

# CORRELATES OF PARANORMAL BELIEFS, I: SCHIZOTYPY

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**ABSTRACT:** Previous research has indicated a consistent relationship between paranormal belief and schizotypy. The present study sought to replicate these findings, and to explore the differential associations of various dimensions of paranormal belief with the various dimensions of schizotypy. Tobacyk's Paranormal Beliefs Scale (PBS), the Schizotypal Personality Questionnaire (SPQ), the STA, and the Magical Ideation and Perceptual Aberration scales were administered to a sample of 657 undergraduate students. Item-level factor analyses of the PBS and the SPQ each yielded 5 factors. Total scores on Tobacyk's PBS were significantly associated with scores on the STA, the Magical Ideation and Perceptual Aberration scales, total SPQ scores, and the Reality Distortion and Paranoid/Suspiciousness factors of the SPQ. The Reality Distortion dimension of schizotypy was more strongly and consistently related to paranormal beliefs than the other factors of schizotypy. All 5 factors of paranormal belief were significantly positively correlated with the STA and the SPQ Reality Distortion factor. Although general measures of paranormal belief and schizotypy are significantly related, the association of paranormal beliefs with schizotypy varies across different facets of paranormal belief, and does not entail all aspects of schizotypy.

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*Keywords:* paranormal beliefs, schizotypy, reality distortion, magical ideation

Belief in the paranormal in the general population is highly prevalent (Ede, 2000; Eve & Dunn, 1990; Greeley, 1975; Kallery, 2001; Newport & Strausberg, 2001; Orenstein, 2002; Rice, 2003; Vyse, 1997; Yates & Chandler, 2000; Zusne & Jones, 1989). Although there is no definition of "paranormal" that yet shares a wide consensus, many assessments of paranormal beliefs (e.g., Newport & Strausberg, 2001) commonly operationalize the concept of paranormal in terms of a wide variety of phenomena, including telepathy, clairvoyance, psychokinesis, precognition (these four are referred to as "psi" phenomena in the parapsychological literature), ESP, mental or spiritual healing, and other psychic, "shamanic" or "siddhi" powers. Lindeman (Lindeman & Aarnio, 2007; Lindeman et al., 2008) proposed the following definition: "paranormal beliefs are beliefs in physical, biological, or psychological phenomena that contain core ontological attributes of one of the other two categories [e.g., a stone (physical) having thoughts (psychological)]." Studies of the psychological correlates of paranormal beliefs have reported a wide range of associations, including schizotypy; temporal-limbic signs; sleep-related experiences and the superordinate trait dimension of transliminality; and right hemisphericity (references will be cited later).

Schizotypy is a personality dimension thought to be related to vulnerability to schizophrenia spectrum disorder, which consists of cognitive

and perceptual distortions analogous to delusions and hallucinations, disorganized thought and behavior, and interpersonal deficits and social isolation analogous to the negative symptoms of schizophrenia (e.g., Raine et al. 1994). Schizotypic personality traits have been used as markers of vulnerability to schizophrenia spectrum disorders in a "behavioral high-risk paradigm" (Chapman, Chapman, Raulin, & Edell, 1978; Chapman, Edell, & Chapman, 1980). Paranormal belief assessed by Tobacyk's Paranormal Beliefs Scale (Tobacyk & Milford, 1983), the Australian Sheep-Goat Scale (Thalbourne & Delin, 1993), or the Anomalous Experiences Inventory (Gallagher, Kumar, & Pekala, 1994) has been reported to be significantly associated with psychosis-proneness or schizotypy measured by several different self-report scales (Chequers, Joseph, & Diduca, 1997; Gallagher, Kumar, & Pekala, 1994; Genovese, 2005; Goulding, 2004, 2005; Hergovich, Schott, & Arendsay, 2008; Houran, Irwin, & Lange, 2001; Irwin & Green, 1998; Lange, Irwin, & Houran, 2000; Peltzer, 2003; Thalbourne, 1994, 1999; Thalbourne & Delin, 1994; Thalbourne, Dunbar, & Delin, 1995; Thalbourne & French, 1995; Thalbourne, Bartemucci, Delin, Fox, & Nofi, 1997; Tobacyk & Wilkinson, 1990; Williams, 1995; Williams & Irwin, 1991; Windholz & Diamant, 1974; Wolfradt, Oubaid, Straube, Bischoff, & Mischo, 1999; Wolfradt & Watzke, 1999). Participants who experienced apparitions scored significantly higher than those who did not on measures of absorption, fantasy-proneness, and cognitive-perceptual schizotypy (Parra, 2006). Participants who performed successfully on a psi task scored significantly higher on the Magical Ideation Scale than unsuccessful participants (Parker, Grams, & Pettersson, 1998). Participants with high scores on the Survey of Belief in Extraordinary Phenomena obtained significantly higher scores than paranormal nonbelievers on the MMPI Schizophrenia and Hypomania scales (Windholz & Diamant, 1974).

The association between paranormal beliefs and experiences on the one hand and schizotypy on the other is often interpreted in terms of psychopathology, based on the assumption that schizotypy represents a subclinical form of schizophrenia spectrum psychopathology (e.g., Chapman, Chapman, Raulin, & Edell, 1978; Chapman, Edell, & Chapman, 1980). Factor analyses of schizotypy measures have consistently yielded three factors paralleling the factor structure of schizophrenic symptomatology: (a) reality distortion or aberrant perceptions and beliefs, also referred to as the cognitive-perceptual dimension, (b) cognitive disorganization, including odd behavior and odd speech, and (c) negative symptoms, including interpersonal deficits, social isolation, affective flattening, and anhedonia (e.g., Raine et al., 1994). McCreery and Claridge (2002) found four factors, with the negative symptoms factor described in other studies splitting into introverted anhedonia and asocial schizotypy factors. Participants who reported at least one out-of-body experience scored significantly higher than non-OBEs on the aberrant perceptions and beliefs factor, but the groups did not differ significantly on

the disorganization, introvertive anhedonia, and asocial schizotypy factors. McCreery and Claridge (1995, 1996) reported that OBE experiencers scored higher than nonexperiencers on measures of positive schizotypy (Perceptual Aberration, Luanay-Slade Hallucination Scale, STA, Hypomania) and significantly lower on a measure of negative schizotypy (the Physical Anhedonia Scale), suggesting that, “far from being anhedonic, they were particularly enjoying life.” It is possible that among “healthy schizotypes” unusual ideas may reflect creativity and unconventional thinking associated with high Openness to Experience (e.g., Holt, Simmonds-Moore, & Moore, 2008). There are numerous studies reporting an association between schizotypy and creativity (e.g., Nettle, 2006; Rawlings & Locarnini, 2008; review by Brod, 1997). In contrast, among participants with schizotypal personality disorder, the same sorts of unusual beliefs may be the result of cognitive rigidity (difficulty shifting mental set) and poor reality contact (quasi-psychotic delusions and perceptual aberrations). McCreery and Claridge (1995, 1996) interpreted their findings as supporting the notion of “healthy schizotypes” who are functional despite, or even in part because of, their anomalous perceptual and other experiences. This interpretation is consistent with the fully dimensional model of schizotypy proposed by Claridge (1997), which posits that schizotypy is a continuously distributed trait, associated with normal functioning for most of its extent, and playing a causal role in the etiology of psychosis only at the upper extreme. Thus, out-of-body experiences and other paranormal experiences are not necessarily pathological, and associations with schizotypy do not necessarily imply psychopathology.

Both schizotypy and paranormal beliefs are multidimensional. It is possible that the significant relationship between schizotypy and paranormal beliefs involves only particular dimensions of schizotypy or specific factors of paranormal belief. Factor analytic studies of the Schizotypal Personality Questionnaire using the nine subscales have consistently yielded a three-factor solution (Badcock & Dragovic, 2006; Chen, Hsiao & Lin, 1997; Fossati, Raine, Carretta, Leonardi, & Maffei, 2003; Gruzelier, 1994, 1995, 1996; Gruzelier, Burgess, Stygall, Irving, & Raine, 1995; Raine et al., 1994; Reynolds, Raine, Mellinger, Venables, & Mednick, 2000; Rossi & Daneluzzo, 2002; Vollema & Hoijtink, 2000): Reality Distortion (Ideas of Reference + Magical Thinking + Unusual Perceptual Experiences + Suspiciousness), Interpersonal Deficit (Constricted Affect + No Close Friends + Social Anxiety + Suspiciousness), and Disorganization (Odd Behavior + Odd Speech). Item-level factor analysis of the SPQ yielded five factors of schizotypy: Reality Distortion, Paranoia, Disorganization, Interpersonal Deficit, and Social Anxiety (Chmielewski & Watson, 2008). Similarly, factor analytic studies of paranormal beliefs have yielded a five-factor solution (Lawrence & De Cicco, 1997; Lawrence, Roe, & Williams, 1997) consisting of New Age Philosophy, Traditional Religious Beliefs, Extraordinary Lifeforms, Psi-related Phenomena, and Superstition.

Previous studies have suggested that the relationship between schizotypy and paranormal beliefs involves particular facets of schizotypy and paranormal belief. Using canonical correlation, Irwin and Green (1998) found that beliefs in spiritualism and precognition were significantly associated with the cognitive-perceptual dimension of schizotypy (measured by the Schizotypal Personality Questionnaire—(SPQ) and female gender, whereas belief in extraordinary lifeforms and witchcraft was associated with the disorganization dimension of schizotypy in males, who were also likely to disavow beliefs in traditional religious beliefs and precognition. Top-down purification of items in Tobacyk's Revised Paranormal Beliefs Scale (Tobacyk, 1998) in order to remove items with differential item functioning related to participants' age and gender yielded two clusters of items: New Age Philosophy, consisting of beliefs in psi, spiritualism, astrology, and reincarnation items, and Traditional Paranormal Belief, consisting of items referring to traditional religious beliefs, witchcraft, extraordinary lifeforms, and superstitions (Lange, Irwin, & Houran, 2000). Houran, Irwin, and Lange (2001) found that the New Age Philosophy factor was significantly correlated with the Dissociative Experiences Scale and the Cognitive-Perceptual and Disorganized subscales of the SPQ-Brief, whereas the Traditional Paranormal Beliefs factor was significantly correlated only with the Cognitive-Perceptual subscale of the SPQ-B. These findings suggest that different facets of paranormal belief are differentially associated with various dimensions of schizotypy.

In the present study we examined the relationships between paranormal beliefs and schizotypy, both at the level of overall summary measures of each construct, and at the level of multiple dimensions or factors comprising each construct. A significant overall relationship between summary measures of schizotypy and paranormal beliefs was hypothesized. In order to examine the relationships between different facets of paranormal beliefs and different dimensions of schizotypy, item-level factor analyses were performed with the Tobacyk Paranormal Beliefs Scale (TPBS; Tobacyk & Milford, 1993) and the Schizotypal Personality Questionnaire (Raine, 1991), each of which yielded five factors. The five-factor solution of the TPBS is more parsimonious than the traditional seven-subscale structure, and increases statistical power by using fewer degrees of freedom. Similarly, the five-factor structure of the SPQ is more parsimonious than the nine-subscale structure, and provides a more differentiated and accurate picture of the structure of schizotypy than the usual three-factor structure based on subscale-level factor analyses. It was further hypothesized that paranormal beliefs would be most strongly associated with the reality distortion dimension of schizotypy, and least strongly associated with the interpersonal deficit and social anxiety dimensions. We further explored the associations between schizotypy factors and various dimensions of paranormal belief, with the expectation that the various factors of paranormal belief would be differentially associated with the dimensions of schizotypy.

## Method

### Participants

The initial sample consisted of 668 undergraduates enrolled in undergraduate psychology courses. There were 513 females and 152 males (3 participants failed to answer this item) recruited through the undergraduate psychology participant pool via announcements on a bulletin board and a website for psychology experiments. All participants were offered extra credit in their psychology courses as an incentive to participation. The lengthy questionnaire included 14 infrequency items, in order to detect random responding or failure to read items. Eleven participants answered more than three of these items in the unusual or infrequent direction, and their data was excluded from the analyses. An additional 2 participants were excluded due to excessive missing data, leaving a total sample of 655 participants (507 females, 148 males). The questionnaire included multiple-choice items concerning ethnic group membership. Based on responses to these items, participants were classified into seven ethnic groups. There were 410 Euro-American Whites (98 males, 312 females), 63 African-Americans (11 males, 52 females), 67 Asian-Americans (20 males, 47 females), 15 Middle Eastern (e.g., Syrians, Jordanians, etc.; 4 males, 11 females), 22 Indo-Aryan (Indian, Pakistani, Sri Lankan; 2 males, 20 females), 28 Hispanics (3 males, 25 females), and 50 "Other-Mixed" participants (10 males, 40 females). The ages of the participants ranged from 17 to 58 years, with a mean of  $20.4 \pm 2.68$  years. The study procedures were approved by the Institutional Review Board of the University of Maryland.

### Procedure

Volunteers received instructions, informed consent forms, and a questionnaire packet. They were allowed to take these with them and return them at a later date. There was a 100% return rate.

### Measures

**Paranormal beliefs.** Paranormal beliefs were assessed using Tobacyk's Paranormal Belief Scale (Tobacyk & Milford, 1983), a 25-item scale with a five-choice Likert scale response format ranging from strongly disagree to strongly agree (scored 0 to 4). The TPBS consists of four-item subscales assessing traditional religious beliefs, psi (telepathy, clairvoyance, psychokinesis), witchcraft, and spiritualism, and three-item subscales assessing beliefs in superstitions, extraordinary lifeforms, and precognition. Scores on the seven subscales are summed to provide a total paranormal beliefs score ranging from 0 to 100. In the present sample, the total scale had quite high internal reliability (.91).

**Schizotypy.** Four measures of schizotypy were used: the Magical Ideation (MI; Eckblad & Chapman, 1983), Perceptual Aberration (PA; Chapman, Chapman, & Raulin, 1978), the STA (Claridge & Broks, 1984), and the Schizotypal Personality Questionnaire (SPQ; Raine, 1991). The SPQ is a widely used measure of schizotypy that allows the measurement of multiple dimensions or facets of schizotypy. The other three scales were included as additional measures of the reality distortion or cognitive-perceptual dimension of schizotypy, which was expected to have the strongest relationship to paranormal beliefs. Rather than the standard true-false response format, for the SPQ a five-response Likert scale was used, which has been shown to have a very high correlation with the standard version ( $r = .99$ ), good validity, and better internal reliability than the standard version for the total scale and particularly for the nine subscales (Wuthrich & Bates, 2005). The Likert version identified all but one of the same individuals as high scorers as the standard version, plus a few more, suggesting that a small portion of people may be more willing to disclose schizotypal symptoms using a Likert format than a forced-choice format. These measures have been shown to have good internal consistency, test-retest reliability, and construct validity (see articles cited above). These four schizotypy scales were all significantly intercorrelated in this sample, with an average correlation of  $r = 0.50$ .

## Results

### Factor Analyses

**Tobacyk Paranormal Belief Scale.** The 25 items of the TPBS were subjected to an item-level principal components analysis with Varimax rotation. There were five factors with eigenvalues greater than one, cumulatively accounting for 63.43% of the total variance. Examination of the scree plot suggested a discontinuity after the fifth factor, so the first five factors were retained (Table 1). The first factor, accounting for 35.40% of the variance, had moderate to high loadings for 12 items referring to a variety of paranormal phenomena, and seems to represent a general paranormal beliefs factor, similar to the "New Age Philosophy" factor described previously (Houran et al., 2001). The second factor, accounting for an additional 9.80% of the variance, had high loadings for belief in the soul; the devil; heaven and hell; and God, and clearly represents Traditional Religious Beliefs. The third factor, accounting for 7.20% of the variance, had high loadings for belief in the yeti, Loch Ness monster, and Big Foot, and represents an Extraordinary Lifeforms or cryotrozoologic factor. This factor also had moderate loadings for black magic, witches, and voodoo death. The fourth factor, accounting for 6.03% of the variance, had high loadings for psychokinesis, voodoo, and predicting the future, and seems to represent a belief in psi-related phenomena. The fifth factor, accounting

for 4.98% of the variance, had high loadings for black cats, breaking mirrors, and bad luck, and represents a Superstition factor. Factor scores were generated for each of the five paranormal belief factors.

Table 1  
*Factor Loadings for TPBS Items*

	I	II	III	IV		II	III	IV	V
Levitation	.59				Soul exists	.73			
Black magic	.56		.41		Devil	.83			
Astral projection	.57				God	.84			
Psychokinesis	.58			.44	Heaven & hell	.79			
Witches	.45		.43		Yeti		.74		
Spirit travel	.56				Loch Ness monster		.76		
Precognition	.62				Big foot		.72		
Reincarnation	.62				Psychokinesis (2)			.77	
Telepathy	.70				Voodoo		.76		
Voodoo death	.55		.42		Predicting future			.69	
Communicate w/dead	.73				Black cats				.78
Precognitive dreams	.38			.37	Break mirror bad luck				.85
					Unlucky person				.70

Factors: I: New Age Philosophy, II: Traditional Religious Beliefs, III: Extraordinary Lifeforms, IV: Psi Beliefs, V: Superstitious Beliefs

**Item-level factor analysis of the Schizotypal Personality Questionnaire.** A principal components analysis of the 74 items of the SPQ yielded 14 factors with eigenvalues greater than one, cumulatively accounting for 70.55% of the variance. Examination of the scree plot suggested that the slope of the curve flattened out markedly after five factors, which cumulatively accounted for 41.94% of the variance. A PCA was conducted with oblique (OBLIMIN) rotation, restricting the number of factor to five (Table 2). These five factors were clearly interpretable. The first factor, accounting for 21.78% of the variance, had high loadings for items referring to social anxiety, most derived from the Social Anxiety subscale of the SPQ, with several items from the Constricted Affect and No Close Friends subscales. The second factor, accounting for an additional 8.14% of the variance, consisted of items referring to superstitious beliefs and perceptual aberrations, derived



Table 2a  
*Five-Factor Solution for SPQ*

	I	II	III
2. avoid people when anxious	.61		
11. nervous in polite conversation	.64		
15. keep to myself	.49		
17. poor at expressing feelings	.30		
20. nervous walking	.36		
24. quiet with people	.68		
29. anxious first meeting	.69		
38. nervous w unfamiliar people	.80		
46. uncomfortable social situation	.74		
51. avoid eye contact	.36		
54. anxious giving speech	.63		
57. keep in the background	.69		
68. not expressive & lively	.36		
69. hard to communicate	.35		
71. uneasy talking to people	.75		
1. TV has special meanings		.26	
3. experience w the supernatural		.70	
4. mistaken shadow & noises		.34	
12. telepathy		.75	
13. sensed person or force		.64	
21. can tell what you're thinking		.33	
22. face in the mirror changes		.39	
28. special signs		.39	
30. clairvoyance		.74	
31. voices speaking thoughts		.30	
39. others feel my feelings		.50	
40. seen things invisible		.57	
47. astrology, UFOs, ESP		.69	
48. objects unusually large or small		.29	
55. telepathy		.74	
64. loud thoughts		.36	
5. eccentric			.79
7. hard to understand			.56
14. unusual mannerisms			.73
16. jump topics			.54
23. a little strange			.81
25. forget what I'm saying			.39

Factors: I: Social Anxiety, II: Reality Distortion, III: Disorganization;  
 IV: Interpersonal Deficit, V: Paranoid



Table 2b  
*Five-Factor Solution for SPQ (continued)*

	III	IV	V
32. very bizarre person	.76		
34. ramble	.58		
42. vague & elusive	.34		
50. use words in unusual ways	.58		
58. wander off topic	.52		
67. odd & unusual person	.80		
70. eccentric habits	.73		
72. conversation confusing	.52		
74. odd appearance	.38		
6. little interest in people		.45	
8. aloof & distant		.34	
26. rarely laugh & smile		.62	
33. hard to be close		.52	
35. non-verbal communication poor		.47	
41. close to no one		.59	
43. poor at courtesies		.38	
49. writing friends too much trouble		.30	
52. not self-disclosing		.38	
62. close friends unimportant		.58	
66. unable to get close		.57	
73. keep feelings to self		.40	
9. being talked about			.65
10. people notice me			.46
18. people have it in for you			.54
19. hints with double meanings			.49
27. friends not trustworthy			.55
36. on guard with friends			.44
37. special meaning in ads			.43
44. hidden threats			.61
45. people take notice of me			.49
53. people talking about you			.50
56. strong sense of smell			.33
59. others have it in for me			.54
60. people watching you			.54
61. distant sounds distract			.26
63. talking about you			.65
65. keep an eye out			.50

Factors: I: Social Anxiety, II: Reality Distortion, III: Disorganization;  
 IV: Interpersonal Deficit, V: Paranoid

from the Magical Thinking and Unusual Perceptual Experiences subscales of the SPQ. This factor corresponds to the Cognitive-Perceptual or Reality Distortion dimensions of the SPQ described by previous factor analyses. The third factor, accounting for an additional 4.92% of the variance, consisted of items referring to eccentricity, oddness, and difficulty communicating, derived from the Odd Speech and Odd Behavior subscales of the SPQ, and corresponding to the Disorganization dimension of the SPQ described by previous factor analyses. The fourth factor, accounting for an additional 4.22% of the variance, consisted of items referring to social isolation and lack of close interpersonal relationships, derived from the No Close Friends and Constricted Affect subscales of the SPQ. The fifth factor, accounting for an additional 2.90% of the variance, had high loadings for items referring to paranoia and ideas of reference, derived from the Suspiciousness and Ideas of Reference subscales of the SPQ.

The total TPBS score, all five TPBS scores, the STA, Magical Ideation, total SPQ, and all five SPQ factor scores had skewness and kurtosis values less than 1.0, indicating that the distributions for these measures did not differ markedly from normality. Only the Perceptual Aberration scale had higher skewness (1.30) and kurtosis (2.32). Perceptual Aberration scores were transformed by rank ordering (using means for ties), which reduced the skewness of the distribution to acceptable levels (0.03).

### **Sex Differences**

An analysis of variance (ANOVA) with sex as the grouping factor and total TPBS scores as the dependent variable failed to yield a significant effect of sex. A multivariate analysis of variance (MANOVA) with sex as the grouping factor and the five TPBS factors as dependent variables did yield a significant multivariate effect of sex,  $F(5, 648) = 10.75, p < .001$ , with significant univariate effects of sex on the Traditional Religious Beliefs,  $F(1, 652) = 4.836, p = .028$ , Extraordinary Lifeforms,  $F(1, 652) = 17.30, p < .001$ , and Psi Beliefs factors,  $F(1, 652) = 26.32, p < .001$ . Males scored higher than females on the Extraordinary Lifeforms factor (males:  $0.29 \pm 0.98$ ; females:  $-0.09 \pm 0.99$ ), whereas females scored higher than males on the Traditional Religious Beliefs (males:  $-0.16 \pm 1.12$ ; females:  $0.05 \pm 0.96$ ) and Psi Beliefs factors (males:  $-0.36 \pm 0.81$ ; females:  $0.11 \pm 1.03$ ).

A MANOVA with sex as the grouping factor and the SPQ, STA, Magical Ideation and Perceptual Aberration Scales as dependent variables yielded a significant multivariate effect of sex,  $F(1, 649) = 7.33, p < .001$ . There were significant univariate effects of sex on total SPQ scores,  $F(1, 652) = 9.29, p = .002$ , and Magical Ideation scores,  $F(1, 652) = 6.20, p = .013$ . Both effects remained significant after correction for the number of tests performed. Males scored higher than females on the SPQ (males:  $117.69 \pm 34.678$ ; females:  $107.55 \pm 35.75$ ), while females scored higher than males on the Magical Ideation Scale (males:  $6.93 \pm 4.80$ ; females:  $8.08 \pm 4.94$ ).

A MANOVA with sex as the grouping factor and the five SPQ factors as dependent variables also yielded a significant multivariate effect of sex,  $F(1, 649) = 7.663$ ,  $p < .001$ , with significant univariate effects of sex on the Interpersonal Deficit,  $F(1, 653) = 30.994$ ,  $p < .001$ , and Social Anxiety factors,  $F(1, 653) = 4.43$ ,  $p = .036$ . Only the effect for the Interpersonal Deficit factor remained significant after correction for the number of tests performed. Males scored higher than females on the Interpersonal Deficit factor (males:  $0.40 \pm 1.62$ ; females:  $-0.11 \pm 0.95$ ). The pattern and magnitude of correlations between paranormal belief and schizotypy measures were generally quite similar for males and females, so only the results for the total sample are presented below.

### Paranormal Beliefs and Schizotypy

In order to explore whether schizotypy is more strongly related to particular facets of paranormal belief, the correlations between the five paranormal factor scores and schizotypy measures were examined (Table 3). The pattern of correlations differed somewhat for each of the factors of paranormal belief, although most of the correlations were positive, indicating an association between higher schizotypy and greater belief in the paranormal. The New Age Philosophy factor was significantly positively correlated with all four schizotypy scales, and the Reality Distortion factor of the SPQ. Traditional Religious Beliefs were significantly associated with *lower* Perceptual Aberration, Disorganization, and Interpersonal factors, and positively correlated with the STA scale, the Reality Distortion, Paranoid/Suspiciousness, and Social Anxiety factors of the SPQ. The Extraordinary Lifeforms factor was significantly and positively associated with most of the schizotypy measures (all four schizotypy scales, three of five SPQ factors), and was the only paranormal belief factor significantly correlated with the interpersonal dimension of schizotypy. The Psi Beliefs factor was significantly positively correlated with all four schizotypy scales, and the Reality Distortion factor of the SPQ. The Superstition factor was significantly positively correlated with the total SPQ and Magical Ideation scales, and the Paranoid/Suspiciousness and Reality Distortion factors of the SPQ. All five factors of paranormal belief were significantly positively correlated with the STA and the SPQ Reality Distortion factor. The Reality Distortion factor of schizotypy was significantly positively correlated with all five factors of paranormal belief. The Paranoid/Suspiciousness factor of schizotypy was significantly positively correlated with the Traditional Religious Beliefs and Superstition factors of the TPBS. The Interpersonal and Disorganization factors of schizotypy were both positively correlated with the Extraordinary Lifeforms factor and negatively correlated with the Traditional Religious Beliefs factor. The Social Anxiety factor of schizotypy was significantly positively correlated with the Traditional Religious Beliefs factor.

Table 3  
Correlations Between TPBS Factor Scores and Schizotypy Measures

	Total TPBS	New Age Philosophy	Traditional Religion	Extraordinary Lifeforms	Psi Beliefs	Superstitions
Schizotypy scales						
Schizotypal Personality question.	.297***	.217***	.055	.207***	.091*	.081*
STA	.318***	.256***	.117**	.111**	.115**	.072
Magical Ideation	.389***	.086*	.050	.112**	.526***	.166***
Perceptual Aberration (ranks)	.146***	-.125***	-.067	.115**	.462***	.060
SPQ factors						
Interpersonal Deficit	-.001	-.016	-.090*	.170***	-.011	-.043
Disorganization	-.001	.038	-.149***	.101**	.007	.002
Paranoid/Suspicious	.121**	-.004	.185***	.037	-.004	.086*
Reality Distortion	.627***	.543***	.099*	.178***	.295***	.198***
Social Anxiety	-.015	-.006	.104**	-.032	-.057	-.041

\*\*\*  $p < .001$ . \*\*  $p < .01$ . \*  $p < .05$ .

## Discussion

Significant relationships were found among overall measures of paranormal belief and schizotypy. Total scores on the TPBS were significantly related to scores on all four schizotypy scales. Previous studies have reported findings consistent with relationship between paranormal beliefs and schizotypy (e.g., Chequers, Joseph, & Diduca., 1997; Gallagher, Kumar, & Pekala., 1994; Genovese, 2005; Goulding, 2004, 2005; Hergovich, Willanger, & Arendsay, 2005; Houran, Irwin, & Lange, 2001; Irwin & Green, 1998; Lange, Irwin, & Houran, 2000; Thalbourne, 1994; Windholz & Diamant, 1974; Wolfradt, Oubaid, Straube, Bischoff, & Mischo, 1999; Wolfradt & Watzke, 1999). The significant correlation between the total TPBS score and the Magical Ideation Scale replicates several previous findings (Hergovich, Schott, & Arendsay, 2008; Peltzer, 2003; Thalbourne, 1998, 1999; Thalbourne & Delin, 1994, 1999; Thalbourne, Dunbar, & Delin, 1995; Thalbourne & French, 1995; Thalbourne, Bartemucci, Dein, Fox, & Nofi, 1997; Tobacyk & Wilkinson, 1990), and is not surprising, given that almost half of the items of the Magical Ideation Scale refer to paranormal beliefs or experiences (e.g., precognition, telepathy, superstitions). Magical Ideation, with and without items referring to paranormal phenomena, was significantly correlated with global paranormal belief and with all of the subscales of the Tobacyk Paranormal Belief Scale (Williams, 1995; Williams & Irwin, 1991). The significant associations between paranormal beliefs and the other three schizotypy scales are unlikely to be due solely to overlapping items, as the STA contains only 4 items (out of 33) referring to paranormal beliefs, the SPQ contains 7 such items (all within the Magical Thinking subscale and the Reality Distortion factor), and the Perceptual Aberration Scale contains no such items.

Although the significant association of paranormal beliefs and schizotypy replicates numerous previous studies, not all paranormal beliefs were equally related to schizotypy. An item-level analysis of the TPBS yielded five factors of paranormal belief, quite similar to previously reported findings (Lawrence & De Cicco, 1997; Lawrence, Roe, & Williams, 1997). The Extraordinary Lifeforms factor was the most consistently correlated with schizotypy measures of the five TPBS factors, showing significant positive correlations with all four schizotypy scales, and three of five SPQ factors (Interpersonal, Disorganization, and Reality Distortion). The strongest correlation was with total SPQ scores. Hergovich, Schott, and Arendsay (2008) found a stronger relationship between schizotypy and a Paranormal Beliefs latent factor (similar to New Age Philosophy) than between schizotypy and a Superstition latent factor, which included traditional religious beliefs and beliefs in extraordinary lifeforms. The findings of the present study suggest the opposite: stronger relationships between schizotypy and beliefs in extraordinary lifeforms and traditional religious beliefs than between schizotypy and New Age Philosophy or general paranormal belief.

In the present study, participants with high scores for Traditional Religious Beliefs tended to have higher scores on measures of the reality distortion dimension of schizotypy. Most studies have found negative relationships between paranormal beliefs and traditional Christian beliefs, with small to moderate effect sizes (Beck & Miller, 2001; Duncan, Donnelly, & Nicholson, 1992; Ellis, 1988; Emmons & Sobal, 1981; Persinger & Makarec, 1990; Skirda & Persinger, 1993; Tobacyk & Milford, 1983; Tobacyk & Wilkinson, 1990). A few studies have found positive relationships between traditional Christian beliefs and beliefs in the paranormal (Buhrmann & Zaugg, 1983; Goode, 2000; Haraldsson, 1981; Irwin, 1985; Rudski, 2003; Schumaker, 1987; Thalbourne, 1995, 2003a; Williams, Francis & Robbins, 2006). The findings of the present study are consistent with those of the latter set of studies reporting positive associations of traditional religious beliefs and paranormal beliefs, which are associated with the reality distortion dimension of schizotypy. Hergovich and Arendsay (2005) reported that the association of poorer reasoning with paranormal belief was restricted to traditional religious belief and superstition, and was not seen for the New Age Philosophy component of paranormal belief. The Disorganized dimension of schizotypy is associated with impairments in reasoning. Paranormal beliefs assessed by Tobacyk's Revised Paranormal Beliefs Scale were significantly associated with poorer performance on the Wiener Matrizen Test, an adapted version of the Raven progressive matrices, a measure of visuospatial reasoning ability (Hergovich & Arendsay, 2005). The association of poorer reasoning with paranormal belief was restricted to traditional religious belief and superstition, and was not seen for the New Age Philosophy component of paranormal belief. Paranormal beliefs were not significantly related to several measures of critical thinking. In contrast, in the present study, traditional religious belief was *inversely* correlated with the Disorganization and Interpersonal factors, but positively correlated with the other three factors of schizotypy.

The New Age Philosophy factor showed significant positive correlations with all four schizotypy scales, and the Reality Distortion factor of the SPQ. Of the five paranormal belief factors, the New Age Philosophy factor had the strongest correlation with the SPQ Reality Distortion factor. These findings support a fully dimensional model of schizotypy with general belief in the paranormal considered as nonpathological manifestations of "healthy schizotypy," assuming that the Reality Distortion factor is the least "pathological" of the schizotypy factors. Hergovich and Arendsay (2005) found low disorganization scores associated with New Age Philosophy, a broad factor reflecting general paranormal beliefs. In the present study the correlation was low and nonsignificant. New Age beliefs and practices comprise a loose form of religiosity including yoga, meditation, aromatherapy, astrology, Tarot, channeling, energy healing, and so forth, which have been found to be significantly associated with higher scores on the Magical Ideation and STA schizotypy scales (Farias, Claridge, &

Lalljee, 2005). Structural equation modeling supported a model separating paranormal beliefs into two groups or latent factors: (1) Paranormal Beliefs (corresponding to the New Age Philosophy factor of Houran et al., 2001), consisting of RPBS subscales measuring beliefs in precognition, psi, spiritualism, and witchcraft; and (2) Superstition (corresponding to the Traditional Paranormal Belief factor of Houran et al., 2001), consisting of RPBS subscales measuring beliefs in traditional religiosity, extraordinary lifeforms, and superstition, as well as items from the Magical Ideation Scale referring to superstition (Hergovich, Scott, & Arendsay, 2008). A latent factor of schizotypy consisting of the three subscales of the SPQ-B (with the Cognitive-Perceptual dimension showing the strongest association) and Magical Ideation Scale items referring to ideas of reference was significantly related to both latent factors of Paranormal Belief and Superstition, but with a much stronger relationship to the Paranormal Belief latent factor, which mediated much of the effect of schizotypy on superstition. The findings of the present study contrast with those of Hergovich, Schott, and Arendsay (2008) in showing stronger relationships between schizotypy and superstition (including traditional religious belief and belief in extraordinary lifeforms) than between schizotypy and New Age Philosophy or general paranormal belief.

Conversely, not all aspects of schizotypy were significantly related to paranormal beliefs, which were very strongly related to reality distortion, less strongly related to the paranoid/suspiciousness dimension, and weakly or inconsistently related to the disorganization, interpersonal deficit, and social anxiety dimensions of schizotypy. In the present study, the Reality Distortion factor of the SPQ was significantly correlated with all five paranormal belief factors, whereas none of the other schizotypy factors showed more than two significant correlations with the paranormal belief factors, and for the Interpersonal and Disorganization factors, one correlation was negative and the other positive. In a large Australian sample of adolescents, scores on the Revised Paranormal Beliefs Scale (RPBS) were significantly correlated with total scores on the SPQ-Brief, as well as scores on the Cognitive-Perceptual, Interpersonal, and Disorganized subscales of the SPQ-B, and the Magical Ideation Scale (Hergovich, et al., 2008). The SPQ-B Cognitive-Perceptual dimension had a much stronger association with paranormal beliefs than the Interpersonal or Disorganized dimensions (Hergovich, et al., 2008). Like Hergovich et al. (2008), in the present study paranormal beliefs were most strongly related to the reality distortion (cognitive-perceptual) dimension of schizotypy. McCreery and Claridge (2002) found that out-of-body experiencers had higher scores than nonexperiencers on the aberrant perceptions and beliefs factor of the Combined Schizotypal Traits Questionnaire, but did not differ significantly on the introverted anhedonia, asocial schizotypy, or cognitive disorganization factors. Genovese (2005) found that paranormal belief assessed by an eight-item scale was significantly correlated with scores



on the Cognitive-Perceptual (i.e., Reality Distortion) and Disorganized dimensions of the SPQ-Brief in a sample of teachers and teacher trainees.

Multivariate analyses of variance with schizotypy scales or schizotypy factors as dependent variables and sex and a dichotomy based on total TPBS scores (median split) or TPBS clusters as grouping factors yielded results that essentially paralleled the correlational findings. Similarly, multivariate analysis with sex and schizotypy scale dichotomies and TPBS factors as dependent variables also yielded results that paralleled the correlational findings. While there were significant main effects of gender, few of the effects of the interaction of sex and paranormal belief or schizotypy were significant, suggesting that the associations between paranormal belief and schizotypy were similar for males and females. There was no significant difference between males and females for total TPBS scores in the present study. This finding contrasts with some previous studies, which have found significant sex differences in paranormal belief and experience. Women are more likely than men to report having had contact with the dead (Greeley, 1987; Kalish & Reynolds, 1973), and more women than men believe in ghosts (e.g., Rudski, 2003; Sharps, Matthews, & Asten, 2006). Others have reported that women report more paranormal beliefs than men (e.g., Goritz & Schumacher, 2000; Voracek, 2009). The disadvantaged status of women and those with lower incomes may contribute to their greater tendency to report paranormal experiences (Fox, 1992). However, in the present study males scored higher than females on the Extraordinary Lifeforms factor, while females scored significantly higher than males on the Traditional Religious Beliefs and Psi Beliefs factors. Females scored higher than males on the Magical Ideation Scale, while males scored significantly higher than females on the total SPQ and the SPQ Interpersonal Deficit factor. These findings are consistent with previous reports of higher scores in females than males on the Magical Ideation Scale (e.g., Lenzenweger & Moldin, 1990; Lyons, Toomey, Faraone, & Tsuang, 1994; Mohr & Leonards, 2005; Muntaner, Garcia-Sevilla, Fernandez, & Torrubia, 1988), and higher scores in males than females on the Interpersonal Deficit dimension and subscales of the SPQ (Badcock & Dragovic, 2006; Fossati et al., 2003; Gruzelier, 1994; Mata, Mataix-Cols, & Peralta, 2005; Miller & Burns, 1995; Raine, 1992). These studies are part of a larger literature on sex differences in schizotypy which suggests that males score higher on measures of the negative symptom dimension whereas females score higher on measures of the positive symptom (reality distortion) dimension of schizotypy.

The present study is limited by the use of an undergraduate sample, which may limit the generalizability of the findings. It is possible that the findings are influenced by selection factors involved in the use of undergraduate participants, such as restricted age range, higher academic achievement and intelligence, substance use, and so forth. Further research in this area should make use of general community samples. A large number of analyses were conducted without experiment-wide correction for the

number of tests. Bonferroni's correction applied on a study-wide basis would be inappropriately restrictive. Of the 54 correlations presented in Table 3, 33 were significant at conventional levels ( $p < .05$ ), whereas only 2 or 3 correlations significant at this level would be expected by chance. At most 1 correlation significant at the  $p < .001$  level would be expected by chance, whereas there were 19 correlations significant at this level in the current study. These 19 correlations would survive Bonferroni's correction.

## References

- Badcock, J. C., & Dragovic, M. (2006). Schizotypal personality in mature adults. *Personality and Individual Differences, 40*, 77–85.
- Beck, R., & Miller, J. P. (2001). Erosion of belief and disbelief: Effects of religiosity and negative affect on beliefs in the paranormal and supernatural. *Journal of Social Psychology, 141*, 277–287.
- Brod, J. H. (1997). Creativity and schizotypy. In G. Claridge (Ed.), *Schizotypy: Implications for illness and health* (pp. 274–298). Oxford, UK: Oxford University Press.
- Buhrmann, H. G., & Zaugg, M. (1983). Religion and superstition in the sport of basketball. *Journal of Sport Behavior, 6*, 146–151.
- Chapman, L. J., Chapman, J. P., & Raulin, M. I. (1978). Body-image aberration in schizophrenia. *Journal of Abnormal Psychology, 87*, 399–407.
- Chapman, L. J., Chapman, J. P., Raulin, M. L., & Edell, W. S. (1978). Schizotypy and thought disorder as a high-risk approach to schizophrenia. In G. Serban (Ed.), *Cognitive defects in the development of mental illness*. New York: Brunner/Mazel.
- Chapman, L. J., Edell, E. W., & Chapman, J. P. (1980). Physical anhedonia, perceptual aberration and psychosis proneness. *Schizophrenia Bulletin, 6*, 639–653.
- Chen, W. J., Hsiao, C. K., & Lin, C. C. (1997). Schizotypy in community samples: The three-factor structure and correlation with sustained attention. *Journal of Abnormal Psychology, 106*, 649–654.
- Chequers, J., Joseph, S., & Diduca, D. (1997). Belief in extraterrestrial life, UFO-related beliefs, and schizotypal personality. *Personality and Individual Differences, 23*, 519–521.
- Chmielewski, P. M., & Watson, D. (2008). The heterogeneous structure of schizotypal personality disorder: Item-level factors of the Schizotypal Personality Questionnaire and their associations with obsessive-compulsive disorder symptoms, dissociative tendencies, and normal personality. *Journal of Abnormal Psychology, 117*, 364–376.
- Claridge, G. (1997). Theoretical background and issues. In G. Claridge (Ed.), *Schizotypy: Implications for illness and health* (pp. 3–18). Oxford, UK: Oxford University Press.

- Claridge, G., & Broks, P. (1984). Schizotypy and hemisphere function: I. Theoretical considerations and the measurement of schizotypy. *Personality and Individual Differences, 5*, 633–648.
- Duncan, F. D., Donnelly, W. J., & Nicholson, T. (1992). Belief in the paranormal and religious belief among American college students. *Psychological Reports, 70*, 15–18.
- Eckblad, M., & Chapman, L. J. (1983). Magical ideation as an indicator of schizotypy. *Journal of Consulting and Clinical Psychology, 51*, 215–225.
- Ede, A. (2000). Has science education become an enemy of scientific rationality? *Skeptical Inquirer, 24*(4), 48–51.
- Ellis, L. (1988). Religiosity and superstition: Are they related or separate phenomena? *Psychology, 25*, 12–13.
- Emmons, C. F., & Sobal, J. (1981). Paranormal beliefs: Functional alternatives to mainstream religion? *Review of Religious Research, 22*, 310–312.
- Eve, R. A., & Dunn, D. (1990). Psychic powers, astrology and creationism in the classroom? *American Biology Teacher, 52*, 10–21.
- Farias, M., Claridge, G., & Lalljee, M. (2005). Personality and cognitive predictors of New Age practices and beliefs. *Personality and Individual Differences, 39*, 979–989.
- Fossati, A., Raine, A., Carretta, I., Leonardi, B., & Maffei, C. (2003). The three-factor model of schizotypal personality: Invariance across age and gender. *Personality and Individual Differences, 35*, 1007–1019.
- Fox, J. W. (1992). The structure, stability, and social antecedents of reported paranormal experiences. *Sociological Analysis, 53*, 417–431.
- Gallagher, C., Kumar, V. K., & Pekala, R. J. (1994). The anomalous experiences inventory: Reliability and validity. *Journal of Parapsychology, 58*, 402–428.
- Genovese, J. E. C. (2005). Paranormal beliefs, schizotypy, and thinking styles among teachers and future teachers. *Personality and Individual Differences, 39*, 93–102.
- Goode, E. (2000). Two paranormals or two and a half? An empirical exploration. *Skeptical Inquirer, 24*, 29–35.
- Goritz, A. S., & Schumacher, J. (2000). The WWW as a research medium: An illustrative survey on paranormal belief. *Perceptual and Motor Skills, 90*, 1195–1206.
- Goulding, A. (2004). Schizotypy models in relation to subjective health and paranormal beliefs and experiences. *Personality and Individual Differences, 37*, 157–167.
- Goulding, A. (2005). Healthy schizotypy in a population of paranormal believers and experiencers. *Personality and Individual Differences, 38*, 1069–1083.
- Greeley, A. (1975). *The sociology of the paranormal: A reconnaissance*. Beverly Hills, CA: Sage.
- Greeley, A. (1987). Hallucinations among the widowed. *Sociology and Social Research, 71*, 258–265.

- Gruzelier, J. H. (1994). Syndromes of schizophrenia and schizotypy, hemispheric imbalance and sex differences: Implications for developmental psychopathology. *International Journal of Psychophysiology*, *18*, 167–178.
- Gruzelier, J. H. (1995). Syndromes of schizotypy: Patterns of cognitive asymmetry, arousal, and gender. In A. Raine, T. Lencz, & S. A. Mednick (Eds.), *Schizotypal personality* (pp. 329–351). Cambridge, UK: Cambridge University Press.
- Gruzelier, J. H. (1996). The factorial structure of schizotypy: Part I. Affinities with syndromes of schizophrenia. *Schizophrenia Bulletin*, *22*, 611–620.
- Gruzelier, J., Burgess, A., Stygall, J., Irving, G., & Raine, A. (1995). Patterns of cognitive symmetry and syndromes of schizotypal personality. *Psychiatry Research*, *56*, 71–79.
- Haraldsson, E. (1981). Some determinants of belief in psychological phenomena. *Journal of the American Society for Psychological Research*, *75*, 297–309.
- Hergovich, A., & Arendsay, M. (2005). Critical thinking ability and belief in the paranormal. *Personality and Individual Differences*, *38*, 1805–1812.
- Hergovich, A., Schott, R., & Arendsay, M. (2008). On the relationship between paranormal belief and schizotypy among adolescents. *Personality and Individual Differences*, *45*, 119–125.
- Hergovich, A., Willinger, U., & Arendsay, M. (2005). Paranormal belief, schizotypy, and Body Mass Index. *Perceptual and Motor Skills*, *100*, 883–891.
- Holt, N., Simmonds-Moore, C., & Moore, S. (2008). Benign schizotypy: Investigating differences between clusters of schizotypes on paranormal belief, creativity, intelligence and mental health. *Proceedings of Presented Papers: The Parapsychological Association 51st Annual Convention*, 82–96.
- Houran, J., Irwin, H. J., & Lange, R. (2001). Clinical relevance of the two-factor Rasch version of the Revised Paranormal Belief Scale. *Personality and Individual Differences*, *31*, 371–382.
- Irwin, H. J. (1985). Parapsychological phenomena and the absorption domain. *Journal of the American Society for Psychological Research*, *79*, 1–11.
- Irwin, H. J., & Green, M. J. (1998). Schizotypal processes and belief in the paranormal: A multidimensional study. *European Journal of Parapsychology*, *14*, 1–15.
- Kalish, R. A., & Reynolds, D. K. (1973). Phenomenological reality and post-death contact. *Journal for the Scientific Study of Religion*, *12*, 209–221.
- Kallery, M. (2001). Early-years educators attitudes to science and pseudoscience: The case of astronomy and astrology. *European Journal of Teacher Education*, *24*, 329–342.
- Kelley, M. P. (Submitted for publication). Item-level factor analysis of the Schizotypal Personality Questionnaire.

- Lange, R., Irwin, H. J., & Houran, J. (2000). Top-down purification of Tobacyk's Revised Paranormal Belief Scale. *Personality and Individual Differences, 29*, 131–156.
- Lawrence, T., & De Cicco, P. (1997). The factor structure of the paranormal belief scale: More evidence in support of the oblique five. *Journal of Parapsychology, 61*, 243–251.
- Lawrence, T., Roe, C., & Williams, C. (1997). Confirming the factor structure of the paranormal belief scale: Big orthogonal seven or oblique five? *Journal of Parapsychology, 61*, 13–31.
- Lenzenweger, M. F., & Moldin, S. O. (1990). Discerning the latent structure of hypothetical psychosis proneness through admixture analysis. *Psychiatry Research, 33*, 243–257.
- Lindeman, M., & Aarnio, K. (2007). Superstitious, magical, and paranormal beliefs: An integrative model. *Journal of Research in Personality, 41*, 731–744.
- Lindeman, M., Cederstrom, S., Simola, P., Simula, A., Ollikainen, S., & Riekke, T. (2008). Sentences with core knowledge violations increase the size of N400 among paranormal believers. *Cortex, 44*, 1307–1315.
- Lyons, M. J., Toomey, R., Faraone, S. V., & Tsuang, M. T. (1994). Comparison of schizotypal relatives of schizophrenia versus affective probands. *American Journal of Medical Genetics (Neuropsychiatric Genetics), 54*, 279–285.
- Mata, I., Mataix-Cols, D., & Peralta, V. (2005). Schizotypal Personality Questionnaire-Brief: Factor structure and influence of sex and age in a nonclinical population. *Personality and Individual Differences, 38*, 1183–1192.
- McCreery, C., & Claridge, G. (1995). Out-of-the-body experiences and personality. *Journal of the Society for Psychical Research, 60*, 129–148.
- McCreery, C., & Claridge, G. (1996). A study of hallucination in normal subjects I. Self-report data. *Personality and Individual Differences, 21*, 739–747.
- McCreery, C., & Claridge, G. (2002). Healthy schizotypy: the case of out-of-body experiences. *Personality and Individual Differences, 32*, 141–154.
- Miller, L. S., & Burns, S. A. (1995). Gender differences in schizotypic features in a large sample of young adults. *Journal of Nervous and Mental Disease, 183*, 657–661.
- Mohr, C., & Leonards, U. (2005). Does contextual information influence positive and negative schizotypy scores in healthy individuals? The answer is maybe. *Psychiatry Research, 136*, 135–141.
- Muntaner, C., Garcia-Sevilla, L., Fernandez, A., & Torrubia, R. (1988). Personality dimensions, schizotypal and borderline personality traits and psychosis proneness. *Personality and Individual Differences, 9*, 257–268.

- Nettle, D. (2006). Schizotypy and mental health amongst poets, visual artists and mathematicians. *Journal of Research in Personality, 40*, 876–890.
- Newport, F., & Strausberg, M. (2001). *Americans' belief in psychic and paranormal phenomena is up over last decade*. Retrieved from [www.gallup.com/poll/releases/pr010608.asp](http://www.gallup.com/poll/releases/pr010608.asp)
- Orenstein, A. (2002). Religion and paranormal belief. *Journal for the Scientific Study of Religion, 41*, 301–311.
- Parker, A., Grams, D., & Pettersson, C. (1998). Further variables relating to psi in the ganzfeld. *Journal of Parapsychology, 62*, 319–337.
- Parra, A. (2006). “Seeing and feeling ghosts”: Absorption, fantasy proneness, and healthy schizotypy as predictors of crisis apparition experiences. *Journal of Parapsychology, 70*, 357–372.
- Peltzer, K. (2003). Magical thinking and paranormal beliefs among secondary and university students in South Africa. *Personality and Individual Differences, 35*, 1419–1426.
- Persinger, M. A., & Makarec, K. (1990). Exotic beliefs may be substitutes for religious beliefs. *Perceptual and Motor Skills, 71*, 16–18.
- Raine, A. (1991). The SPQ: A scale for the assessment of schizotypal personality based on DSM-III-R criteria. *Schizophrenia Bulletin, 17*, 555–564.
- Raine, A. (1992). Sex differences in schizotypal personality in a nonclinical population. *Journal of Abnormal Psychology, 101*, 361–364.
- Raine, A., Reynolds, C., Lencz, T., Scerbo, A., Triphon, N., & Kim, D. (1994). Cognitive-perceptual, interpersonal, and disorganized features of schizotypal personality. *Schizophrenia Bulletin, 26*, 603–618.
- Rawlings, D., & Locarnini, A. (2008). Dimensional schizotypy, autism, and unusual word associations in artists and scientists. *Journal of Research in Personality, 42*, 465–471.
- Reynolds, C. A., Raine, A., Mellingen, K., Venables, P. H., & Mednick, S. A. (2000). Three-factor model of schizotypal personality: Invariance across culture, gender, religious affiliation, family adversity, and psychopathology. *Schizophrenia Bulletin, 26*, 603–618.
- Rice, T. W. (2003). Believe it or not: Religious and other paranormal beliefs in the United States. *Journal for the Scientific Study of Religion, 42*, 95–106.
- Rossi, A., & Daneluzzo, E. (2002). Schizotypal dimensions in normals and schizophrenic patients: A comparison with other clinical samples. *Schizophrenia Research, 54*, 67–75.
- Rudski, J. (2003). What does a “superstitious” person believe? Impressions of participants. *Journal of General Psychology, 130*, 431–445.
- Schumaker, J. F. (1987). Mental health, belief deficit compensation, and paranormal beliefs. *Journal of Psychology, 121*, 451–457.
- Sharps, M. J., Matthews, J., & Asten, J. (2006). Cognition and belief in paranormal phenomena: Gestalt/feature-intensive processing



- theory and tendencies toward ADHD, depression, and dissociation. *Journal of Psychology*, *140*, 579–590.
- Skirda, R. J., & Persinger, M. A. (1993). Positive associations among dichotic listening errors, complex partial epileptic-like signs, and paranormal beliefs. *Journal of Nervous and Mental Disease*, *181*, 663–667.
- Thalbourne, M. A. (1994). Belief in the paranormal and its relationship to schizophrenia-relevant measures: A confirmatory study. *British Journal of Clinical Psychology*, *33*, 78–80.
- Thalbourne, M. A. (1995). Psychological characteristics of believers in the paranormal: A replicative study. *Journal of the American Society for Psychical Research*, *89*, 153–163.
- Thalbourne, M. A. (1998). Transliminality: Further correlates and a short measure. *Journal of the American Society for Psychical Research*, *92*, 402–419.
- Thalbourne, M. A. (1999). Personality characteristics of students who believe themselves to be psychic. *Journal of the Society for Psychical Research*, *63*, 203–212.
- Thalbourne, M. A. (2003a). Theism and belief in the paranormal. *Journal for the Society for Psychical Research*, *67*, 208–210.
- Thalbourne, M. A., Bartemucci, L., Delin, P. S., Fox, B., & Nofi, O. (1997). Transliminality: Its nature and correlates. *Journal of the American Society for Psychical Research*, *91*, 305–331.
- Thalbourne, M. A., & Delin, P. S. (1993). A new instrument for measuring the sheep-goat variable: Its psychometric properties and factor structure. *Journal of the Society for Psychical Research*, *59*, 172–186.
- Thalbourne, M. A., & Delin, P. S. (1999). Transliminality: Its relation to dream-life, religiosity and mystical experience. *International Journal for the Psychology of Religion*, *9*, 45–61.
- Thalbourne, M. A., & Delin, P. S. (1994). A common thread underlying belief in the paranormal, creative personality, mystical experience and psychopathology. *Journal of Parapsychology*, *58*, 3–38.
- Thalbourne, M. A., Dunbar, K. A., & Delin, P. (1995). An investigation into correlates of belief in the paranormal. *Journal of the American Society for Psychical Research*, *89*, 215–231.
- Thalbourne, M. A., & French, C. C. (1995). Paranormal belief, manic-depressiveness, and magical ideation: A replication. *Personality and Individual Differences*, *18*, 291–292.
- Tobacyk, J. (1998). *A Revised Paranormal Beliefs Scale*. Unpublished manuscript, Louisiana Tech University, Ruston, LA.
- Tobacyk, J., & Milford, G. (1983). Belief in paranormal phenomena: Assessment instrument development and implications for personality functioning. *Journal of Personality and Social Psychology*, *44*, 1029–1037.
- Tobacyk, J., & Wilkinson, L. (1990). Magical thinking and paranormal beliefs. *Journal of Social Behavior and Personality*, *5*, 255–264.



- Vollema, M. G., & Hoijtink, H. (2000). The multidimensionality of self-report schizotypy in a psychiatric population: An analysis using multidimensional Rasch models. *Schizophrenia Bulletin*, *26*, 565–575.
- Voracek, M. (2009). Who wants to believe? Associations between digit ratio (2D:4D) and paranormal and superstitious beliefs. *Personality and Individual Differences*, *47*, 105–109.
- Vyse, S. A. (1997). *Believing in magic: The psychology of superstition*. New York: Oxford University Press.
- Williams, E., Francis, L. J., & Robbins, M. (2006). Attitude toward Christianity and paranormal belief among 13- to 16-year-old students. *Psychological Reports*, *99*, 266.
- Williams, L. (1995). Belief in the paranormal: Its relationship with schizotypy and cognitive style. *Australian Parapsychological Review*, *20*, 8–10.
- Williams, L. M., & Irwin, H. J. (1991). A study of paranormal belief, magical ideation as an index of schizotypy, and cognitive style. *Personality and Individual Differences*, *12*, 1339–1348.
- Windholz, G., & Diamant, L. (1974). Some personality traits of believers in extraordinary phenomena. *Bulletin of the Psychonomic Society*, *3*, 125–126.
- Wolfradt, U., Oubaid, V., Straube, E. R., Bischoff, N., & Mischo, J. (1999). Thinking styles, schizotypal traits and anomalous experience. *Personality and Individual Differences*, *27*, 821–830.
- Wolfradt, U., & Watzke, S. (1999). Deliberate out-of-body experiences, depersonalization, schizotypal traits, and thinking styles. *Journal of the American Society for Psychical Research*, *93*, 249–257.
- Wuthrich, V., & Bates, T. C. (2005). Reliability and validity of two Likert versions of the Schizotypal Personality Questionnaire (SPQ). *Personality and Individual Differences*, *38*, 1543–1548.
- Yates, C. R., & Chandler, M. (2000). Where have all the skeptics gone? Patterns of new age beliefs and anti-scientific attitudes in preservice primary teachers. *Research in Science Education*, *30*, 377–387.
- Zusne, L., & Jones, W. H. (1989). *Anomalistic psychology: A study of magical thinking*. Hillsdale, NJ: Lawrence Erlbaum Associates.

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### Abstracts in Other Languages

#### French

#### CORRELATS DES CROYANCES PARANORMALES, I : LA SCHIZOTYPIC

RESUME: La recherche antérieure a indiqué une relation consistante entre la croyance paranormale et la schizotypie. La présente étude cherche à répliquer

ces résultats et à explorer les associations différentielles de diverses dimensions de la croyance paranormale avec les diverses dimensions de la schizotypie. La Paranormal Beliefs Scale (PBS) de Tobacyk, le Schizotypal Personality Questionnaire (SPQ), le STA, et les échelles d'idéation magique et d'aberration perceptuelle furent administrés à 657 étudiants niveau licence. Des analyses de facteur au niveau des items pour la PBS et le SPQ ont chacun fait émergé cinq facteurs. Les scores totaux sur la PBS de Tobacyk étaient significativement associés avec les scores sur la STA, les échelles d'idéation magique et d'aberration perceptuelle, les scores SPQ totaux, et les facteurs de Distorsion de la réalité et de Paranoïde/Tendance à la suspicion du SPQ. La dimension de Distorsion de la réalité de la schizotypie fut associée plus fortement et de façon plus consistante avec les croyances paranormales que les autres facteurs de la schizotypie. Tous les 5 facteurs de la croyance paranormale étaient significativement et positivement corrélés avec la STA et le facteur de Distorsion de la réalité du SPQ. Bien que des mesures générales de la croyance paranormale et de la schizotypie sont significativement reliées, l'association des croyances paranormales avec la schizotypie varie selon différentes facettes de la croyance paranormale, sans rendre compte de tous les aspects de la schizotypie.

### *Spanish*

#### CORRELATOS DE LAS CREENCIAS PARANORMALES, I: ESQUIZOTIPIA

RESUMEN: Investigaciones previas han indicado una relación consistente entre la creencia paranormal y la esquizotipia. Este estudio trató de replicar estos resultados y explorar las diferentes asociaciones entre las diversas dimensiones de la creencia paranormal con las diversas dimensiones de la esquizotipia. Administramos las escalas Paranormal Beliefs Scale (PBS) de Tobacyk, Schizotypal Personality Questionnaire (SPQ), Schizotypy Traits Questionnaire (STA), y Magical Ideation and Perceptual Aberration a una muestra de 657 estudiantes de licenciatura. Análisis factoriales a nivel de reactivo de la PBS y la SPQ arrojaron cinco factores para cada una. Las puntuaciones totales en la PBS estuvieron asociadas significativamente con las puntuaciones de la STA, con las subescalas de ideación mágica y aberración perceptual, y con las puntuaciones totales de la SPQ y de sus subescalas de distorsión de la realidad y paranoide/sospecha. La dimensión de distorsión de la realidad de la esquizotipia mostró más firmes y coherentes relaciones con las creencias paranormales que los otros factores de la esquizotipia. Todos los 5 factores de creencias paranormales correlacionaron significativamente con la STA y el factor de distorsión de realidad de la SPQ. Aunque las medidas generales de las creencias paranormales y la esquizotipia se relacionan significativamente, la asociación de las creencias paranormales con la esquizotipia varía según las diferentes facetas de las creencias paranormales y no incluye todos los aspectos de la esquizotipia.

*German*

## KORRELATE PARANORMALER BELIEFSYSTEME, I: SCHIZOTYPIE

ZUSAMMENFASSUNG: Frühere Forschungsergebnisse legten eine konsistente Beziehung zwischen paranormaler Glaubenseinstellung und Schizotypie nahe. Die vorliegende Studie versuchte, diese Befunde zu replizieren und herauszuarbeiten, wie verschiedene Dimensionen paranormaler Glaubenseinstellung mit verschiedenen Dimensionen von Schizotypie unterschiedlich assoziiert sind. Eine Stichprobe von 657 Studenten in den Anfangssemestern füllte Tobacyks Paranormal Beliefs Scale (PBS), den Schizotypal Personality Questionnaire (SPQ), den STA und die Skalen zur Messung der Magical Ideation und der Perceptual Aberration aus. Faktorenanalysen der PBS auf Itemebene und der STA führten jeweils zu 5 Faktoren. Die Gesamtwerte von Tobacyks PBS waren signifikant korreliert mit denjenigen des STA, den Skalen für Magical Ideation und Perceptual Aberration sowie den Gesamtscores des SPQ und den Reality Distortion- und Paranoid/Suspiciousness-Faktoren des SPQ. Verglichen mit anderen Schizotypiefaktoren war die Reality Distortion-Dimension der Schizotypie ausgeprägter und konsistent auf paranormale Einstellungen bezogen.