

REALITY TESTING AND THE FORMATION OF PARANORMAL BELIEFS: A CONSTRUCTIVE REPLICATION

by HARVEY J. IRWIN

ABSTRACT

This study investigated the role of reality testing deficits in the formation of belief in the paranormal. In the present context reality testing is taken to entail the person's inclination to test critically the logical plausibility of his or her beliefs. An earlier study of this relationship by the author (Irwin, in press) was partially compromised by the use of an index of reality testing deficits that was potentially contaminated by a small number of items implicating paranormal belief. The current research therefore constitutes a constructive replication of the original study in that it surveyed the relationship of facets of paranormal belief to a deficit in reality testing when the measure of the latter had no items concurrently incorporating specifically paranormal beliefs. A questionnaire survey of 161 adults from the general Australian population revealed that two fundamental facets of paranormal belief were predicted by reality testing deficits. The findings are discussed in relation to the cognitive bases of the formation of paranormal belief.

INTRODUCTION

The psychodynamic functions served by paranormal beliefs have now been extensively documented (for a review see Irwin, 1993, 2004), but the processes through which these beliefs are actually formed have received little empirical scrutiny. Researchers have largely neglected the cognitive or information processing correlates of paranormal belief, thereby impeding the formulation of a scientific account of the formation and maintenance of paranormal beliefs. This study sought to extend the previous work of the author (Irwin, in press) by considering the formation of paranormal beliefs in relation to people's habitual inclination to test critically the logical plausibility of their beliefs.

The theoretical context for the original study (Irwin, in press) was provided by Langdon and Coltheart's (2000) account of the generation and evaluation of beliefs. Under this view sensory experiences provide information about the environment and the self for which the percipient is often driven to generate an explanation. The production of potential causal explanations of an experience, generally referred to as the processes of causal attribution, can nevertheless be biased both by universal human dispositions and by the person's own idiosyncrasies (Kahneman & Tversky, 1972; Weiner, 1986). In what Langdon and Coltheart (2000) designate as a 'normal' or non-pathological style of belief generation, the person undertakes a critical evaluation and ranking of the plausibility of the various hypothetical explanations of the sensory experience. That is, hypotheses may be scrutinized in the light of prior personal experience, general knowledge, and the input of authoritative persons and similar sociocultural sources. In short, optional hypotheses are logically 'tested' or probed. In the psychodynamic literature this evaluative process is termed *reality testing* and comprises "a set of perceptual, cognitive and

sensorimotor acts that enables one to determine one's relationship with the external physical and social environments" (Reber, 1995, p.640). The causal explanation that best survives the person's application of reality testing may then be embraced as a generalized *belief* about the nature of the physical and social worlds. It should be added that such a belief is usually subject to ongoing critical revision as further relevant information comes to hand.

Under Langdon and Coltheart's (2000) approach, pathological beliefs or delusions arise in part through a failure of the person to subject a hypothetical explanation of sensory experience to critical testing. Most important in the present context is the fact that some commentators (e.g. Alcock, 1981, 1995; Goode, 2000; Vyse, 1997; Zusne & Jones, 1982) have argued that this is also the case for paranormal beliefs. In other words, when a person formulates a paranormal explanation for an experience it is said that this hypothesis might not then be subject to the usual processes of rigorous critical evaluation either at the time of its formulation or when further relevant information later becomes available. In this way an observed event may become the basis for a paranormal belief by the individual. On such a basis people who endorse paranormal beliefs would therefore be predicted to show some deficit in reality testing.

Despite frequent exposition of this view, direct empirical evidence for the predicted relationship is nevertheless meagre, so much so that it is tempting to suggest that the position has been propagated largely by sceptical commentators for purely polemical reasons. The author's recent study (Irwin, in press) nevertheless yielded some support for the prediction. That is, the intensity of each of two fundamental dimensions of paranormal belief (New Age Philosophy and Traditional Paranormal Beliefs—Lange, Irwin & Houran, 2000) were found to be predicted by types of reality testing deficits, particularly the factor of Hallucinations and Delusions and that of Reality Distortion (multivariate $R = 0.63$ and 0.57 for the two belief dimensions, respectively). Some doubt is cast on the reliability of the finding for Reality Distortion, however, by the fact that four questionnaire items contributing to this index of reality testing may also have functioned as items about paranormal belief. Thus, one item concerns the respondent's belief that he or she has been possessed by the devil; another taps the conviction of having mystical powers; and a further two concern the notion that the respondent's thoughts can be read by other people. Now, while these items may well signal the presence of reality distortion, they may also reflect the respondent's willingness to embrace paranormal beliefs. The observed relationships of paranormal beliefs to reality distortion may therefore have been a simple artifact of a degree of overlap between the scales used to index these two domains. Although this psychometric flaw does not undermine the finding of relationships between paranormal beliefs and the factor of Hallucinations and Delusions, the researcher (Irwin, in press) acknowledged the need for the relationship between paranormal belief and reality testing deficits to be replicated using an index of reality testing that is not contaminated by items explicitly concerning the paranormal. The present investigation pursued this objective of constructive replication.

The measure of reality testing deficits used by Irwin (in press) was the *Bell Object Relations and Reality Testing Inventory* or BORRTI (Bell, 1995). The psychometric characteristics of the BORRTI subscales have been thoroughly

documented (Bell, 1995; Bell, Billington & Becker, 1985, 1986). Indeed, the BORRTI appears to be the most widely used and the only multidimensional objective index of reality testing. For these reasons the identification of a viable substitute for the BORRTI is problematic. Indeed, most other available measures are very brief components of more general questionnaires and, like the BORRTI, they incorporate some items with a paranormal theme (e.g. the *Borderline Personality Inventory* — Leichsenring, 1999). The index of reality testing deficits used in this study was the Reality Testing subscale of the *Inventory of Personality Organization* (IPO-RT — Lenzenweger, Clarkin, Kernberg & Foelsch, 2001). This measure is unidimensional and thus is probably an oversimplification of the reality testing domain. On the other hand, with 20 items the IPO-RT does canvass a variety of aspects of reality testing. In addition, none of the items in this self-report questionnaire explicitly addresses paranormal phenomena. Finally, the items of the IPO-RT were designed to index “the capacity to differentiate self from non-self, intrapsychic from external stimuli, and to maintain empathy with ordinary social criteria of reality” (Kernberg, 1996, p.120). To the extent that this construction depicts reality testing deficits more in terms of an information processing style than as frankly psychotic phenomena it is a fair representation of the evaluative processes posited under Langdon and Coltheart’s (2000) account of belief generation. On these grounds the IPO-RT was deemed the most suitable substitute for the BORRTI in the present context.

The working hypothesis of the study was that paranormal beliefs generally are associated with deficits in reality testing.

METHOD

Participants

The study was conducted as a questionnaire survey of a convenience sample recruited through friendship networks within the general community of Australian adults. Respondents were residents of several cities or major towns in the states of New South Wales and Queensland, and did not include any of the participants in the earlier study (Irwin, in press). Data were solicited from 164 participants, but the data from three participants were unusable. This sample size was determined in part by the number of hours for which the research assistant, June Young, could be employed. Thus, the effective sample comprised 161 adults (96 women and 65 men) ranging in age from 18 to 74 years ($M = 41.6$, $SD = 15.16$, $Median = 42$).

Materials

Participants completed a short demographic questionnaire that included items on age and gender, followed in order by questionnaire measures of paranormal belief and of reality testing. The last two measures will now be described more fully.

The index of paranormal belief was the 26-item *Revised Paranormal Belief Scale* (RPBS — Tobacyk, 1988), an amended form of the scale originally developed by Tobacyk and Milford (1983). In its various guises the RPBS has been the most widely used questionnaire measure of paranormal belief for almost two decades (Goulding & Parker, 2001) and it is especially notable for

its extremely liberal view of the scope of 'the paranormal'. Through a process of 'top-down purification' followed by factor analysis Lange et al. (2000) identified two facets of paranormal belief that are indexed free of differential item functioning (DIF) by selected items of the RPBS, that is, the actual measurement of these paranormal beliefs is not confounded by the extraneous factors of gender and age. These scales are labelled New Age Philosophy (NAP) and Traditional Paranormal Beliefs (TPB). The NAP scale comprises 11 items relating to belief in psi abilities, reincarnation, altered states, and astrology; the TPB scale has 5 items on belief in traditional paranormal concepts such as the devil, hell, and witchcraft. Responses to the RPBS are made on a 7-point scale (1 = strongly disagree, to 7 = strongly agree), but for the purpose of this study they were recoded under a Rasch scaling procedure (Andrich, 1988) specified by Lange et al. (2000). Thus, NAP scores may range potentially from 6.85 to 47.72, and TPB scores may range from 11.16 to 43.24.

As indicated earlier, the chosen measure of reality testing was the 20-item Reality Testing subscale of the *Inventory of Personality Organization* (IPO-RT; Lenzenweger et al., 2001). Examples of IPO-RT items are 'I can't tell whether certain physical sensations I'm having are real, or whether I am imagining them', and 'When I'm nervous or confused, it seems like the things in the outside world don't make sense either'. Responses to the IPO-RT are made on a 5-point scale (1 = never true, to 5 = always true), and a total score on the scale is computed as the sum of responses over the 20 items; that is, IPO-RT scores may range from 20 to 100. The psychometric characteristics of the scale are impressive, and scores have been found to correlate with measures of proneness to psychosis (Lenzenweger et al., 2001). Although the items of the IPO-RT have not been investigated for differential item functioning Lenzenweger et al. (2001) do report that scores do not vary across gender.

Procedure

Potential participants were approached individually or in small groups by the research assistant. A 'plain language' statement was attached to the front of the inventory. This statement described the topic of the study, stressed that participation was voluntary and anonymous, and explained that the return of the completed form would in itself be taken to signify the respondent's informed consent to participate in the project. Additionally, an appeal was made to participants to respond to all questionnaire items as spontaneously and openly as possible. Most participants sealed their completed forms in an envelope and returned them in person to the research assistant, although other means of return were sometimes used.

It may be noted that the research assistant herself is moderately sceptical about paranormal phenomena. As both a caring non-judgemental person and a qualified psychologist, however, she is skilled in eliciting the expression of views from other people without the inhibitory intrusion of her own personal opinions.

RESULTS

Descriptive statistics for the survey measures are presented in Table 1. For comparative purposes statistics for the RPBS are shown both for the DIF-free

factors extracted by Lange et al. (2000) and for the original factors identified by Tobacyk (1988).

Table 1

Means and Standard Deviations of Survey Variables and Spearman Correlations Between RPBS Scales and IPO-RT (N =161)

	Mean	SD	Spearman Correlation
RPBS scales			
New Age Philosophy (NAP)	24.24	7.00	0.54 ***
Traditional Paranormal Beliefs (TPB)	23.91	7.27	0.55 ***
Traditional religious belief	4.12	1.96	0.36 ***
Psi	3.68	1.78	0.49 ***
Witchcraft	3.18	2.13	0.63 ***
Superstition	1.56	1.06	0.38 ***
Spiritualism	3.82	2.07	0.48 ***
Extraordinary life forms	3.20	1.40	0.32 ***
Precognition	3.57	1.81	0.43 ***
IPO-RT	35.52	11.88	

*** Significance level (uncorrected): $p < 0.001$

The three major survey variables (the two RPBS factors and the IPO-RT) were significantly (positively) skewed. Spearman correlations were therefore used to provide a basic indication of the strength of relationships between paranormal beliefs (RPBS factors) and reality testing deficits (IPO-RT). For the sake of completeness these correlation coefficients were computed also for the seven originally proposed factors of the RPBS (Tobacyk, 1988). The coefficients are given in Table 1. These data suggest that belief in New Age Philosophy (NAP) and Traditional Paranormal Beliefs (TPB) are both associated with reality testing deficits. Indeed, the pattern of correlations across the range of paranormal belief factors is consistent and relatively uniform. The simple correlational analysis nevertheless does not take account of the possible role of the extraneous demographic variables, age and gender. To this end multivariate analyses were conducted.

Before parametric statistical analysis could proceed, skewness had to be eliminated from three of the survey variables. This objective was successfully achieved with a square root transformation of TPB scores and inverse transformation (reciprocal) of the IPO-RT scores. None of the usual mathematical transformations, however, eliminated skewness from the NAP scores, and this problem had to be resolved by excluding three extreme scorers (all with the maximum NAP score of 47.72). Without these three participants the skewness of NAP scores disappeared; nonetheless, scores still showed a very substantial range (6.85 to 44.12), and the exclusion of the top three scorers is therefore unlikely to have compromised the interpretation of the statistical analyses.

All subsequent analyses were undertaken with these adjusted scores. Note particularly that the use of the reciprocal of IPO-RT scores in the analyses means that relationships become the inverse of reality. Thus, if a dimension of paranormal belief is *negatively* related to the reciprocal of IPO-RT, the belief is *positively* predicted by reality testing deficits.

The survey was designed to assess the contribution of reality testing deficits to the intensity of each of the facets of paranormal belief indexed in the study. To this end it was appropriate to conduct a separate multiple regression analysis for each of the two beliefs, NAP and TPB (Tabachnick & Fidell, 1996). In the first such analysis the following independent variables were regressed on (the slightly truncated) NAP: the IPO-RT reality testing scale, together with age and (female) gender as extraneous variables. It should be noted that all tolerance statistics in the regression were well above zero, ranging from 0.98 to 0.99; multicollinearity of predictor variables therefore was of no practical concern (Darlington, 1990). A significant regression equation was generated ($R = 0.54$, $R^2 = 0.29$, $F(3, 154) = 21.19$, $p < 0.001$). Table 2 presents the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), and the squared semipartial correlation (sr^2). As this table shows, NAP was predicted by the set of independent variables and, more specifically, by the IPO-RT scale.

Table 2

Standard Multiple Regression of Reality Testing (IPO-RT), Age, and Gender on New Age Philosophy (N = 158)

Variables	B	β	p	sr^2 (unique)
IPO-RT (inverse)	-359.003	-0.510	0.000	0.255
Age	-8.467×10^{-3}	-0.021	0.753	0.000
Gender (female)	1.517	0.119	0.084	0.014
Intercept =	34.439			

$$R = 0.54, R^2 = 0.29, p < 0.001$$

Table 3

Standard Multiple Regression of Reality Testing Subscales (IPO-RT), Age, and Gender on Traditional Paranormal Beliefs (N=161)

Variables	B	β	p	sr^2 (unique)
IPO-RT (inverse)	-42.944	-0.519	0.000	0.263
Age	-2.299×10^{-3}	-0.047	0.488	0.002
Gender (female)	0.115	0.076	0.266	0.006
Intercept =	5.999			

$$R = 0.54, R^2 = 0.29, p < 0.001$$

A similar multiple regression analysis was performed for (the square root of) TPB. All tolerance statistics in this regression were well above zero, ranging from 0.97 to 0.99. Again, the regression equation was significant ($R = 0.54$, $R^2 = 0.29$, $F(3, 157) = 21.29$, $p < 0.001$). The results in Table 3 indicate that TPB was predicted by the set of independent variables and, more specifically, by the IPO–RT scale.

DISCUSSION

As predicted, reality testing deficits were a predictor of both dimensions of paranormal belief, New Age Philosophy ($sr^2 = 0.255$) and Traditional Paranormal Beliefs ($sr^2 = 0.263$). These findings have two principal implications.

First, the outcome of the study may be seen as a successful constructive replication of the original investigation by Irwin (in press). That is, rather less credence may now be given to the possibility that the original findings were seriously contaminated by some degree of overlap in the measures of paranormal belief and reality testing deficits.

Second, and more important, the findings of the study lend support to the view that the formation and the maintenance of paranormal beliefs may entail deficient processes in reality testing. That is, some people, when faced with an anomalous experience, may jump to a paranormal interpretation without due critical testing of the logical plausibility of this belief. The study may therefore help in a small way to illuminate the insufficiently researched processes entailed in the formation and the maintenance of paranormal beliefs. Further, the observed relationship between paranormal beliefs and reality testing deficits may have some capacity to accommodate previously reported associations between the intensity of paranormal beliefs and such personality variables as schizotypy or genetic proneness to psychosis (e.g. Irwin & Green, 1998; Thalbourne, Dunbar & Delin, 1995), fantasy proneness (e.g. Irwin, 1990, 1991), and dissociativity (e.g. Irwin, 1994; Wolfradt, 1997).

Nevertheless, the universality of these findings should not be overstated. While many people in the general population may generate paranormal beliefs in the way described above, this might not invariably be the case. It is possible, for example, that some academic parapsychologists may base their paranormal beliefs largely on a rigorous examination of the empirical literature of experimental parapsychology. In this context the processes of reality testing are arguably intact, since the parapsychologist's observation has been logically scrutinized in terms of the accepted principles of scientific methodology. On the other hand, this approach is certainly not representative of the typical believer in the paranormal, and thus the proposed role of reality testing deficits in the generation of paranormal beliefs may be very broadly applicable. The latter view admittedly warrants further empirical scrutiny. As one reviewer of this paper has noted, paranormal believers are by no means a homogeneous group. Future research might usefully examine the role of reality testing deficits in independently identified subgroups of paranormal believers (Irwin, 1997).

In addition, the observed association should not be taken to imply that all paranormal believers are frankly psychotic. While psychotic people may well be inclined to endorse paranormal beliefs (Greyson, 1977; Persinger, 1987) the

converse may not uniformly obtain. To assess this association, use was made of a criterion recommended by one of the IPO test designers (Mark Lenzenweger, personal communication, 25 June 2003), namely, that a score of 58 or more on the IPO–RT scale is indicative of *clinically significant* reality testing deficits. Ten of the present sample met this criterion, and certainly this group exhibited significantly higher NAP ($F(1, 154) = 23.39, p < 0.001$) and (transformed) TPB performance ($F(1, 157) = 17.27, p < 0.001$) than did the remainder of the sample. Nonetheless, of the 38 participants comprising the top quartile of (truncated) NAP scorers 31 (81.6%) had IPO–RT scores *below* the cut-off for clinical significance and, similarly, the IPO–RT scores of 35 (83.3%) of the 42 people in the top quartile of TPB scorers did *not* reach clinical significance. In short, the reality testing deficits of a sizeable majority of ardent paranormal believers were still below clinically significant levels. Similar trends were observed by Irwin (in press). Reality testing deficits in paranormal believers should therefore be understood more in terms of an information processing style than as an intrinsic concomitant of florid psychoticism.

The nature of this predispositional information processing style needs to be further clarified by research. A recent study by Irwin and Young (2002) suggests that, when an anomalous experience invites an attribution involving paranormal processes, people with a habitual intuitive-experiential information processing style (Epstein, Pacini, Denes-Raj & Heier, 1996) will be satisfied with the attribution's intuitive appeal and therefore will not subject it to reality testing. Thus, the suspension of reality testing may be integral to a broader cognitive style of the person. Motivational factors, such as a need for a sense of control over life events (Irwin, 2000), may also be pivotal here. Thus, if a paranormal belief provides a sense of reassurance in this respect, reality testing of the belief might be suspended and the belief thereby protected against revision in the face of contrary information (Bader, 1999; Russell & Jones, 1980; Singer & Benassi, 1981; Wiseman & Smith, 2002).

The principal limitation of the present study is its reliance on self-report questionnaire measures. Perhaps a performance measure of reality testing would be advantageous in future research.

In summary, several commentators (e.g. Alcock, 1981, 1995; Goode, 2000; Vyse, 1997; Zusne & Jones, 1982) had earlier construed paranormal beliefs to arise from a personal disinclination to subject causal attributions to rigorous logical scrutiny. While these expositions may well have been largely polemical, simplistic, and insufficiently grounded on empirical evidence, the findings of the present study and that by Irwin (in press) point persuasively to the role of reality testing deficits in the formation and maintenance of paranormal beliefs. There is a need for research to clarify further the nature of the 'pro-paranormal information processing style' that is characterized by an intuitive-experiential outlook and a concomitant suspension of reality testing processes when the person is confronted with an anomalous experience. Researchers could also usefully examine the role of reality testing deficits in protecting cherished paranormal beliefs from revision in the light of further information.

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*School of Psychology
University of New England
Armidale NSW 2351
AUSTRALIA*

hirwin2@pobox.une.edu.au

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