranormal belief, with individuals claiming to have been traumatized as children more likely to endorse the existence of paranormal phenomena as adults. Similar trends were also found for the two paranormal belief subscales (Lange et al, 2000), with adult survivors of childhood trauma more likely to adopt a New Age philosophy and/or endorse traditional paranormal concepts than those who were not traumatised as children. These data are consistent with a wider literature linking paranormal beliefs to childhood trauma (French and Kerman, 1996; Irwin, 1992; 1994; Lawrence et al, 1995; Perkins, 2000; Ross and Joshi, 1992) and thus offer further support for Irwin's claim that paranormal beliefs serve as a psychodynamic coping strategy for dealing with everyday distress and/or uncertainty (Irwin, 1992; in press). Similarly, fantasy proneness was also a significant predictor of paranormal belief and further, was itself predicted by childhood trauma. This was also true of New Age, and in particular, traditional paranormal beliefs.

Thus, fantasy proneness appears to be a mediator of global, New Age and more importantly, traditional paranormal beliefs, such that individuals who report experiencing childhood trauma are more prone to fantasizing which in turn, renders them more likely to endorse a paranormal mind-set. It seems fantasy proneness may be especially important in the formation and/or maintenance of beliefs about Heaven, Hell, witchcraft and the efficacy of spells. Further, the significant trauma \times fantasy interaction in subsequent analyses suggests fantasy proneness also moderates the relationship between childhood trauma and

paranormal belief, such that survivors of childhood trauma who subsequently resort to fantasy, are more likely to endorse global, New Age and traditional paranormal beliefs than are survivors who do not fantasise. These findings provide yet more support for Irwin's (1992) psychodynamic functions hypothesis.

Social loneliness was also a significant predictor of global belief in the paranormal and more specifically, of New Age Philosophy. Thus, subjective *feelings* of loneliness appear to be another factor in development and/or maintenance of these mind-sets. Surprisingly, social loneliness did not predict traditional paranormal beliefs implying that much of the global measure comprised acceptance of a New Age outlook (Lange et al, 2000).

Interestingly, this association between subjective loneliness and support for paranormal, and in particular New Age, phenomena only applies to feelings of loneliness derived from the physical absence of a social network. Emotional loneliness — the feelings of loneliness which stem from a perceived lack of closeness with a romantic partner or family members (Qualter and Munn, 2002) — has no impact on any form of paranormal belief. Thus it is individuals who feel lonely because of their limited social networks, not those who experience unsatisfactory relationships, who tend to endorse the existence of paranormal, and in particular New Age, phenomena. It seems that belief in the validity of ESP, PK, astrology and OBEs³ can somehow give those with few friends a mechanism by which to alleviate their feelings of isolation (see below for further discussion).

Evidence that social loneliness in adulthood was itself predicted by childhood trauma is also consistent with previous research (Shahar, 2001). Moreover, whilst social loneliness does not mediate the relationship between childhood trauma and traditional paranormal beliefs, it does moderate it. That is, social loneliness does not cause adult survivors of childhood trauma to adopt paranormal beliefs but it does influence the *strength* of their association (see Holmbeck, 1997). This is consistent with previous models implicating a direct link between traumatic childhood experiences and belief in the paranormal (e.g., Lawrence et al, 1995), and suggests the absence of a good social support network may exacerbate the use paranormal belief systems to engender a sense of mastery over life (Irwin, 1992; in press). Interestingly,

³Otherwise known as 'astral projection' in New Age circles (Hines, 2003).

this moderating relationship was only found for traditional paranormal beliefs. Survivors of childhood trauma who, as adults, also report feeling socially lonely are more likely to believe in Heaven, Hell, witchcraft and spell-work — but not in New Age concepts such as ESP, PK, astrology and OBEs' — than are survivors who do not feel lonely. It seems the presence versus absence of social loneliness in adulthood will influence the type of paranormal beliefs upheld by those claiming to have been traumatised as children. One tentative suggestion is that traditional paranormal concepts such as those associated with the afterlife (e.g., Heaven) and/or control (e.g., spell-work) are more useful for alleviating survivors' current loneliness (Benore and Park, 2004; Hoffman, 1997). This may have been used in childhood for dealing with, say, the death of a parent or forms abuse when one felt helpless (Irwin, 1992; *in press*). Why similar trends are not found for New Age beliefs has yet to be established.

In sum, it seems the distinction between social versus emotional loneliness may be an important factor in the development and/or maintenance of belief in the paranormal, and that those with poor social networks are for some reason drawn to a paranormal worldview. One possibility is that socially lonely people simply do not have enough friends who will challenge their beliefs about paranormal phenomena. But whilst sociocultural factors undoubtedly play a part in the formation and maintenance of paranormal beliefs (Irwin, *in press*; Schumaker, 1990), the general robustness of these beliefs (Irwin and Watt, 2007) suggests even believers who have rich social networks will not be persuaded to change their views on paranormal phenomena too easily. In short, current findings cannot be explained by insufficient social challenges to one's pro-paranormal beliefs.

A second, arguably more plausible, explanation is that feedback obtained from allegedly paranormal sources is used as a replacement for the support otherwise afforded by a good network of friends and/or family. In this case, it is the absence, rather than the poor quality, of emotional support that mediates the need for paranormal alternatives. It may be that socially lonely individuals gain comfort from visiting a fortune teller or medium (Hines, 2003). Likewise, believing in the possibility of paranormal contact with people far away (telepathy) or deceased (spirit contact) may offer at least partial relief from feelings of social isolation. Other scientifically unacceptable beliefs, such as the possibility of foreseeing one's own future (via precognition) or in the

efficacy of magical spells may also be used to offset feelings of social alienation, fostering a sense of hope that 'things will soon get better'. Indeed, previous claims that belief in the paranormal can engender a sense of control over one's interpersonal world (Irwin, 1992), and that adult survivors of childhood trauma will, in the absence of more active-behavioral coping strategies, utilise paranormal beliefs to deal with everyday stresses (Rogers, Qualter, Phelps and Gardner, 2007), support these suggestions.

Aside from supporting Irwin's (1992) PFH, current findings are also in line with the *Social Marginality Hypothesis* (SMH) of paranormal belief; namely that belief in the paranormal is used by individuals with marginal status to help them cope with the social alienation afforded to them (Bainbridge, 1978; Emmons and Sobal, 1981; Lett, 1992; Wuthnow, 1976). To date the SMH has received limited empirical support (Irwin and Watt, 2007). This may lie in the fact that the SMH tends to focus on a person's objective status as belonging to an apparently marginalised group, whilst overlooking (more) subjective feelings of loneliness. As noted earlier, it is quite feasible that those identified as belonging to an apparently marginalised group may not actually *feel* marginalised or lonely. In short, the link between social marginality and paranormal belief may lie, not in one's objective status of belonging to a particular demographic cohort, but rather in how one *subjectively* experiences their social status (e.g., Qualter and Munn, 2002). The tendency for previous studies to focus on objective states may explain the lack of robust evidence for the SMH.

Finally, and contrary to expectations, (adult) attachment style was neither a significant predictor nor a significant mediator of belief in the paranormal. Thus individuals with an insecure attachment style — who avoid or fear rejection from intimate personal relationships — are just as likely to endorse the existence of paranormal phenomena as are those with a secure attachment style who are comfortable with interpersonal intimacy. Moreover, an individual's inability to form close personal relationships has no impact on the extent to which they employ paranormal beliefs as a psychodynamic mechanism for coping either with childhood trauma (Irwin, 1992) or with social loneliness (Ernst and Cacioppo, 1998).

Methodological issues

The present study explored the paranormal beliefs of members of the British public and to that end, is more generalisable than comparable studies derived from student samples (e.g., Irwin, 1992). However, there are limitations to this work. First, whilst similar figures have been reported for social loneliness (SELSA) ratings elsewhere (e.g., DiTommaso, Turbide, Poulin and Robinson, 2007), childhood abuse and trauma (CATS) scores seemed unusually high compared to previous research in which mean CATS scores for college samples were all below 1.0 (Kent and Waller 1998; Sanders and Becker-Lausen (1995). One possibility is that members of the general public tend to experience more childhood trauma than those who go on to higher education. That said, other studies using both student and/or community based samples have found CATS scores that are comparable with those in the present study (Irwin, 1992; Krill, Fiszdon and Crosby, 1996). Nevertheless, current data relating to the PFH should be considered in the light of respondents' seemingly high levels of childhood trauma.

A second methodological limitation is that causality remains uncertain. Whilst there is no doubt childhood trauma precedes both loneliness and the acceptance of paranormal phenomena during adulthood, it is impossible to determine the temporal sequencing of associations between loneliness and paranormal beliefs. Longitudinal work is needed to ascertain whether social and emotional loneliness and attachment are implicated, along with childhood trauma and fantasy proneness, in the *development* of paranormal beliefs.

Third, by incorporating a self-report measure of childhood abuse and trauma, the present study is also limited to Irwin's original PFH (Irwin, 1992) and fails to consider the revised version in which paranormal belief is predicted by a perceived loss of control, rather than traumatization, in childhood (Irwin, in press). Future work should establish whether social loneliness is a mediator in this relationship too.

Fourth, the current study failed to differentiate between chronic versus transient loneliness. Loneliness can be related to short-term experiences such as loss, rejection and other social disappointments and thus, is sometimes a temporary phenomenon. Such feelings are common, particularly during life transitions and not in themselves pathological (Hymel, Tarulli, Hayden-Thomson, and Terrell-Deutsch, 1999). However, loneliness that lasts two or more consecutive years and which

causes behavioural, cognitive and/or interpersonal deficits *is* seen as pathological (Koenig and Abrams, 1999). As such, the duration of a loneliness experience may be important to its long term effects including those relating to paranormal beliefs. Indeed, the general robustness of these beliefs (Irwin and Watt, 2007) suggests it is those who suffer from *chronic* loneliness who are more likely to endorse the existence of paranormal phenomena. Further research needs to differentiate between transient versus chronic forms of both social and emotional loneliness.

A final criticism is that our measure of attachment style failed to incorporate the concept of disorganised attachment (see Cassidy and Shaver, 1999). Disorganized attachment behaviour if defined by the absence of an organised strategy to deal with stress in the presence of the caregiver (see Main and Solomon, 1990, for a full description), and is prominent in groups of at risk children exposed to neglect and/or abuse (Crittendon, 1985; Emanuel, 2004). As such, future studies should incorporate this attachment style as a potential predictor of paranormal belief.

Summary and conclusion

The present study is the first to examine the mediating and moderating roles of loneliness and adult attachment style as factors in the onset and/or maintenance of paranormal belief. Previous claims that childhood trauma and fantasy proneness are key antecedents which serve a psychodynamic coping function against everyday distress (Irwin, 1992), were supported with SEM analyses showing that fantasy proneness was both a mediator and moderator between childhood trauma and global belief in the paranormal. Further analyses showed that although childhood trauma continues to be important for explaining both New Age and traditional paranormal beliefs, it seems that the extent to which social loneliness acts as a mediator or moderator is related to whether one's paranormal belief reflect traditional or New Age concepts. Thus, in line with both versions of the PFH (Irwin, 1992; *in press*) it seems that paranormal beliefs may also serve as a means of coping with adult feelings of social isolation. In this sense, the present study offers a bridge between the psychodynamic functions and the social marginality hypotheses of paranormal belief. Whilst critics might argue that this suggestion casts paranormal believers as 'sad and lonely people' (D. West; personal communication) this was neither the inten-

tion nor the claim here. Instead, the current evidence confirms previous claims that there are many reasons why people believe in paranormal phenomena; feelings of social loneliness appear to be one of them.

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Openness to Experience and Belief in the Paranormal — A Modified Replication of Zingrone, Alvarado, and Dalton (1998–99)

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Abstract

The present study is a modified replication of Zingrone, Alvarado, and Dalton (1998–99) designed to explore the extent to which Openness to Experience predicts belief in paranormal phenomena in an unselected sample of respondents. Total Openness correlated significantly with Total Belief and with four of six factor subscales of paranormal belief. Total Belief correlated significantly with the Aesthetics, Actions, and Values facets of Openness. Contrary to Zingrone et al., Openness to Fantasy did not correlate with any measure of belief. Total Belief and three of the six belief factors were significantly predictable from the six Openness facets.

Introduction

Research in the field of parapsychology typically has focused on attempts to establish explanations for paranormal phenomena. Recently, however, researchers have begun to study patterns of belief in the paranormal, rather than paranormal phenomena themselves. That is, whether or not paranormal phenomena exist, it may be possible to uncover psychological mechanisms associated with belief in the paranormal. The present study is a modified replication of Zingrone, Al-

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varado, and Dalton (1998–99) designed to explore the extent to which *Openness to Experience* predicts belief in paranormal phenomena.

Definitions of paranormal belief

Definitions of paranormal belief range from narrow to broad. Thalbourne (e.g., 1995; Thalbourne, Dunbar, and Delin, 1995) advocated a unidimensional definition of paranormal belief measured using “sheep-goat” scales. These scales usually contained 5 to 15 items and determined whether a person was a “sheep” or a “goat”, where sheep are those who believe in ESP and goats are those who do not. Other researchers believed that a division into “sheep” and “goats” was too simplistic, and factor analytic investigations provided support for multidimensional definitions of paranormal beliefs (Irwin, 1993). Tobacyk and Milford (1983) used principal axis factor analysis with varimax rotation to reduce a 61-item scale to seven “meaningfully interpretable” common factors. Traditional religious belief, the largest factor, accounted for only 17.2% of the total variance. As a consequence, Tobacyk and Milford concluded that, contrary to past research, “the structure of paranormal belief is clearly multidimensional” (p. 1031).

Grimmer and White (1989) and Thalbourne (1995) expressed concern that 17 of the 21 correlations between subscales on Tobacyk and Milford’s *Paranormal Belief Scale* were statistically significant. Only one of these correlations exceeded .40, but the relationships among the subscales led these researchers to question whether the test actually measured distinct dimensions. Grimmer and White (1989) constructed a more “up-to-date” pool of 46 paranormal items. Factor analysis of responses to these items revealed seven main factors, accounting for 38.5% of the variance, that they interpreted as structures underlying belief in the paranormal. Both Grimmer and White and Tobacyk and Milford identified traditional religious belief and psi belief factors. Additionally, Grimmer and White found a structural psi factor similar to Tobacyk and Milford’s spiritualism factor and a popular science factor relating to extraordinary life forms. Grimmer and White added three new factors: alternative treatments (homeopathy, acupuncture, etc), paratherapies (astrology, numerology, etc), and “obscure unbelief.”

Personality correlates of belief in the paranormal

Researchers also have examined patterns of paranormal belief with regard to various personality factors. We propose that the personal-

ity characteristic of Openness to Experience can serve as an organizing principle to explain these individual differences correlates. For example, Tobacyk and Milford (1983) found stronger paranormal belief in individuals with a more external locus of control and with a stronger feeling of social alienation. They also found that individuals with high scores on dogmatism held stronger belief in witchcraft, and individuals with high scores in irrational belief believed more in superstition and spiritualism. Aarnio and Lindeman (2005) and Genovese (2005) reported significant positive correlations between intuitive thinking and paranormal belief. Genovese also reported significant positive correlations of belief with measures of schizotypal thinking. Hergovich (2003) reported significant positive correlations between belief in paranormal phenomena and both suggestibility and field dependence.

At least superficially, these correlates appear related to Openness, and they are consistent with our proposal that Openness is the best candidate for a fundamental personality characteristic that is conducive to belief in paranormal phenomena.

Openness to experience

Openness to Experience is one aspect of the “Big Five” personality model, which claims to “adequately describe” personality (McCrae and Costa, 1999; see also John and Srivastava, 1997) in terms of five major dimensions: *Extraversion*, *Neuroticism*, *Openness to Experience*, *Agreeableness*, and *Conscientiousness*. Primary sources for understanding Openness include McCrae and Costa (1985) and McCrae (1996). According to McCrae and Costa (1997, p. 826), “Openness is seen in the breadth, depth, and permeability of consciousness, and in the recurrent need to enlarge and examine experience.” Openness is a broad construct that includes cognitive, motivational, and behavioral components. It is best understood in terms of its six component facets: Openness to Fantasy, to Ideas, to Values, to Aesthetics, to Feelings, and to Actions. Open individuals are often characterized by such adjectives as creative, imaginative, broad interests, complex, independent, and untraditional. The nature of the construct thus makes it reasonable to expect a relationship between paranormal belief and Openness to Experience.

Prior research has suggested a relationship between Openness and belief in the paranormal. For example, Irwin (1990, 1991) showed that fantasy proneness correlates positively with general paranormal belief as well as with traditional religious belief, psi, witchcraft, spiritualism,

extraordinary life forms, and precognition. Irwin (1993) went so far as to make fantasy proneness the dominant feature in his model of the formation of paranormal belief, and his work leads us to expect a correlation between paranormal belief and Openness, particularly Openness to Fantasy. Other studies involving Openness to Experience lend support to the hypothesis that Openness relates to belief in the paranormal. For example, Dollinger, Leong, and Ulicni (1996) found that open people valued broadmindedness and imagination whereas closed people valued obedience, responsibility, and self-control. These characteristics of closed people may discourage them from “exotic” beliefs in the paranormal.

Despite the logic of the relationship, the association between paranormal beliefs and Openness to Experience rarely has been studied directly. McCrae and Costa (1997) reported an apparently unpublished correlation of .47 between Openness and the *Superstitious Thinking* scale on Epstein and Meier’s *Constructive Thinking Inventory*. In an unpublished doctoral dissertation, Smith (2004) reported a significant correlation between Openness and belief in paranormal phenomena, and she found the strongest relationship for the *Fantasy* facet of Openness. In the most relevant study to date, Zingrone et al. (1998–99) found significant correlations of a “Psi Index” measuring incidence of various psi experiences with Openness ($r = .20$) and its Fantasy facet scale ($r = .22$). The sample in this study, however, was pre-selected on the basis of presumed artistic talent and prior spontaneous psi experiences. In addition, Zingrone et al. examined the relationship between Openness and psi experience, not psi belief. In summary, then, no clear evidence exists for a relationship between Openness and belief in the paranormal.

Purpose of the Present Study

The present replication of Zingrone et al. (1998–99) differs in two major ways from the original study. First, we used an unselected sample of respondents. Second, we predicted positive correlations between measures of Openness and measures of belief in the paranormal rather than actual paranormal experiences. That is, because paranormal phenomena are by definition beyond the realm of “normal” belief, we suggest that one would have to be open to experience to express belief in them. Following Zingrone et al., we expect the Openness to Fantasy facet scale to exhibit the strongest correlations with measures of belief.

Method

Participants

Fifty-two unselected college student volunteers at a highly selective liberal arts college received one credit toward a subject participation requirement for completing this study. Participants included 18 males, 33 females, and one person who did not report his/her sex. Participants' ages ranged from 18 to 21 years.

Materials

Participants completed the NEO PI-R (Costa and McCrae, 1992) and a modified version of Grimmer and White's (1990) 46-item *paranormal belief questionnaire*. Grimmer and White (1990) suggested that their respondents generally knew little about the items that defined their "Obscure Unbelief" factor, and that the factor was more accurately associated with unbelief; therefore, we followed their suggestion to discard these items. We also eliminated several items with which pilot subjects were unfamiliar (Lost continents, Iridology, Levitation, and Telepathy with plants). The final questionnaire thus included Grimmer and White's original *Traditional Religion* (3 items), *Functional Psi* (5 items), and *Structural Psi* (4 items) factors, as well as slightly modified versions of their *Popular Science* (5 items), *Alternative Treatments* (5 items), and *Paratherapies* (5 items) factors. Participants responded to the items using a one to five rating scale on which "one" represented no belief in a particular phenomena and "five" represented unconditional belief.

Procedure

Participants volunteered to complete "questionnaires measuring Openness and belief in paranormal phenomena." They were tested in three groups on three separate nights. Participants were told that they were free to leave the test site if any questions made them uncomfortable. Participants made up and entered four-digit codes rather than names to ensure anonymity. They were administered the paranormal beliefs questionnaire first and the NEO PI-R second.

Results

We conducted an initial analysis of variance on *Total Belief* scores using sex of subject and high/low Openness to Experience as independent variables. As expected, and in anticipation of subsequent

correlational results, subjects above the median in Openness to Experience scored significantly higher on Total Belief than subjects below the median in Openness (mean Total Belief scores = 96.7, 81.3 respectively), $F_{(1,47)} = 6.25, p < .02$. Women scored slightly higher than men on Total Belief (means = 89.1 and 87.1, respectively), but neither sex, $F_{(1,47)} < 1.00$, nor the interaction of sex and Openness, $F_{(1,47)} < 1.00$, had a significant effect on Total Belief. Therefore, sex of subject was ignored in subsequent analyses.

Table 1 presents correlations among measures of belief in the paranormal and measures of Openness to Experience. Total Openness correlated significantly with Total Belief and with all factor subscales of paranormal belief except Paratherapies and Religion. Total Belief correlated significantly with the *Aesthetics*, *Actions*, and *Values* facets of Openness. The *Aesthetics*, *Actions*, and *Values* facets had the strongest patterns of correlation with the factors of belief, and the *Alternative Treatments* and *Functional Psi* factors had the strongest pattern of correlations with the facets of Openness. Contrary to prediction and to the results of Zingrone et al., Openness to Fantasy did not correlate with any measure of belief.

Table 1: Correlation coefficients between Openness to Experience and Belief in the Paranormal

<i>Belief</i>	<i>Openness</i>						<i>Total</i>
	<i>Fantasy</i>	<i>Aesthetics</i>	<i>Feelings</i>	<i>Actions</i>	<i>Ideas</i>	<i>Values</i>	
Popular Science	.13	.33*	-.03	.26	.35*	.21	.34*
Alternative							
Treatments	.26	.28*	.34*	.30*	.07	.27	.40**
Paratherapies	.02	.11	.07	.29*	-.04	.27	.18
Religion	.04	.40**	-.08	.38**	.15	-.15	.26
Structural Psi	.18	.33*	.13	.26	.12	.40**	.39**
Functional Psi	.21	.41**	.20	.37**	.14	.38**	.47**
<i>Total</i>	.19	.41**	.14	.41**	.17	.33*	.45**

* $p < .05$, two-tailed.

** $p < .01$, two-tailed.

Finally, we regressed Total Belief and the belief factors on the six facets of Openness, in order to determine how predictable belief scores were from Openness facet scores. This additional analysis was purely exploratory, given the small sample size. The regression was significant for Popular Science, $F_{(6,44)} = 2.38, p < .05, R^2 = .25$, for Religion, $F_{(6,44)} = 5.51, p < .01, R^2 = .43$, for Functional Psi, $F_{(6,44)} = 2.75, p < .05, R^2 = .27$,

and for Total Belief, $F_{(6,44)} = 2.65, p < .05, R^2 = .27$.

Discussion and conclusions

Results of the present study extend Zingrone et al.'s finding of a relationship between Openness to Experience and psi experiences by demonstrating the utility of investigating belief in paranormal phenomena from the integrative perspective of Openness to Experience. That is, correlations between total Openness and Total Belief, as well as numerous correlations among dimensions of belief in the paranormal and facets of Openness to Experience, reached significance. In addition, Total Belief and three Grimmer and White (1989) factors of belief were predictable from the facets of Openness. By extension, therefore, our results support the conclusion from prior studies that a broad, multi-dimensional definition and measure of belief in the paranormal is necessary in order to capture this phenomenon.

In contrast to Zingrone et al., belief in the paranormal correlated with Openness to Aesthetics (6 of the 7 correlations with Total Belief and its facets were significant), Actions (5 significant correlations), and Values (3 significant correlations), but not with Openness to Fantasy (no significant correlations). Post hoc examination of the eight NEO PI-R items defining each facet casts some light on this pattern. The Actions items refer to trying something different, and the Values items refer to open mindedness. Both of these themes seem consistent with a belief in paranormal phenomena. The Aesthetics items reference interest in poetry, music, and the arts; this may represent a correlate of belief in the paranormal, rather than a foundation for it. The Fantasy items reference daydreaming, fantasy, imagination, and make believe; perhaps those open to belief in paranormal phenomena do not conceptualize paranormal events in this manner. Similarly, the Feelings items describe emotionality, and the Ideas items reference puzzles, theories, and abstract ideas; it may not be surprising that belief in the paranormal is unrelated to these concerns.

Our conclusions are limited in three respects. First, our choice of the Grimmer and White paranormal belief questionnaire, rather than the more widely used Tobacyk and Milford's Paranormal Belief Scale, was arbitrary. Second, our sample size was small, and test administration was not counter-balanced to preclude order effects. Third, significance levels for our correlational results must be interpreted with

caution, given that 3 of the 49 correlations could be expected to reach significance purely by chance. Note, however, that our significant correlations fall in the “medium” effect size described by Cohen (1988), so our results suggest an important relationship between Openness and belief.

Finally, it is important to note that our correlational results cannot indicate any particular causal direction. That is, we have no basis for inferring whether Openness influences belief, belief influences Openness, or a reciprocal and mutually sustaining relationship exists. Further research is needed to explore the directional relationships between aspects of belief and facets of Openness.

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Assessing the Roles of Sender and Experimenter in Dream ESP Research

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Abstract

This study explored the role of the sender in a dream ESP task by considering the effects of presence of a sender (sender, no sender) and the receiver's expectancy that a sender was present. Forty participants each completed a sender and a no sender trial on consecutive nights by keeping a dream diary of all mentation they could recall when they awoke. The order of trials was randomised across participants. On no-sender nights a randomly selected video clip was played repeatedly from 2:00 until 6:30am; on sender nights a sender would also watch the clip between 6:00 and 6:30am and attempt to communicate its content. Both sender and no sender conditions produced above chance hit rates (30% and 35% respectively), but z scores for similarity ratings did not deviate significantly from chance (sender night: $t_{(39)} = 0.92$, $p = .18$; no sender night: $t_{(39)} = 1.11$, $p = .14$, one-tailed). There was no difference in performance in terms of sender conditions ($z = -0.22$, $p = .41$, one-tailed) or sender expectancy ($z = -0.18$, $p = .46$, one-tailed), failing to support the proposal that senders play an active role in dream ESP success. Possible improvements in the manipulation of participant expectancy are discussed.

Introduction

J. B. Rhine's advice to those who hoped to study *psi* in the laboratory involved an analogy with making rabbit stew; "If you want to have rabbit stew, first catch the rabbit" (Stanford, 1993, p. 129).¹ Thus if we are to study the action of *psi* in the laboratory we need to ensure that all aspects of the laboratory situation are arranged so as to facilitate (or at least not inhibit) its occurrence. *Psi* phenomena are not renowned for their experimental reliability (e.g., Beloff, 1983, Milton and Wiseman, 1999, see Shapin and Coly, 1985 for an extended discussion), and all too often we have been left to feed on scraps. It might be naïve to expect replication on demand given the effect sizes typically involved (cf. Utts, 1991), but nevertheless there must be a suspicion that *psi* is sensitive to some factors that have not been adequately explored or typically are not controlled for effectively. If different laboratories differ in these subtle respects it could lead superficially similar experiments to generate different outcomes, as some enjoy rabbit stew while others settle for vegetable broth. Efforts to identify potential confounding factors promise to inform us of the necessary conditions to capture *psi* more consistently as well as perhaps offering some insight into its *modus operandi*.

In looking to map these necessary conditions we have recently been especially concerned to consider the sender-receiver-experimenter dynamic as a factor (or collection of factors) that moderates *psi* performance in Ganzfeld ESP trials (Roe, Sherwood and Holt, 2004; Sherwood, Roe, Holt and Wilson, 2005). In the first of these studies (Roe et al., 2004) we attempted to distinguish between the active contribution a sender might make and the positive effects of simply believing that a friend was viewing the target. The direct hit rate was exactly at chance (25%) and, although this was slightly better for sender trials than no sender trials (26.1% versus 23.5%) and better for trials on which the receiver believed there was a sender than when they believed there was not, irrespective of whether there actually was one (33.3% versus 18.2%), there were no significant differences between conditions based on *z* scores of target ratings (for sender status $p = .632$; for sender expectancy $p = .765$). This was disappointing given that of seven previ-

¹After presenting a version of this paper at the International Conference of the Society for Psychical Research in September 2006, Sean O'Donnell questioned Rhine's choice of analogy here, which seems to suggest that *psi* is something to be slain and dismembered by its investigators. We have some sympathy with his suggestion that a better analogy would be of *psi* as a butterfly, delicately to be caught and closely observed in its natural, intact and healthy state.

ous Ganzfeld studies that directly compared sender and no-sender conditions within the same study, all reported better performance with a sender, significantly so for two studies (see Roe et al., 2004 for a more thorough review). We therefore intended to reconsider this aspect in the current study. In a subsequent study we explored whether participants' perceptions of the experimenter and of the experimenter's attempts to generate a warm social ambiance were predictive of performance (Sherwood et al., 2005). Here both participants and the experimenter completed an interaction questionnaire that asked about their mood, expectations of success and sense of rapport with the other participants. Responses on the interaction questionnaire suggested that participants were typically in a good mood, fairly relaxed, optimistic about the trial — though not confident of success — and had a positive perception of the experimenter, all of which were expected to be psi conducive features. Nevertheless, the direct hit rate for this study was nonsignificantly worse than chance (21.1%, $z = -.015$). However, although relationships between these variables and trial outcomes (in terms of z scores for similarity ratings) did not exhibit a clear pattern and tended to vary somewhat from experimenter to experimenter, they did offer some significant overall relationships, such as with receiver mood (negative-positive; $r_s = -.335$), sender optimism ($r_s = .432$) and confidence of success ($r_s = .398$) which we felt warranted further work.

We planned to follow up these findings by conducting a further study that would investigate the effects of both sender and experimenter upon the receiver's ability to identify a target video clip based on correspondences with their own mentation. However, using the Ganzfeld procedure as a method of eliciting psi has proved to be very labour intensive, and may have deterred some participants from volunteering because of the time commitment required and the coordination necessary when involving a sender and receiver. In looking for an alternative method we were encouraged to reconsider dream ESP as a paradigm, since the original Maimonides research programme was notably successful (Child, 1985; Ullman and Krippner, with Vaughan, 1973), and there is evidence of above-chance scoring among subsequent replication attempts with experimental designs using a simplified method that did not require REM monitoring or access to sleep laboratories (e.g., Dalton, Steinkamp and Sherwood, 1999; see Sherwood and Roe, 2003, for a review).

In considering previous dream ESP research we can derive some

encouragement for suggesting that sender and experimenter effects might be evident here too. For example, Ullman et al. (1973), in reflecting on the performance of participants in the Maimonides dream ESP series, commented that “[T]he active involvement of the agent [sender] is an important ingredient for success.” (p. 212). The majority of Maimonides studies investigated telepathy rather than clairvoyance, which might be interpreted as a tacit assumption that a sender can facilitate psi hitting in a dream ESP task. However, this presumption was not supported in Sherwood and Roe’s (2003) summary analysis, which suggested that overall the clairvoyance studies in this series had been more successful than those intended to study telepathy. Of course, making comparisons across studies may be misleading, since they could have differed in other ways besides whether or not they involved a sender, and we expected that a direct comparison within a single study should clarify this relationship.

There is also some suggestion in the database of post-Maimonides dream ESP studies that some groups of researchers have been markedly more successful than others (see Sherwood and Roe, 2003, pp. 102–104). Given the diversity of approaches used in these studies it is difficult to attribute these differences to one particular cause, but it may be worthwhile to consider whether differences in experimenter-participant interaction have some effect.

Planned analyses

The main planned analyses are to consider the following hypotheses:

1. Participant performance, in terms of z score of target rating, will be higher than chance expectation for each experimental night
2. Participant performance in the actual sender condition will be higher than that in the no sender condition
3. Participant performance in trials for which the participant believed there was a sender will be higher than for trials for which the participant believed there was not a sender

We are grateful to an anonymous referee for suggesting that we consider differences in success between the two senders and we include this *post-hoc* analysis here. Following Sherwood et al. (2005), we also

planned to conduct exploratory analyses considering covariation of performance (using z -scores of target ratings) with experimenter interaction measures.

Design

This study employed a repeated measures design to assess the role of the sender in dream ESP research, with each participant completing a sender and a no sender trial night. Participants remained blind as to which night was which but were asked to nominate on which night they felt there was a sender so as to allow us to consider expectancy effects. Potential psychological experimenter effects were assessed by correlating participant and experimenter ratings of their interaction against task performance. In all cases the dependent variable was pre-specified to be the z score of target clip ratings.

Method

Participants

Forty participants were recruited from a variety of sources including the undergraduate population, appeals to the media and an established research database. The sample consisted of 30 females and 10 males² (Mean age = 32.08; range = 19–62; mean score on belief measure = 80.32, range = 19–119, absolute range of scale = 19–133, midpoint = 76), of whom 21 had practised a mental discipline (e.g., meditation/relaxation techniques) at some point and 15 had practised a physical discipline (e.g., Yoga/martial arts). Participants were not selected on the basis of their gender or age; neither were they screened for prior experience or for ability to recall dreams. For trials 1–26, Louie Savva (LS) acted as experimenter; for trials 27–40 Louise Farrell (LF) acted as experimenter.

Apparatus

This study used an automated program for selecting and playing video clips that was developed by Dr Paul Stevens and written in Microsoft Visual Basic.³ Video clips are stored digitally as MPEG files, la-

²One anonymous reviewer speculated that the gender bias toward female participants could have been problematic given that there may be gender differences at this task. *Post hoc* analysis revealed that males performed slightly better than females overall (mean $z = .40$ and $.06$ respectively) but this difference was not significant overall (Mann-Whitney $z = -.93$, $p = .36$) or for either night separately (Mann-Whitney $z = -1.66$, $p = .10$; $z = -.41$, $p = .70$, two-tailed).

³For a more complete description of the program, see Roe, Sherwood, Luke and Farrell (2002).

belled 1a, 1b, 1c etc. The target set consists of 116 minute-long digital video clips arranged in 29 sets of 4. These were the same clips used in our previous Ganzfeld studies (Roe, et al., 2004; Sherwood et al., 2005) and have mainly been produced at the University of Northampton and are drawn from popular television programmes and commercial films, although some have been taken from the pool previously used at Edinburgh. Copies of the target pool are available on DVD from the first author upon request. Randomisation is achieved using the Visual Basic pseudo-random algorithm (rnd), having seeded it using the timer at the start of the program (RANDOMIZE TIMER). Once the "Start" button has been pressed, the computer first selects a target set, then selects one of the 4 clips within that set. The order of presentation of the four clips at judging is similarly randomised. The target sets were selected with replacement. All trials were run at the sender's home (CR or SS) using standard desktop PCs and could be set to play through the night.

Materials

The *Participant Information Form* (PIF) is a 56-item measure that was constructed for general use with parapsychological research at the University of Northampton and was based partially on a version used previously at the University of Edinburgh. It includes questions concerning biographical and contact details (11-items); religious and parapsychological background (5 items); computer experience (2 items); practice of mental/physical disciplines (2 items); belief in luck (2 items); clumsiness and punctuality (2 items); competitiveness (1 item); absorption (2 items); sleep and dreams (4 items); imagination and fantasy-proneness (3 items); creativity (2 items); and physical and mental health (1 item). The remaining items relate specifically to knowledge, belief and experience of anomalous phenomena including telepathy, clairvoyance, precognition, psychokinesis, 'communication with the dead' and out of body experiences (19 items). The form concludes with questions about hypnagogic/hypnopompic experiences in a range of modalities (10 items) and an open question inviting descriptions of personal anomalous sleep-related experiences. Copies of all in-house measures are available from the first author on request.

Participants also completed the short extraversion and neuroticism subscales of the EPQ-R⁴ (Eysenck, Eysenck, and Barrett, 1985). Each subscale has 24 items with a dichotomous yes/no response format. A

⁴An analysis of these personality variables will not form part of this paper

belief in paranormal measure, adapted from Thalbourne and Delin's (1993) 18-item *Australian Sheep-Goat Scale* (ASGS) with an additional item asking about their performance in the current study and incorporating a 7-point Likert response scale ranging from strongly agree to strongly disagree, was also completed.

Given the apparent importance of experimenter-participant interactions and expectations of success, at the end of the pre-judging briefing, the experimenters and participants completed a short *Interaction Questionnaire*.⁵ This contained six questions, concerning their personal feelings and expectations and perceptions of the quality of the interactions between experimenter and participants, which they were required to answer by giving ratings on 7-point scales (see Appendix).

Procedure

Once recruited for the experiment, participants were sent — either through the post or by email — the PIF, and they returned this ahead of their trial or brought it in with them on the day of judging. Participants were also sent a paper-copy of a dream diary, which contained instructions to clarify the procedure, information about confidentiality and the experimenter's contact information, as well as space to record their dreams and their associations or comments on dreams that they could recall during the trial period. They kept the dream diary for three consecutive nights; night 1 was a practice night and nights 2 and 3 were experimental nights.

On each night participants slept at their own homes, as normal. Upon waking, either during the night or in the morning, they completed the appropriate section of their dream diary, writing down as much detail concerning their dreams as possible. There was space in the diary for participants to note any associations they may have identified between their dreams and events in their waking lives about which they may have been preoccupied or worried. Participants were also asked to indicate on which of the trial nights they believed there had been a sender and on which there had been no sender. It was intended that the participants make this judgement prior to their meeting with the experimenter but in practice this was not always the case.

A sender (either SS or CR) was allocated to each participant on the basis of availability. Both senders remained blind as to participant identities until after the study was completed. On the evening of Night 2 (the

⁵Experimenters did not complete question 3.

first experimental night) the sender flipped a coin to determine whether Night 2 would be designated a telepathy or a clairvoyance trial. If Night 2 was a telepathy trial then by default Night 3 was a clairvoyance trial, and vice versa. The experimenter remained blind as to which condition had been selected for each trial night until after the participants' judgments had been made and recorded. On both experimental nights the sender initiated the experimental software at his own home, where a randomly-selected target clip was played from 2:00am until 6:30am. On the telepathy trial only, the target clip was played for the same length of time but the sender watched the target clip between 6:00am and 6:30am⁶ and attempted to communicate its content to the participant by ESP. The sender had no contact with the experimenter concerning the experiment until the information was needed about the target sets used for the trial nights.

After keeping the dream diary for three nights the participant travelled to the university campus to take part in the judging.⁷ Participants were requested to attend judging as soon as possible after completing the dream diary — ideally the morning after the last dream night — so that dream content might still be retrievable from memory; however, appointments were arranged at their convenience. On arrival they were met by the experimenter, who took them to a reception room where refreshments were available. They were then engaged in an informal conversation incorporating a brief discussion of their experiences. After this interaction the participant was asked to complete a measure that asked them to rate the experimenter along a number of dimensions, such as warmth, spontaneity, and optimism (see Sherwood et al., 2004). The experimenter also completed brief ratings of confidence about the trial and his/her assessment of the interaction with the participant. These forms were placed in a sealed envelope and sent to an independent researcher (IB). Participants were assured that we were only interested in their honest impressions and that at no time would the experimenter be aware of the ratings they had given.

Next, the participant read out their dream diary content; if they

⁶The sending period was set at 30 minutes after initial pilot work suggested that it was difficult for senders to maintain their interest and focus on the clip over a longer time span. In this respect it is comparable with a typical sending period in a Ganzfeld session. Although there is no guarantee that a sending period of 30 minutes will necessarily overlap with a receiver REM period, Braud (1977) has previously reported successful dream ESP performance when sending between 6:00 and 6:30am.

⁷On some trials, where access to the reception rooms was not possible, judging was conducted in the experimenter's own office or the participant's own home.

had not remembered any dream material they still participated in the judging phase and were advised to use 'intuition' or to see if the clips prompted any dream recall. The judging phase commenced with the experimenter accessing an SMS text message from the sender that identified the target sets for nights 2 and 3 (but not the identities of the target clips). The sender was shown, via a laptop computer, the four clips that made up the target set (consisting of the target clip and three decoys in random order) for night 2, and these were rated and rank ordered for their degree of correspondence to the dream mentation for that night. This process was repeated for the target set and dream mentation for night 3. Once all judgements were recorded the experimenter contacted the sender via mobile phone to discover the identities of the two target clips and which night had been the sender night.

Once the series was completed, IB was provided with trial outcome data (but no personal information from participants) and analysed the relationships between these and the interaction data sent to him. The other members of the team only saw the results of analyses conducted by IB and were not at any stage provided with the raw data from the interaction measures.

Results

To assess our prediction that participants would award a similarity rating to the target that was higher than the average rating for the three dummy clips for each experimental night, z scores were calculated (see Table 1). The overall mean z score for both nights was slightly positive (actual sender night mean $z = 0.13$, $SD = 0.86$; actual no sender night mean $z = 0.16$, $SD = 0.91$), indicating that the target clips tended to be awarded higher dream correspondence ratings than the other clips, but this did not differ significantly from zero (for no sender night: Wilcoxon $z = -1.06$, $p = .15$; for sender night: Wilcoxon $z = .91$, $p = .18$, one tailed), and the hypothesis was therefore not supported. We did not plan to evaluate performance in terms of direct hits, but for information we note that the proportion of direct hits is nonsignificantly higher than mean chance expectation of 25% for both sender and no sender trials ($z = 0.55$ and 1.28 respectively).

Contrary to expectations, the mean z -score for ratings was greater for no sender trials compared with sender trials (mean $z = 0.16$ versus 0.13), but a Wilcoxon Signed Ranks test found that the difference was

Table 1: Target rank frequencies and z -score based upon ratings for actual sender and no sender conditions ($N = 40$ in each case), with similarity rating (SR) mean z -scores and standard deviations (SD)

	Rank				SR	
	1	2	3	4	mean z	$SD z$
Sender trials	12 (30.0%)	11 (27.5%)	10 (25.0%)	7 (17.5%)	0.13	0.86
No sender trials	14 (35.0%)	7 (17.5%)	13 (32.5%)	6 (15.0%)	0.16	0.91

not significant ($z = -0.22$, $p = .41$, one-tailed), suggesting that having a sender did not help participants' performance. Neither condition deviated significantly from the null value of $z = 0$.

As well as looking for gross differences between sender and no sender conditions we were able here to consider sender differences, since this study involved two senders who were quasi-randomly allocated to participants and who contributed 20 trials each. Exploratory analysis of the results by the different senders are given in Table 2, and reveal an interesting but unexpected interaction effect: SS's participants performed as predicted, with greater success on sender nights compared with no sender nights, although this difference is not significant (Wilcoxon $z = 1.23$, $p = .22$, two-tailed); however, the reverse was true for CR's participants, with better performance on no sender nights compared with sender nights, to a degree that was suggestive (Wilcoxon $z = -1.66$, $p = .10$, two-tailed). Thus, whether or not having a sender try to send the target is advantageous may depend on who the sender is. This full interaction trend, which could explain the lack of an overall sender effect, is further illustrated in Figure 1.

 Table 2: Target rank frequencies and z -score based upon ratings for actual sender and no sender conditions ($N = 20$ in all cases), with similarity rating (SR) mean z -scores and standard deviations (SD)

	Rank				SR	
	1	2	3	4	mean z	$SD z$
CR						
Sender	5 (25.0%)	5 (25.0%)	5 (25.0%)	5 (25.0%)	-0.04	0.91
No sender	9 (45.0%)	4 (20.0%)	5 (25.0%)	2 (10.0%)	0.32	0.91
SS						
Sender	7 (35.0%)	6 (30.0%)	5 (25.0%)	2 (10.0%)	0.30	0.79
No sender	5 (25.0%)	3 (15.0%)	8 (40.0%)	4 (20.0%)	0.002	0.83

We also planned to consider the effects upon performance of partic-

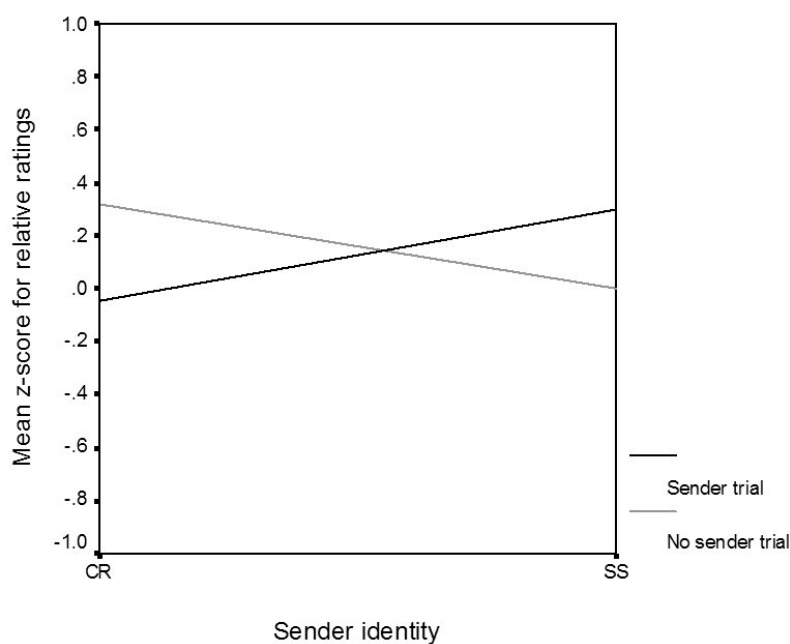


Figure 1. Mean z -scores based upon ratings for actual sender and no sender conditions according to sender

participants' belief that a sender had been operating, and so participants were asked to nominate on which night they believed there was a sender and on which night there was not (of course, they were blind to actual sender status). Participants correctly identified the order of sender and no-sender conditions for their trial on just 18 of the 40 trials, which is slightly less than chance expectation of 20 and suggests that participants could not accurately identify the sender condition. This allows us to consider the effects of 'expectancy' separately from actual condition, since the two variables are unrelated. A summary of participant performance on nights when they believed there was a sender operating compared with nights when they believed there was no sender are given in Table 3. Contrary to expectations, the mean z -score for ratings was slightly greater for the trials when the participants did not believe there had been a sender compared to the trials when they believed there had been a sender, although a Wilcoxon Signed Ranks test found that this difference was not statistically significant ($z = -0.18$, $p = .46$, one-tailed). Thus, judgements regarding sender status did not affect performance in the dream ESP task.

We also conducted a combined analysis that looked for possible interactions between actual sender status and participants' judgements that there had been a sender. These data are summarised in Table 4, and

Table 3: Target rank frequencies and z -score based upon ratings for conditions deemed to be sender and no sender ($N = 20$ in all cases), with similarity rating (SR) mean z -scores and standard deviations (SD)

	Rank				SR	
	1	2	3	4	mean z	$SD z$
Deemed Sender	12 (30.0%)	9 (22.5%)	13 (32.5%)	6 (15.0%)	0.13	0.92
Deemed No sender	14 (35.0%)	9 (22.5%)	10 (25.0%)	7 (17.5%)	0.16	0.86

show that, in terms of our planned outcome measure of z -scores for similarity ratings⁸, the worst performance was for the condition that was expected to be optimal, where participants believed there had been a sender and there in fact was, although the differences across conditions are not significant (Wilcoxon $z = -.24$, $p = .81$, two-tailed).⁹ Where participants wrongly identified sender and no sender conditions there is no difference whatever in performance between the two trials (Wilcoxon $z = 0.00$, $p = 1.00$, two-tailed). Taken together, these results give little indication of any overall sender or sender expectancy effect in this study but there is some indication that this may be influenced by who the sender was; indeed, based on the planned outcome measure of z scores, these results do not give evidence of ESP at all (despite the percentage hit rates being reasonably consistent with others' Ganzfeld findings).

Finally we conducted exploratory analyses to see whether performance covaried with measures of the quality of interaction between experimenter and participant. Spearman rank order correlations between the different questionnaire ratings and the experimental results are summarised in Table 5, and include separate analyses for each experimenter. Generally, there is little indication from these that performance at the dream ESP task can be predicted by scores on interaction measures, with only three of 90 correlations achieving significance. Although all of these were associated with experimenter or participant mood, the effects seem to be reversed for sender and no sender trials, making interpretation difficult; since the analyses have not been cor-

⁸In terms of direct hits, the best performance occurred with no sender trials in which the participant believed there had been no sender and worst performance is for sender trials where participants believed there had been a sender. In terms of mean ranks, performance is again worst with the sender-sender condition that was expected to be optimal; performance in the other three conditions is very similar.

⁹An omnibus test of these data would not be appropriate given their non-independence (all participants contribute to two of the 2×2 cells)

Table 4: Target rank frequencies and z -score based upon ratings for actual sender and no sender conditions separated by participants' judgments of sender status, and similarity rating (SR) mean z -scores and standard deviations (SD)

	Rank				SR	
	1	2	3	4	mean z	$SD z$
Deemed Sender						
Sender present ^a	5 (28%)	4 (22%)	6 (33%)	3 (17%)	.053	.927
No sender present ^b	7 (32%)	5 (23%)	7 (32%)	3 (14%)	.187	.922
Deemed No Sender						
Sender present ^b	7 (32%)	7 (32%)	4 (18%)	4 (18%)	.184	.821
No sender present ^a	7 (39%)	2 (11%)	6 (33%)	3 (17%)	.128	.924

^a $N = 18$

^b $N = 22$

rected for multiple analyses they may simply reflect random noise and would need to be replicated in future work before they should be interpreted as a real effect. Some other associations generated relatively large coefficients, particularly with confidence, although this is in the opposite direction to prediction. There do seem to be some differences between experimenters, which perhaps reflect their different personalities and interaction styles.

Discussion

Although hit rates of 30% and 35% over two sets of 40 dream ESP trial nights is somewhat above the mean chance expectation of 25%, and represents an improvement on the overall hit rate of 21.1% from our previous study that used Ganzfeld stimulation, deviations from chance expectation based on z scores of similarity ratings (our pre-specified dependent variable) were not sufficient to give statistical significance (respectively, mean $z = 0.13$, $t_{(39)} = 0.92$, $p = .18$, one-tailed; mean $z = 0.16$, $t_{(39)} = 1.11$, $p = .14$, one-tailed), and so we are unable to reject the null hypothesis. Of course, we may not expect to see evidence of psi in any summary measure since this study included conditions that were hypothesised to show differential psi performance, although we did not confirm our prediction that participants would perform better on sender trials than on no-sender trials. This failure to capture any sender effect is consistent with Sherwood et al.'s (2005) failure to find a sender effect in earlier Ganzfeld work and with Sherwood and Roe's (2003) finding that post-Maimonides dream ESP studies that had investigated clairvoyance had in fact been more successful than those ostensi-

Table 5: Spearman correlation co-efficients for *z*-score experiment results for the sender and no-sender conditions correlated against the sender and experimenter questionnaire ratings. The co-efficients are shown for the overall results, and also broken down by experimenter

Questions	<i>Experimenter</i>						
	Overall (<i>N</i> = 40)		LS (<i>N</i> = 26)		LF (<i>N</i> = 14)		
	Sender	No Sender	Sender	No Sender	Sender	No Sender	
<i>Participant</i>	Mood	-.03	.08	-.13	-.14	.08	.64*
	Feeling	-.14	-.14	-.27	-.11	-.46	-.14
	Optimism	.23	.18	.20	.10	.22	.28
	Confidence	-.09	-.09	-.04	-.07	-.52	-.15
	Rapport	-.07	-.03	-.03	.07	.00	-.13
	Warmth	-.05	-.04	.00	.08	-.18	-.16
	Spontaneity	.08 ^a	-.13 ^a	.02 ^b	-.14 ^b	.05 ^c	-.01 ^c
	Positiveness	.11 ^a	.02 ^a	.15 ^b	.11 ^b	-.04 ^c	.02 ^c
<i>Experimenter</i>	Mood	-.34*	.22	-.28	.04	-.12	.62*
	Feeling	-.07	-.05	-.08	.10	.14	-.11
	Rapport	-.11	.20	-.21	.27	-.08	.09
	Confidence	-.11	.05	.13	-.10	-.50	.26
	Warmth	.04	.16	-.09	.36	.16	-.23
	Spontaneity	.04	.15	-.06	.31	.31	-.09
	Positiveness	-.10	.23	-.10	.34	-.04	.11

* *p* < .03 (2-tailed).

^a*N* = 38 due to missing values.

^b*N* = 25 due to missing values.

^c*N* = 13 due to missing values.

bly investigating telepathy — despite earlier researchers advocating the involvement of an agent (e.g., Ullman et al., 1973). One might speculate, then, that it may be desirable to concentrate on clairvoyance designs in future research, given the advantages this would offer in recruitment (since participants could be scheduled one at a time instead of having to co-ordinate across two people) and in security (with sensory leakage and cheating made less likely when no-one needs to be aware of the target until after judging is completed), and apparently minimal disadvantages in terms of impact upon effect sizes.

One form in which senders might play a role without being essential to any psi process is if they make the task seem inherently more plausible or help diffuse responsibility for any psi that occurs (see Roe et al., 2004, for a fuller discussion), and indeed Roe et al. did report a sender expectancy effect, whereby participants performed better when they believed that a sender was involved compared with when they believed there was no sender (with hit rates of 33.3% and 18.2% respec-

tively), irrespective of actual sender status. In this study there was no indication of any sender expectancy effect, with better performance actually occurring where participants believed there was no sender. This may not be a legitimate comparison, however, since in Roe et al.'s (2004) study participant expectancy was manipulated by giving either true or false information at the beginning of the session, whereas in this study participants decided retrospectively for themselves, typically by reflecting on their dream mentation, whether a trial involved a sender. In this latter case then, participants might have no particular expectancy as to whether or not the first trial will involve a sender, since at that point they have no material on which to base their judgement, and it may be that any expectancy effect would only be expressed on the second trial night (although this too may be problematic, since some participants in the current study only made their judgements after completing both nights).¹⁰

In any case, any potential advantages of involving a sender may have been undermined here by our decision on security grounds to keep the senders and participants isolated from one another to the extent that senders and participants were given no information whatsoever about one another. Several of the participants recruited and run by LF expressed doubt that telepathy would be possible under circumstances in which the people involved had never established any rapport, indeed had never met each other or even knew each other's names. Likewise the senders found it a handicap to have no shared experiences or knowledge about the participant on which to base their sending strategy. We should note, however, that although Honorton et al. (1990) reported a suggestive advantage for friends as senders, Broughton and Alexander (1997) found that participants with a lab-assigned sender achieved a much higher hit rate than those who had a spouse or friend serve in that role. Nevertheless, on reflection, this security measure seems Draconian, and in future studies greater effort would be needed to ensure that some degree of rapport is possible, for example by adopting aspects of the methodology used in remote healing studies (e.g. providing a photograph or the first name of the other party, as in Sicher, Targ, Moore and Smith, 1998).

Analysis of participant-experimenter interaction data did not re-

¹⁰We are grateful to our referees for suggesting that it would be useful in future studies to have participants rate the confidence they have in their estimates and also to ask participants how they decided whether trials had been sender or no sender.

veal any strong trends, and given the scope for committing Type I errors, no confident claims are made from these results. If taken at face value, the best predictors seem to be participant and experimenter mood, although these only emerge in some conditions and not others, and do not confirm our earlier finding of a negative relationship between outcome and receiver mood (Sherwood et al., 2005). Previous promising findings with optimism and confidence of success were not confirmed here. It may be unrealistic to expect experimenter-participant interaction findings to replicate across studies given that the participants (and experimenters in this case) are different, and efforts need to be made to ensure continuity across studies. In any case, in the present study there may have been limited opportunity for experimenter interaction effects to occur; with the switch from a Ganzfeld to a dream ESP design most of the recruitment and running of the study was conducted by telephone, email and by post, so that there was a large reduction in the amount of face-to-face interaction until the judging session, by which time any psi performance is likely to be over (unless it occurs during judging). There might, therefore, have been little opportunity for the interaction to affect performance unless it could act retrospectively. Future tests of interaction effects would need to ensure that there is sufficient interaction between the parties so as to provide an opportunity for this to be influential.

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Appendix

Interaction questionnaire

1. How would you rate your current mood?

(Negative — Positive)

2. How do you feel at this moment?

(Tense — Relaxed)

3. How do you feel about the prospect of participating in this experiment?

(Pessimistic — Optimistic)

4. How confident are you that today's experiment will be a success?

(Not at all confident — Extremely confident)

5. How would you describe the quality of rapport that you have with the Experimenter?

(Extremely poor — Extremely good)

6. How would you rate the quality of the interaction between experimenter and participants?

(Very cold — Very warm)

('Rehearsed' — Spontaneous)

(Very negative — Very positive)

Book Review

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**A review of “The Common Thread between ESP
and PK (Parapsychological Monograph Series No.
19)”, by Michael A. Thalbourne (2004)**

Many authors have suggested, often in passing or with very superficial theorisation, that what parapsychologists usually term “ESP” and “PK” may be different manifestations of the same underlying process. “The common thread between ESP and PK” is an in-depth discussion of one such idea, namely Michael Thalbourne’s theory of *psychopraxia*. Thalbourne examines the philosophical, theoretical, and developmental implications of his ideas and, ambitiously, proposes that parapsychologists largely discard the “dying” older terms and update their concepts and terminology in line with his theory.

Thalbourne begins by describing what the majority of parapsychologists would recognise as the current conceptual framework; *ESP* refers to the reception of information concerning mental or physical target events, *PK* refers to the influencing of physical targets, and both may relate to past, present or future targets or events. The author then discusses, with reference to experimental results, two major and familiar problems arising from the use of these concepts; the *process uncertainty problem* (e.g., does one utilise ESP, PK, or both, to predict the arrangement of differently-coloured steel balls?) and the *target uncertainty problem* (e.g., in a telepathy experiment with a physical target, does the ESP information pertain to the target itself, to the agent’s thoughts concerning the target, or both?). Thalbourne further argues that these difficul-

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ties plague all parapsychological research efforts, including those that appear to demonstrate “pure” ESP or PK (e.g. the telepathic transmission of thoughts that have no physical counterpart). He suggests part of the cause of these problems to be the assumption of Dualistic ontology, and considers the effects on the conceptual framework of adopting either of the Monistic alternatives: a purely Materialist view would consider only PK, while a purely Idealist view would only entertain ESP. Thalbourne proposes that his theory neither disagrees with, nor presupposes the truth of, any of these three metaphysical systems.

Thalbourne begins his second chapter by mentioning other parapsychologists who have considered that ESP and PK may be different manifestations of the same process, but he finds no satisfactory descriptions of the nature of the relation between them. The author suggests that there are three properties common to ESP and PK, the first of which refers to the ideas of Thouless and Wiesner’s (1947) *Shin Theory*. These authors theorised that an identical process (i.e., *psi-gamma*) takes place in normal information acquisition as in ESP, and that likewise an identical process (i.e., *psi-kappa*) takes place in voluntary bodily movement as in PK; in the cases of apparent ESP or PK, the target is *exosomatic*, or external to the body, while in the cases of normal information acquisition or voluntary bodily movement, the target is *endosomatic*, or within the body. The “Shin” is a soul-like entity at the core of the model, receiving information through *psi-gamma*, and causing action through *psi-kappa*. Thus, Thalbourne proposes that ESP and PK are both *diasomatic*, in that they occur in relation to target-events both within and outside a person’s mind/body complex. Further to this, Thalbourne suggests that “Shin” is largely analogous to the “self”, and that Thouless and Wiesner’s ideas identify the living person as a triune complex of body, mind, and self. The author also argues that Shin Theory can be treated as metaphysically neutral.

Thalbourne mentions the support the diasomatic hypothesis has received from other parapsychologists, and deals with some criticisms, before discussing the scientific status of the Shin Theory. The Thouless-Wiesner formulation views Shin as non-physical, making the theory potentially untestable, although Thalbourne suggests that recasting the Shin Theory in physicalistic form could improve its prospects for testability. He rejects a suggestion by Isaacs (1977) of how Dualism could be empirically tested, and examines promising research by Honorton and Tremmel (1979), among others, but concludes that the diasomatic

hypothesis is not satisfactorily supported by the evidence available.

In his third chapter, Thalbourne introduces the remaining two properties linking ESP and PK. Firstly, he suggests that both operate in a goal-oriented manner, satisfying an intention or need. Thalbourne discusses this with reference to the sheep-goat effect, arguing that psi brings about the reduction of cognitive dissonance; sheep score above chance in psi experiments, goats below chance, because that is consistent with their beliefs about the workings of the world — statistically naïve goats do not appreciate that below chance scores are evidence for psi. Thalbourne supports his ideas with reference to Lovitts' (1981) experiment whereby goats were "tricked" into obtaining above-chance scores, and also discusses studies where participants display psi effects without any conscious intention. He is careful to point out that the concept of psi fulfilling some motivational state or "need" is open to abuse, but suggests that a rigorously disciplined approach can solve this. Thalbourne prefers the term *pro attitude* to encompass both conscious and unconscious goals, thus describing psi as *pro attitude serving*.

The author's third suggested similarity between ESP and PK is the locus of the cause in psi events. He naturally regards PK as caused by the agent, but also views ESP as active information-acquisition on the part of the percipient — this is comparable with normal sensory perception, where the person must attend to and process the information. Thalbourne therefore suggests the term *agent*, in contrast to its usual use as describing the "sender" of the information, may in fact be preferable to "percipient". Furthermore, he suggests that it may be more ontologically neutral to refer to ESP and PK as *proximal psi* and *distal psi* respectively; *proximal* referring to changes brought about in the agent's own mind, *distal* to changes at a distance from the self, including the physical body.

Thalbourne therefore suggests that the only distinguishing feature between ESP and PK is the location of the psi-effects in relation to the agent. As discussed earlier, it is often impossible to distinguish proximal psi from distal psi; the author thus argues that there is a case for just using the term psi, but he agrees with Beloff (1985) that this has become too firmly connected with the exosomatic manifestations of Shin. Thalbourne therefore introduces his term *psychopraxia*, meaning "the soul bringing about accomplishments". This term is intended to encompass the normal and paranormal, the exosomatic and endosomatic, and the physical and mental. Thalbourne defines psychopraxia as "a fundamen-

tal teleological principle underlying all interactions between the self, or ego, and the realm consisting of mental and physical events, whereby under certain conditions... the adoption of a desire automatically results in its fulfilment in reality" (p. 61).

Thalbourne subsequently aims to provide further evidence for his theory of psychopraxia, by examining psi-missing. He contends that the *blockage model* (which suggests conflict or negativity blocks the correct response) may apply for forced-choice testing but not for free response situations, since blockage would need to occur for a large number of responses associated with the target. Thalbourne proposes instead that psi-missing in free-response situations is due to a pro-attitude. To illustrate, the author refers to one of his own free-response experiments (Thalbourne, 1981), in which ESP scores correlated more reliably with the sheep-goat-scale scores of the agents than with those of the percipients. Thalbourne terms this the *Active-Agent Effect*, and suggests that this was an effect of "psychopractic causation", demonstrating the use of psi to bring about an event towards which the agent had a pro attitude.

Chapter 4 begins with Thalbourne expressing his bold desire that parapsychology should be guided by the psychopractic model, and that his monograph should overcome the problem of the lack of a definitive text. He acknowledges two potential problems posed by this new terminology, namely doubts over the practical usefulness of such a broad-ranging term, and the issue of how parapsychologists may describe their research without resorting to the familiar ESP and PK. Thalbourne suggests that using the terms *endo-psychopraxia* and *exo-psychopraxia* will allow a distinction to be made whilst still referring to the underlying process.

Having earlier discussed experimental evidence in support of his theory, Thalbourne now turns his attention to the operation of psychopraxia in everyday situations. As examples of endo-psychopraxia he cites the retrieval of an item from one's memory and the production of speech and hand movements; for exo-psychopraxia he discusses the ostensible productions of objects by Sathya Sai Baba. Thalbourne also considers that the endosomatic/exosomatic distinction may sometimes be difficult to apply in practice, such as in the case of Christ-like stigmata on the surface of the body, but he suggests that this problem is not important as long as the operation of psychopraxia is recognised.

Thalbourne subsequently discusses three theoretical considerations

regarding his theory, beginning with the potential for psychopraxia to be described as “magic”, where the act of wishing alone leads to the fulfilment of the desire. However, the author dismisses this notion, since conditions other than a pro attitude must be present for a goal to be achieved – and the difficulties in producing reliable results in psi experiments are demonstrable of how little we know of these required conditions, at least in the case of exo-psychopraxia. Thalbourne also suggests that identification of the relevant pro attitude may be difficult, and that an experiment may better be seen as a system in which pro attitudes may operate.

The author then discusses Harvey Irwin’s (1985) examination of the empirical support for what he terms the “unitarian” view, which is analogous to Thalbourne’s theory that ESP and PK relate to the same fundamental process. Thalbourne expresses surprise at what he sees as Irwin’s “extreme conservatism” in concluding there is insufficient evidence to support the Unitarian hypothesis, despite there being many correspondences between ESP and PK such as psi-missing, decline effects etc, and despite the fact that in general the necessary data is simply lacking rather than contradictory to the hypothesis. He suggests that Irwin’s reasoning is flawed, and advocates examining patterns of ESP and PK scoring *within* subjects as a method of gaining evidence for a single process.

The third theoretical consideration Thalbourne examines is that of the meaning of the “self” in the psychopractic model. He designates it as “the ‘I’ of personal identity, the witness of mental and physical events, not to be identified with mind but present as a common denominator of all experience, conscious and unconscious” (p. 83). Thalbourne concedes the impossibility of empirical demonstration of the existence of such a “self”.

In his final chapter, Thalbourne makes what he admits to be “outrageous” speculations as to the implications of the psychopractic model, from a developmental perspective. He proposes a “hierarchy of functioning”, ranging from *alpha-psychopraxia*, the ability to exert endopsychopraxia and no more, to *omega-psychopraxia*, the pinnacle of psychic development whereupon the person must only have a pro attitude for a situation for it to come about. This god-like ability, Thalbourne suggests, may be strivable towards but not achievable, save for conspicuous examples such as Jesus Christ (!), while others such as D.D. Home and Sai Baba have been credited with producing phenomena that

would suggest they were capable of approaching a very high level of psychopractic functioning.

Having proposed the existence of such a hierarchy, Thalbourne turns to the issue of how one may climb it. He describes an exceptionally joyous state of consciousness he often felt when very young, which he refers to as “200% living”, during which his every desire seemed to be fulfilled. The author submits a plausible explanation in terms of chance: just as one often travels through a set of unlinked traffic lights all on green or all on red, pleasant and unpleasant situations may occur in succession. However, he then conjectures that exo-psychopraxia may allow one to leave home at the appropriate time, or drive at sufficient speed, to bring about the “all green” situation. If occurring in many other situations, exo-psychopraxia could therefore bring “luck” to other parts of one’s life.

Thalbourne now turns to recurrent myths of a “Golden Age”, citing Virgil, Hesiod and the Bible’s story of the Garden of Eden. The latter is reinterpreted as mankind choosing the “forbidden fruit” of sensory information over the “God” of infallible intuition, and thus losing the “Eden” of a state of consciousness in tune with nature. The “Fall of Man” is suggested to refer to the effect upon mankind of this decline in cognitive functioning. Thalbourne suggests that he suffered a similar “Fall”, his experiences of 200% living declining in frequency, although after over 30 years of practising *Transcendental Meditation* he reports that they have increased in number, despite being only brief. Again though, Thalbourne appreciates the problem of empirically demonstrating the existence of this state.

In concluding, Thalbourne expresses doubt that exo-psychopraxia can be called “paranormal” – rather, it is “an instance of a process which is normal and indeed familiar, but occurring in other than the familiar situation” (p. 97). Thus the processes that have traditionally been termed “ESP” and “PK” are simply unusual aspects of a normal fundamental process: psychopraxia. It is left to the reader to judge how successful Thalbourne has been in achieving his goals of “unification and de-paranormalisation”.

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