

The Minimal Self and Belief in Paranormal Phenomena

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Abstract: A growing body of evidence suggests that in the general population the development of beliefs in paranormal phenomena relies in part on the cognitive processes involved also in the formation of delusions. One early sign of the development of delusions is a disorder of or vulnerability in the minimal self, an awareness that one's thoughts, perceptions and feelings are experienced by the self. This study sought to investigate the hypothesis that belief in paranormal phenomena may be associated with minimal-self dysfunction. The hypothesis was investigated with an online questionnaire survey of 141 Australian adults. Findings support the hypothesis and indicate also that the relation between minimal-self dysfunction and paranormal belief is partially mediated by schizotypal tendencies. These relations nevertheless are not strong.

Keywords: paranormal belief, minimal-self dysfunction, schizotypy, anomalous experiences

Recent empirical research has suggested that the development of belief in paranormal phenomena may be due in part to psychological processes that also underlie the formation of delusions. The aim of this study was to examine the contribution to paranormal belief by a reported early prelude to the development of delusions, a disturbance in a psychological characteristic known as the minimal self.

Before proceeding to the rationale for the study three crucial points need to be established for the benefit of readers. First, there is no assumption here that a delusion is necessarily false. Although falseness was originally proposed to be a defining feature of delusions (Jaspers, 1913, 1997) this condition is no longer required under contemporary clinical diagnostic criteria (American Psychiatric Association, 2013). Rather, delusions are now defined in terms of the manner of their formation. Other types of belief tend to be accepted after some critical rational analysis of available options and are subject to ongoing evaluation in light of subsequently encountered information. Delusions, on the other hand, have intuitive bases, are established with scant rational scrutiny of supportive evidence or of alternative explanations, and are relatively shielded from further critical reassessment (Coltheart, Langdon, & McKay, 2011; Connors & Halligan, 2015). Indeed, in many cases delusions are emotionally driven (Bortolotti, 2015; McKay & Kinsbourne, 2010), seemingly designed to serve some pressing psychological need with a minimum of cognitive effort. For these reasons delusions may often be false, but they are neither invariably nor inherently so. The hypothesis that popular paranormal beliefs may in part be delusional therefore does not negate the ontological reality of psi processes.

Second, the delusional origins of paranormal beliefs may well prove to be a tenable account for many members of the general population, but there may still be some groups of people for

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whom this is not the case. Most professional parapsychologists, for example, may have endorsed various beliefs in paranormal phenomena because they have undertaken a critical review of some of the empirical literature on psi experiments. Some people with a general interest in the paranormal may have read popular accounts of parapsychological research and have come to a similar considered conclusion. Self-identified professional psychics also may engage in a relatively rational analysis of propositions about the *modus operandi* of psi and may have consulted various authoritative esoteric texts. Again, some members of societies for psychical research, theosophical societies, or other esoteric groups may have given critical consideration to their reasons for believing in the paranormal, as may have people curious about spiritualism or mysticism. Now, several of these groups have been found to have a psychological profile that differs from that of most paranormal believers (McGarry & Newberry, 1981; Milton, 1992; Stone, 2016). Nonetheless, despite the existence of these “exceptions” I would argue that collectively the people in these categories still form a minority. The hypothesis of the delusion-like nature of paranormal beliefs therefore may yet hold for a substantial part of the general population.

Third, the fact that some people hold a delusional belief does not necessarily mean that they have a psychiatric disorder. Indeed, non-psychotic delusions are very common in the general population (e.g., Pechey & Halligan, 2011). The position now taken by most psychologists is that many symptoms of psychosis occur in various degrees and are distributed across the whole population (Claridge, 1997; Johns & Van Os, 2001; Nelson, Seal, Pantelis, & Phillips, 2013; Verdoux & Van Os, 2002), but they constitute a psychotic profile in only a small percentage of cases. Believers in the paranormal therefore are not being “pathologized” by the hypothesis that they have some psychological characteristics independently known to be found in more extreme forms among patients with psychosis. The fact that delusions and the processes underlying them need not be intrinsically pathological is essential to an appreciation of this study’s rationale.

With the foregoing caveats kept in mind, what is the evidence that the formation of paranormal beliefs in most people has something in common with that of (non-pathological) delusions? One level of support concerns personality characteristics. Schizotypy is a personality dimension relating to behaviors that are an attenuated form of schizophrenic symptoms and which are distributed across the general population. As these schizophrenic-like characteristics may be found at subclinical or benign levels among many people this personality profile has been dubbed the “happy schizotype” (McCreery & Claridge, 1995). Many studies have demonstrated that schizotypy is related both to paranormal belief (e.g., Goulding, 2005; Holt, Simmonds-Moore, & Moore, 2008; Irwin & Green, 1998-1999; Peltzer, 2003; Thalbourne, 1985) and to the interpretation of anomalous experiences as paranormal (Irwin, Dagnall, & Drinkwater, 2013; Schofield & Claridge, 2007). The domain of schizotypy, however, is multifactorial, and the cognitive-perceptual component of schizotypy (“unusual experiences”) appears to be particularly prominent as a correlate of paranormal belief (Bouvet et al., 2014; Hergovich, Schott, & Arendasy, 2008; Houran, Irwin, & Lange, 2001; Irwin & Green, 1998-1999). In addition, the fact that delusions are formed with little rational analysis of the evidence for them is paralleled by observations that paranormal belief is related to an intuitive style of thinking (e.g. Aarnio & Lindeman, 2005; Irwin & Marks, 2013; Irwin & Young, 2002; Marks, Hine, Blore, & Phillips, 2008; Sadler-Smith, 2011), a tendency to jump to conclusions (Irwin, Drinkwater, & Dagnall, 2014), and an insufficiency of reality testing (Dagnall, Drinkwater, Denovan, & Parker, 2015; Dagnall, Drinkwater, Parker, & Munley, 2010; Dagnall, Drinkwater, Parker, & Rowley, 2014; Drinkwater, Dagnall, & Parker, 2012; Irwin, 2003, 2004).

Underlying the formation of delusions are schizotypal cognitive processes (Garety & Free-

man, 1999; Garety et al., 2005) that have been empirically documented as key markers of proneness to delusions. Several of these cognitive processes have been shown to correlate also with paranormal beliefs; they include specific biases in reasoning such as emotion-based reasoning and catastrophizing; aberrations in the “salience network” of the cerebral cortex (the bilateral insula and anterior cingulate) that make some potential interpretations of an experience seem unusually salient; inferential confusion or the inclination to draw inferences on the basis of remote theoretical possibilities; proneness to confirmation bias or the neglect of disconfirming information; and distinctive metacognitive beliefs or attitudes towards one’s thinking, particularly the tendency to focus attention on thought processes (cognitive self-consciousness) and negative beliefs about thoughts concerning uncontrollability and danger (Dagnall et al., 2010; Drinkwater et al., 2012; Irwin, 2003, 2004, 2014; Irwin, Dagnall, & Drinkwater, 2012a, 2012b; Jones & Russell, 1980; Russell & Jones, 1980; Sparks & Pellechia, 1997).

The effect size of most of the above relations (as indexed by simple binary correlations) is small, but when considered collectively there is sufficient empirical evidence here to indicate the potential viability of the hypothesis that the formation of paranormal beliefs is due at least in some small way to psychological processes that also underlie the formation of non-pathological delusions.

A corollary of this hypothesis is that schizotypal cognitive processes arise before the emergence of clear delusional tendencies and indeed, in at least some instances this has been shown to be the case (e.g., Raj, Mäntylä, Mantere, Kiesepä, & Suvisaari, 2016). Further insight into the developmental stages of delusions may be found in recent research into so-called prodromal symptoms of schizotypy. *Prodromal symptoms* are specific or non-specific signs that may appear before the emergence of the recognized features of a disease or disorder. Long before symptoms of schizophrenia can be detected, for example, there may be some evidence of reduced cognitive functioning, a period of “prepsychotic disturbance” (Yung & McGorry, 1996, p. 353). Similarly, some commentators would deem early-onset schizotypal behaviors a prodrome of the development of schizophrenia or the less debilitating schizotypal personality disorder (Kwapil & Barrantes-Vidal, 2015; Moukas et al., 2010). Most importantly in the present context, prodromal symptoms may prove instructive in understanding the developmental stages of a disorder (Akroyd, 2013; Davidsen, 2009; Van Kampen, 2005).

In recent years some psychopathology researchers, particularly those in Europe who work from the tradition of a phenomenological viewpoint in psychiatry, have proposed that a condition known as a *minimal-self disorder*¹ may be a prodromal symptom of benign schizotypy, schizotypal personality disorder, and schizophrenia. The minimal self, basic self, experiential self, or “ipseity” entails a first-person perspective on the world, an appreciation of the self as the subject (as distinct from the object) of one’s perceptions, thoughts, and feelings (Nelson, Whitford, Lavoie, & Sass, 2014; Sass, Parnas, & Zahavi, 2011). As defined by Gallagher (2000, p. 15) the minimal self is “a consciousness of oneself as an immediate subject of experience”, and thereby it is much more rudimentary and unelaborated than the construct of self-concept which incorporates all manner of psychological complexities in how one sees oneself (see also Strawson, 2000). The following illustration of the minimal or experiential self is attributed to de Warren (2009, p. 19; cited by Martin et al., 2014): “when looking at this tree in my backyard, my consciousness is directed toward the tree and not toward my own act of perception. I am, however, aware of myself as perceiving this tree, yet this self-awareness (or self-consciousness) is not itself thematic”, that is, this consciousness of the self is “pre-reflective” (Nelson et al., 2014) or something which usually is known to

be present but is not being reflected upon at the time. The schizophrenia spectrum disorders are proposed to arise fundamentally from a disorder of or vulnerability in (Stanghellini & Rosfort, 2015) this minimal self (e.g., Parnas & Handest, 2003; Parnas & Henriksen, 2014; Sass & Parnas, 2007). At the same time it must be stressed that this dysfunction is deemed prodromal and is not a psychotic disturbance in its own right (Henriksen & Nordgaard, 2016). Consistent with their status as prodromal symptoms, disturbances in the minimal self may be evident from childhood or early adolescence (Henriksen & Nordgaard, 2016).

This approach is not entirely new. About a hundred years ago clinicians who studied schizophrenia maintained that a disturbance in the sense of self was a central factor in schizophrenic symptoms, but with the growth of a behavioral perspective in clinical diagnosis this phenomenological element was set aside in favor of overtly observable or “objective” factors (Akroyd, 2013; Sass et al., 2011). The re-emergence of a dysfunction of the minimal self as the essential core of benign schizotypy, schizotypal personality disorder and schizophrenia has invigorated the study of these conditions. Researchers are now exploring the mechanisms through which self disorder may eventually lead to the characteristic behaviors of benign schizotypy (Raballo & Parnas, 2011; Torbet, Schulze, Fiedler, & Reuter, 2015) and the recognized (so-called Schneiderian first-rank) symptoms of schizophrenia (Fuchs, 2015; Irrázaval, 2015; Parnas, Carter, & Nordgaard, 2016; Sass, 2003; Sass & Byrom, 2015), including delusions. In essence, if people have a minimal-self disorder they may suffer a “source monitoring deficit”, an intermittent failure to “own” their perceptual experiences or fantasies as “mine”, and this allows all manner of intuitive interpretations of these experiences and of the nature of the physical and the social world (Nelson et al., 2014). Further, such people may fail to appreciate that they are in a position to make a rigorous assessment of the evidence for these interpretations.

Recent empirical studies have addressed the hypothesized link between minimal-self disorder and symptoms of both benign schizotypy and the schizophrenia spectrum disorders. A few researchers (Cicero, Martin, Becker, & Kerns, 2016; Warman, Lysaker, Luedtke, & Martin, 2010) have claimed confirmation of the relation based on a measure of self-concept, but as noted earlier, the psychological complexity of self-concept differs fundamentally from the construct of minimal self. Other investigations, on the other hand, provide more rigorous support for the link (e.g., Cascio et al., 2015; Torbet et al., 2015; Nordgaard, Revsbech, & Henriksen, 2015).

In summary, there are growing indications that the emergence of delusions in both clinical and non-clinical populations is related to the prodrome of minimal-self disorder.² To the extent that delusion-like processes do underlie the generation of paranormal beliefs within the general population, there may therefore be a relation between paranormal belief and the presence of a minimal-self dysfunction. Further, to the extent that minimal-self dysfunction is prodromal to schizotypy, and schizotypy in turn is predictive of paranormal beliefs, the foregoing relation may be mediated by the presence of schizotypal characteristics. The potential linkage between predictors of paranormal belief may be seen as an initial step in the construction of a model of at least one facet of the formation of paranormal beliefs. In other words, taken in conjunction the above relations provide an opportunity for a preliminary test of a broader view that the formation of paranormal beliefs relies in part on the cognitive processes also responsible for non-pathological delusions. The objective of the study therefore was to investigate the following hypotheses.

Hypothesis 1. For the general (non-clinical) population there is a positive relation between the intensity of paranormal beliefs and a dysfunction of the minimal self.

Hypothesis 2. The relation between minimal-self dysfunction and paranormal beliefs is mediated by schizotypal tendencies.

Method

Design

The project was undertaken as an online survey and run in conjunction with projects on other topics, the results of which are reported elsewhere (e.g., Irwin, 2017). The design of the project was approved by the host university's Human Research Ethics Committee (Approval no. HE16-172).

Participants

The survey was completed by a convenience sample of 141 Australian adults. There were 23 males and 117 females (plus one person who preferred not to disclose his or her gender), aged between 19 and 68 years ($M = 37.3$, $SD = 11.61$). All participants were recruited from a first-year Psychology class and received course credit for their participation. The researcher, a retired faculty member, conducted the study at a distance, so the interaction with the participants was limited to the Information Sheet at the beginning of the online survey; this page specified the nature and general objective of the survey, and gave the researcher's name and email address. Therefore, the participants had no direct knowledge of the researcher's interpersonal style, or other personality characteristics, expectations, or academic interests. The researcher is in general supportive of the psi hypothesis.

Materials

The survey inventory included three psychometric questionnaires plus a couple of items on demographic characteristics (age and gender). The questionnaires were the *Survey of Scientifically Unsubstantiated Beliefs (SSUB)*, the *Inventory of Psychotic-Like Anomalous Self-Experiences (IPASE)*, and the *Oxford-Liverpool Inventory of Feelings and Experiences (Short Form; O-LIFE)*.

The *Survey of Scientifically Unsubstantiated Beliefs (SSUB)*; Irwin & Marks, 2013), labelled the "Survey of Popular Beliefs" for general use, is a 20-item self-report interval-level measure of the intensity of paranormal and related beliefs. Responses to the *SSUB* items are made on a 5-point scale (1 = Strongly disagree, to 5 = Strongly agree), with negatively worded items reverse encoded. The *SSUB* comprises two scales denoted New Age Beliefs (NAB, 15 items) and Traditional Religious Beliefs (5 items), but only the data for the former were used here. The NAB encompasses such New Age beliefs as telepathy, astral projection, fortune telling, psychokinesis, astrology, crop circles, haunted houses, shamanism, and the like. Scores on the NAB scale are computed as the sum of responses to the constituent items and then converted to scores with interval-level (Rasch scale) measurement using the conversion table provided by Irwin and Marks (2013, Appendix 3). Scores for NAB may range from 13.37 to 36.53, and were standardized by Irwin and Marks (2013) to have a mean of 25 and a standard deviation of 5.

Irwin and Marks (2013) have documented the dimensional purity and other psychometric characteristics of the *SSUB*, and generally these are sound. For example, the four-week test-retest coefficient for the NAB scale is satisfactory (.93; Irwin & Marks, 2013). In addition, the strong internal reliability of NAB items is attested by Irwin and Marks (2013; Cronbach's $\alpha = .92$), Irwin, Dagnall, and Drinkwater (2015; $\alpha = .89$), Irwin (2015a; $\alpha = .93$), Irwin (2015b; $\alpha = .91$), and Irwin,

Dagnall, and Drinkwater (2016; $\alpha = .92$). The *SSUB* is one of the few available interval-level measures of paranormal and related beliefs.

The *Inventory of Psychotic-Like Anomalous Self-Experiences (IPASE)*; Cicero, Neis, Klau-nig, & Trask, 2017) is a 57-item self-report questionnaire indexing aspects of the minimal self. Responses to each item are made using a 5-point scale (1 = Strongly disagree, to 5 = Strongly agree), and a total *IPASE* score is computed as the sum of responses over the 57 items. In addition, five subscales of the *IPASE* have been factorially identified. The subscales are labelled Cognition (7 items; anomalous experiences of one's own cognitions or thoughts), Self-Awareness and Presence (22 items; the experience that one's notion of the self is being altered), Consciousness (6 items; disturbances in conscious experience of reality), Somatization (17 items; disturbances in bodily sensations), and Demarcation/Transitivism (5 items; the existential feeling of nonexistence). Scores on each of the subscales are defined as the sum of responses to the constituent items in that scale. Cicero et al. (2017) document the *IPASE*'s congruent validity with its correlations with cognate measures. The internal consistency of the *IPASE* items is impressive for a general population sample (Cronbach's $\alpha = .97$ for the full scale, and .82 to .96 for the individual subscales), and similar statistics were obtained for a sample of schizophrenic patients and for groups defined by level and type of schizotypal symptoms. One drawback in the *IPASE* is that all of its items are couched in the same direction, with no negatively worded or reverse-coded items; this may make the questionnaire prone to participants' response sets (e.g., selecting the same response option for all items after carefully reading only the first few of them). The *IPASE* is also a very new scale, so there is a dearth of independent reports from which to assess its utility (but see Cicero, Klau-nig, Trask, & Neis, 2016). Otherwise, the *IPASE* appears to be a well-constructed index of minimal-self dysfunctions and in any event, it is one of the very few such scales currently available (see also Parnas et al., 2005).

The *Oxford-Liverpool Inventory of Feelings and Experiences (Short Form)* or *O-LIFE* (Mason, Linney, & Claridge, 2005) comprises 43 binary (Yes/No) items designed to index schizotypy. The *O-LIFE*'s four scales are labelled Unusual Experiences (UE; 12 items), Cognitive Disorganization (CD; 11 items), Introverted Anhedonia (IA; 10 items), and Impulsive Nonconformity (IN; 10 items). Scores on each scale are computed as the number of items on which the respondent checks the aberrant option. The *O-LIFE*'s psychometric properties are well documented (e.g., Fonseca-Pedrero, Ortuño-Sierra, Mason, & Muñiz, 2015; Mason, Linney, & Claridge, 2005; Si-erro, Rossier, Mason, & Mohr, 2016); thus, the scale's internal consistency is satisfactory (Cron-bach's $\alpha = .78$ to .87; Fonseca-Pedrero et al., 2015) and the measure's congruent validity has been demonstrated through correlations with other indices of schizotypy. As four of the items of the UE scale address broadly parapsychological or transpersonal experiences (e.g., "Do you think that you could learn to read other's minds if you wanted to?") there could be a potential confound in correlating UE scores with paranormal beliefs; a revised score (revUE) therefore was computed from the remaining eight items, yielding a total revUE score from 0 to 8.

Procedure

The project was administered as an online study compiled using *Qualtrics™ Survey Software* (Qualtrics Labs Inc., Provo, UT; see <http://www.qualtrics.com>). The stated aim of the project was "to survey various life experiences and relate them to aspects of your beliefs". People aged at least 18 years were said to be eligible to take part and they were assured their participation was anonymous and completely voluntary, with withdrawal from the exercise permitted at any time.

The need for frankness in responding was stressed. The system automatically prevented participation more than once by the same person.

After affirming their consent to take part in the project, participants completed the demographic items, followed by the *SSUB*, *IPASE* and *O-LIFE* questionnaires presented in a counter-balanced order. At the conclusion of the survey respondents were thanked for participating in the survey and were given the author's contact details in case they wished to learn about the study's findings when these became available.

Recruitment of participants was terminated at the end of the academic trimester in which the Psychology students were enrolled.

Results

Descriptive statistics for the principal variables of the study are given in Table 1. As the distribution of several variables was significantly skewed, bivariate relations between variables were indexed with Spearman correlation coefficients and are presented in Table 2. These correlations are provided purely as information; they were not used in the inferential statistical analyses.

Table 1
Descriptive Statistics for All Variables

Variable	<i>M</i>	<i>SD</i>	Range	Skewness (SE = .204)
Paranormal Beliefs <i>NAB</i>	22.82	3.16	13.37–29.19	-.89**
Minimal Self <i>IPASE</i>				
Cognition CGN	12.06	4.92	7–28	.91**
Self-Awareness and Presence SAP	42.94	16.99	22–97	.84**
Consciousness CNS	15.29	5.01	6–27	-.06
Somatization SOM	35.89	11.90	17–66	.38
Demarcation/Transitivism DT	8.50	3.44	5–19	.84**
Total	114.69	38.72	57–219	.56*
Schizotypy <i>O-LIFE</i>				
Unusual Experiences UE	4.13	2.73	0–11	.39
Revised Unusual Experiences revUE	3.16	2.01	0–8	.16
Cognitive Disorganization CD	5.08	3.30	0–11	.20
Introverted Anhedonia IA	2.99	2.27	0–9	.77*
Impulsive Nonconformity IN	3.31	2.23	0–9	.63*

Two-tailed tests, $df = 139$, with Bonferroni correction: * $p < .05$, ** $p < .01$

Hypothesis 1 proposed a positive relation between the intensity of paranormal beliefs and a dysfunction of the minimal self. The assessment of this hypothesis took into account the demographic factors of gender and age with which paranormal beliefs are known to vary to some degree (Irwin, 2009). A hierarchical multiple regression was performed with *NAB* as the criterion variable

and with gender and age (in Step 1) and *IPASE* Total scores (Step 2) as predictor variables. As the distribution of NAB scores was not normal the regression analysis was undertaken in conjunction with bootstrapping (1000 samples with bias corrected and accelerated analyses); bootstrapping is a procedure for using the original sample data to estimate a variable's distribution in the population and thereby circumvents the need to meet the statistical requirement for a normal distribution of variables (IBM Corporation, 2011). The regression equation after Step 1 was significant, $F(2, 138) = 5.71, p < .01$, adjusted $R^2 = .08$, with an independently significant contribution to the regression made by gender, partial $r(138) = .28$, $\beta = .28, t(138) = 3.38, p < .001$. With the entry of *IPASE* Total in Step 2 the regression equation showed a significant change, $F(3, 137) = 9.72, p < .001$, adjusted $R^2 = .18$. Hypothesis 1 therefore is supported.

Table 2

Spearman Correlations across all Variables

Variable	CGN	SAP	CNS	SOM	DT	<i>IPASE</i> total	UE	revUE	CD	IA	IN
Paranormal Beliefs <i>NAB</i>	.32	.21	.16	.29	.22	.26	.42	.31	-.04	.02	-.01
Minimal Self <i>IPASE</i>											
Cognition CGN		.81	.62	.81	.81	.87	.41	.47	.35	.22	.35
Self-Awareness/Presence SAP			.72	.79	.86	.95	.38	.47	.51	.35	.46
Consciousness CNS				.73	.65	.81	.43	.49	.39	.35	.39
Somatization SOM					.78	.92	.50	.56	.42	.28	.45
Demarcation/Transitivism DT						.89	.34	.41	.47	.44	.36
Total							.46	.54	.48	.35	.46
Schizotypy <i>O-LIFE</i>											
Unusual Experiences UE								.94	.35	.12	.44
Revised UE revUE									.46	.20	.51
Cognitive Disorg. CD										.47	.58
Introverted Anhedonia IA											.33
Impulsive Nonconformity IN											

All coefficients of .27 or more are significant with $df = 139, p < .05$, Bonferroni corrected, two-tailed

To examine which of the individual *IPASE* factors contribute substantially to this relation the above analysis was repeated but with the five *IPASE* subscales as predictors in Step 2. With the entry of the *IPASE* factors in Step 2 the regression equation again showed a significant change, $F(5, 133) = 5.28, p < .001$, adjusted $R^2 = .23$, with the Cognitive subscale of the *IPASE* making an independently significant contribution, partial $r(133) = .25$, $\beta = .42, t(133) = 2.95, p < .01$. Note, however, that collinearity (i.e., intercorrelations) among the *IPASE* factors may be an issue here; tolerance statistics were as follows: Cognition .28; Self-Awareness and Presence .19; Consciousness .39; Somatization .23; and Demarcation/Transitivism .22. These statistics may not be low enough to warrant exclusion of some *IPASE* factors from the analysis (Tabachnick & Fidell, 1996), but they are grounds for caution in drawing any inference that four of the *IPASE* factors did not contribute significantly to the prediction of NAB scores. These considerations notwithstanding, it is clear that Hypothesis 1 is supported: the intensity of paranormal beliefs is related to some

dysfunction of the minimal self.

Under Hypothesis 2 the relation between minimal-self disorder and paranormal beliefs is held to be mediated by schizotypal tendencies. The preceding analysis for Hypothesis 1 identified the Cognitive subscale of the *IPASE* as a key facet of minimal-self dysfunction in this context; in addition, previous research has shown the cognitive-perceptual component of schizotypy (UE) to be the *O-LIFE* factor most strongly predictive of paranormal belief (Bouvet et al., 2014; Hergovich et al., 2008; Houran et al., 2001; Irwin & Green, 1998-1999). Hypothesis 2 therefore was tested by examining the extent to which the relation between Cognitive *IPASE* and NAB scores is mediated by the *O-LIFE* revUE factor. An assessment of this mediated relation used the PROCESS add-on software for SPSS (Hayes, 2013).³ The output of these analyses was as follows.

The relation between *IPASE* Cognition and revUE was significant, $b = 0.21$, $SE = 0.03$, $p < .001$.

The relation between revUE and NAB was of borderline significance, $b = 0.28$, $SE = 0.14$, $p = .0512$. Given that the link between paranormal beliefs and the “unusual experiences” component of schizotypy is well documented in the literature it is reasonable to apply a one-tailed test here; under this criterion the relation between revUE and NAB is taken as significant.

The total relation between *IPASE* Cognition and NAB was significant, $b = 0.22$, $SE = 0.05$, $p < .001$.

The direct relation of *IPASE* Cognition and NAB was significant, $b = 0.16$, $SE = 0.06$, $p < .01$.

Finally, bootstrapping analyses suggests that there was a significant indirect (mediated) link between *IPASE* Cognition and NAB, $b = 0.06$, 95% CI = [0.00, 0.13]. As indicated above, the relation between these two variables can be broken down as follows⁴: total effect 0.219; direct effect 0.160; indirect effect 0.059.

The above output satisfies the criteria for (partial) mediation (Hayes, 2013). The relation between minimal self and paranormal beliefs therefore is significant when “unusual experiences” is treated as a mediating factor. Hypothesis 2 is supported, but with the rider that the mediation is partial rather than complete.⁵

Discussion

Hypothesis 1 posited a relation between the intensity of paranormal beliefs and the characteristics of a dysfunction in the minimal self. The associated multiple regression analysis confirmed that the set of minimal-self characteristics indexed by the *IPASE* statistically predicted the intensity of paranormal beliefs addressed by the NAB. Further, the contribution of the *IPASE* Cognitive subscale to the regression was independently significant. Now, the Cognitive subscale concerns anomalous experiences of one’s own cognitions or thoughts; these experiences are deemed anomalous because they show a source monitoring deficit, a failure of the person to recognize ownership of his or her cognitions. According to Cicero et al. (2017) examples of this anomaly include “experiences like thought interference, silent thought echoes, spatialisation of cognitive experiences (e.g., thoughts occupying a space in the real world outside of the head), disturbances in intentionality, and an altered experience of time” (p. 14). These disturbances represent the very heart of minimal-self dysfunction, and thereby it may be particularly instructive that this factor emerged as a key *IPASE* predictor of the endorsement of paranormal beliefs. In other words, some people in the

general population may have an intermittently dysfunctional minimal self and thus on occasion they may feel as if their perceptual experiences and imaginal experiences are not their own; this source-monitoring deficit then admits the possibility of interpreting experiences intuitively and of forming paranormal views of the nature of the physical and the social world. Note, however, this vulnerability of the minimal sense of self (at least, as indexed by the *IPASE*) appears to constitute more a sense of detachment rather than the comprehensive self disorder deemed to underlie the development of dissociative disorders or clearly psychotic delusions (Cardeña & Gleaves, 2007). In other words a minimal-self dysfunction in this context is not necessarily pathological. The findings for Hypothesis 2 take this relation a little further by suggesting that the link between minimal-self dysfunction and paranormal beliefs is partially mediated by schizotypal tendencies. This interpretation of the findings is consistent with the view of minimal-self disorder as a prodrome of the development of schizotypy which in turn may foster an inclination to jump to conclusions and an insufficiency of rigorous reality testing in the endorsement of paranormal beliefs. Again, note that the mediated relation between minimal-self dysfunction and paranormal beliefs is not as potent as the direct link between these two variables. In other words, even if a minimal-self dysfunction has not (or has not yet) sparked discernible schizotypal traits the vulnerability of the minimal self in its own right may be sufficient to facilitate paranormal beliefs.

Taken in conjunction with previously established links between schizotypal cognitive processes and paranormal beliefs this study offers some degree of support for the general view that the formation of paranormal beliefs may sometimes engage the cognitive processes that also underlie the formation of delusions, even if the outcome of such processes here is not in itself pathological. The endorsement of this account nevertheless must not be overly enthusiastic, given the small effect sizes of the relations identified here. Basically speaking there are four matters that warrant consideration in this regard.

First, the low effect sizes both in this study and in relevant previous studies may suggest that the apparent role of schizotypal cognitive processes is simply an artefact of some more pivotal psychological factor in the formation of paranormal beliefs. An intuitive-experiential thinking style, for example, is a documented correlate of paranormal belief (e.g. Aarnio & Lindeman, 2005; Irwin & Marks, 2013; Irwin & Young, 2002; Marks et al., 2008; Sadler-Smith, 2011), and perhaps so-called schizotypal cognitive processes are merely a non-clinical instance of this thinking style. Another candidate for an artefactual account may be the trait of fantasy proneness (e.g., Irwin, 1991). On the other hand, relations between paranormal beliefs and these variables are generally no stronger than those for delusion-related processes. This makes the argument for an artefact rather less compelling. Further, the diversity of delusion-related processes reported to correlate with paranormal belief may be taken as an indication that they are not mere artefacts of something more fundamental.

A second issue relates to dissociative phenomena. Although none of the major proponents of the concept of minimal-self dysfunction have linked this notion to dissociative processes it could well be argued that this dysfunction may fairly be defined in terms of a *dissociation* of the minimal sense of self from perceptual, ideational, and emotional acts. More important in the present context, the items of the *IPASE* seem to address dissociative events, even if this theme is specific to dissociation of the minimal sense of self. These considerations raise the possibility that the relations educed in this study can be accommodated by a broader model in which minimal-self dysfunction is replaced by dissociative tendencies as more generally conceived. Certainly there is scope for further empirical investigation of a possible relation between dissociative tendencies

and paranormal belief that is mediated by schizotypal processes. The feasibility of this model is consistent with previous observations of positive bivariate correlations between each pair of the key variables, namely, dissociative tendencies, schizotypal characteristics, and paranormal belief (e.g., Hergovich et al., 2008; Houran et al., 2001; Irwin, 1994, 1998; Rattet & Bursik, 2001). On the other hand, whereas there is a cogent conceptual and empirical rationale for a link between minimal-self dysfunction and schizotypy (see *Introduction*), previous work on the association between dissociative tendencies and schizotypy has failed to identify the origins of this association or even the direction of any underlying putatively causal mechanism (Irwin, 1998, 2001). Researchers seeking to subsume minimal-self dysfunction into dissociative tendencies in this context will therefore have to undertake some preparatory theoretical work. The phenomena of human attachment may well be relevant here (e.g., see Marcusson-Clavertz, Gušić, Bengtsson, Jacobsen, & Cardeña, 2017).

Third, it may be argued that minimal-self dysfunction, schizotypal anomalous experiences, and paranormal beliefs would constitute only a very skeletal model of one aspect of the formation of paranormal beliefs. Perhaps a more potent model would include additional factors independently known to underlie these three factors and their interrelationships. Stressful life events (e.g., childhood trauma) are reported to be conducive to minimal-self dysfunction and schizotypy (e.g., Ataria, 2014; Berenbaum, Thompson, Milanak, Boden, & Bredemeier, 2008; Rössler, Ajdacic-Gross, Rodgers, Haker, & Müller, 2016), as well as being a correlate of paranormal beliefs (e.g., Irwin, 1992); the addition to the model of a history of trauma therefore may be advantageous. Again, as noted in the Introduction, the model is acknowledged to be less applicable to some specific groups in the population, so an attempt to improve the fit of the model could be made with this fact in mind. Perhaps the inclusion of a habitual rational-analytical thinking style as a component would help to take the focus of the model away from these exceptional groups. The model allows for interactions of the above factors with character traits.

Finally, the low effects sizes serve to remind us that taking account of schizotypal processes will only ever accommodate one small facet of the formation of paranormal beliefs. Comprehensive surveys of the correlates of these beliefs (Irwin, 2009) suggest there are many types of variables that are found to predict the intensity of paranormal belief. If the major part of the variance in paranormal belief scores is to be explained it may be necessary to include in a more comprehensive model such factors as other aspects of personality, psychological development, motivation, avenues of cultural transmission, and psychodynamic functions.

Some methodological limitations of the study must be acknowledged. The use of a group of Psychology students as participants may have become routine in psychological research, but as this study explicitly sought to examine how paranormal beliefs are formed in the general population the representativeness of my sample is open to question. Replication of the study with a more diverse group of participants therefore would be appropriate. Another consequence of relying on Psychology students as participants is that women tend to predominate in such samples. Indeed, the small number of men in this sample is even more exaggerated than usual. If the role of gender in the formation of paranormal beliefs had been of primary interest the recruitment of more men would certainly have been necessary. Some readers may have concerns also about the reliability of data elicited through an online survey (but see Göritz & Schumacher, 2000). Finally, as the design of the study was correlational, inferences about underlying causal processes warrant experimental scrutiny.

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Notes

- 1 A common practice in the literature is to refer to this condition as a “minimal self-disorder”. This expression, with the displaced hyphen, could well be taken to signify a minimal disorder of the self rather than a disorder of the minimal self. To stress that the latter interpretation is intended I use the term “minimal-self disorder” or “minimal-self dysfunction” throughout this paper.
- 2 Despite this evidence, official diagnostic criteria for schizophrenia (American Psychiatric Association, 2013) still make no reference to anomalies of the self.
- 3 I acknowledge with gratitude the contribution by Gary Chan in running this PROCESS analysis in accordance with my criteria.
- 4 The use of the term “effect” here is standard statistical shorthand in reporting regression analyses. Nonetheless, I openly acknowledge that the data are correlational and therefore the reference to the relations in terms of “effects” and “effect sizes” is somewhat gratuitous.
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Abstracts in other Languages

French

Le Soi minimal et la croyance aux phénomènes paranormaux

De plus en plus d'éléments empiriques suggèrent que, dans la population générale, le développement des croyances aux phénomènes paranormaux s'appuie en partie sur les processus cognitifs

impliqués également dans la formation des délires. Un signe précoce du développement des délires est un trouble ou une vulnérabilité dans le Soi minimal, la conscience que nos pensées, perceptions et sentiments sont vécues par le Soi. Cette étude cherche à étudier l'hypothèse d'une dysfonction du Soi minimal associée à la croyance aux phénomènes paranormaux. Cette hypothèse a été étudiée grâce à un questionnaire en ligne sondant 141 adultes australiens. Les résultats soutiennent cette hypothèse et indiquent également que la relation entre la dysfonction du Soi minimal et les croyances paranormales est partiellement médiatisée par des tendances schizotypiques. Ces relations ne sont néanmoins pas très fortes.

German

Das minimale Selbst und der Glaube an paranormale Phänomene

Es gibt zunehmend Hinweise darauf, dass in der allgemeinen Bevölkerung die Entwicklung des Glaubens an paranormale Phänomene teilweise auf kognitiven Prozessen beruht, die auch bei Wahnvorstellungen eine Rolle spielen. Ein frühes Zeichen für die Entwicklung von Wahnvorstellungen ist eine Störung oder Vulnerabilität des minimalen Selbst, ein Gewährwerden davon, dass Gedanken, Wahrnehmungen und Gefühle durch das Selbst erfahren werden. Die Studie versuchte die Hypothese zu untersuchen, dass der Glaube an paranormale Phänomene mit einer Dysfunktion des minimalen Selbst einhergeht. Die Hypothese wurde mittels eines online-Fragebogens untersucht, den 141 australische Erwachsene ausgefüllt hatten. Die Ergebnisse unterstützen die Hypothese und weisen auch darauf hin, dass die Beziehung zwischen der Dysfunktion des minimalen Selbst und dem Glauben an Paranormales teilweise durch schizotypische Tendenzen vermittelt ist. Diese Beziehungen sind jedoch nicht stark.

Spanish

El yo mínimo y la creencia en los fenómenos paranormales

Un creciente cuerpo de evidencia sugiere que en la población el desarrollo de creencias en fenómenos paranormales depende en parte de procesos cognitivos implicados también en la formación de delirios. Un signo temprano del desarrollo de delirios es un trastorno o vulnerabilidad en el yo mínimo, la consciencia de que los pensamientos, percepciones, y sentimientos propios son experimentados por el yo. Este estudio investigó la hipótesis de que la creencia en los fenómenos paranormales puede estar asociada con la disfunción mínima del yo. La hipótesis se investigó con una encuesta en línea con 141 australianos adultos. Los resultados apoyan la hipótesis e indican también que la relación entre la disfunción del yo-mínimo y la creencia paranormal está mediada parcialmente por las tendencias esquizotípicas. Estas relaciones, sin embargo, no son fuertes.