

# Ghosts, UFOs, and Magic: Positive Affect and the Experiential System

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Three studies examined the potential interactions of the experiential system and positive affect (PA) in predicting superstitious beliefs and sympathetic magic. In Study 1, experientiality and induced positive mood interacted to predict the emergence of belief in videos purporting to show unidentified flying objects or ghosts. In Study 2, naturally occurring PA interacted with experientiality to predict susceptibility to sympathetic magic, specifically difficulty in throwing darts at a picture of a baby (demonstrating the law of similarity). In Study 3, induced mood interacted with experientiality to predict sitting farther away from, and expressing less liking for, a partner who had stepped in excrement (demonstrating the law of contagion). Results are interpreted as indicating that PA promotes experiential processing. Implications for the psychology of nonrational beliefs and behaviors are discussed.

*Keywords:* positive affect, intuition, sympathetic magic, paranormal beliefs

The only force I fear more than human irrationality is irrationality armed with passion.—Leo Rosten

Perhaps as long as there have been human beings, human irrationality has been discussed, puzzled over, criticized (e.g., Dawes, 2001; Evans & Over, 1997; McCrone, 1994; Stanovich, 1999) and, occasionally, celebrated (see innumerable popular love songs as well as Gladwell, 2005; Weiner, 2005). Although irrationality is often viewed as being at the core of many historical, social, and personal tragedies, there is also an acknowledgement that nonrational processes relate to important human emotional experiences, creativity, and artistic expression (e.g., Langan-Fox & Shirley, 2003; Raidl & Lubart, 2000–2001; Weiner, 2005). Historically, of course, social psychologists have played a large role in documenting human irrationality (e.g., Tversky & Kahneman, 2002). Increasingly, psychologists and others have come to appreciate that a nonrational gut reaction may represent an efficient method of processing information, particularly in situations in which reliance on existing knowledge structures is reasonable (e.g., Bless, 2001; Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; Gladwell, 2005; Klein, 2004; Vaughn, 1979).

Cognitive–experiential self-theory (CEST, e.g., Epstein, 1990, 1993, 1998) provides a rich conceptualization of the two aspects of human information processing, the logical rational system and the

intuitive or experiential system. Before we describe the particular foci of the present studies, a brief summary of CEST may help to set the context for this investigation.

## Cognitive–Experiential Self-Theory

CEST asserts that personality may be understood as comprising two systems that give rise to two types of processing. Epstein and his colleagues have compiled an impressive body of evidence for the existence of these two systems and their independent operations (e.g., Epstein, 1994; Epstein, Lipson, Holstein, & Huh, 1992). Within CEST, the experiential system is fast and automatic. It operates holistically and is associationistic. The experiential system is resistant to change and is prone to broad generalizations and to emotional complexes. Behavior that is guided by the experiential system is mediated by vibes from the past (Epstein, 1990, 1993, 1998). Research has linked the experiential system to the use of heuristics in problem-solving tasks (Epstein, Pacini, Denes-Raj, & Heier, 1996; Shiloh, Salton, & Sharabi, 2002). The processing style that characterizes the experiential system has been measured using the Faith in Intuition (FI) Scale, or the Experientiality Scale (Pacini & Epstein, 1999).

In contrast to the experiential system, the rational system is slow and intentional. Its processing is effortful and logical. Behavior that is guided by the rational system is mediated by conscious appraisals (Epstein, 1990, 1993, 1994; Epstein et al., 1996). The rational system has been shown to relate to the application of probabilities and logic in problem-solving tasks (e.g., Alonso & Fernandez-Berrocal, 2003). The processing style that characterizes the rational system is an analytic one that is measured using a variation on Need for Cognition (NC) (Cacioppo & Petty, 1982).

Both systems have been associated with adaptive functioning, including heightened self-esteem and lowered depression and anxiety (Epstein et al., 1996). Though a modest relation has been shown between the rational system and measures of intelligence, the experiential system is not related to intellectual functioning (Epstein et al., 1996).

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Readers of the social cognitive and cognitive literatures may note that CEST overlaps to some extent with other dual-process models of information processing. Many of these models posit a faster automatic system and a slower, more intentional analytic system (e.g., Bargh, 1989; Evans, Newstead, & Byrne, 1993; Higgins, 1989; Stanovich, 1999; Stanovich & West, 2000; Tversky & Kahneman, 1983; Weinberger & McClelland, 1991). Typically, however, these approaches have not addressed individual differences in processing styles (although see Newstead, Handley, Harley, Wright, & Farrelly, 2004; Stanovich, 1999).

Individual differences in the tendency to rely on these different processing styles represent a largely untapped domain for empirical research. Most dual-processing models focus on describing human problem solving and decision making via these two routes. Given that they represent an adequate accounting, it makes sense to consider the individual differences that may exist within these styles. On any given task, there is variation in reliance on the two types of processing, even if, in general, people respond with slow effortful processing to one task and more automatic processing for another. In a similar vein, Kosslyn et al. (2002) have argued that variation in physical systems demands attention to individual differences in these systems. Here we suggest that apparent psychological universals may be profitably investigated for individual differences. CEST is well suited to an investigation of individual differences in these styles, because it presents a conceptualization of these styles that is embedded in a larger theory of personality.

Furthermore, as outlined by Epstein and Pacini (1999), CEST has already been shown to be useful in uncovering new phenomena (e.g., compromises between processing in the experiential and rational modes) and invalidating other explanations (e.g., the norm theory explanation of counterfactual thinking). Integrative theories, such as CEST, can account for a broad range of phenomena, account for convergent effects, and suggest limitations in generalizations of such effects (Epstein & Pacini, 1999). Narrowly focused, domain-specific theories do not share these strengths. In general, these dual-process models do share some aspects with CEST, but they generally focus on describing these as information-processing strategies without the benefits that CEST provides. CEST offers a richer and broader conceptualization of rationality and intuition in human life.

### *Shifting the Balance to the Experiential System: The Potential Role of Positive Affect*

When and why do individuals approach problems using the rational versus the experiential system? Epstein (e.g., Epstein & Pacini, 1999) answered this question by asserting that nuances of the situation determine which system is predominant. Here, we propose that positive affect (PA) may play a role in shifting the balance toward the experiential system. A striking aspect of CEST is the considerable overlap between the description of the experiential system and the extant literature on the effects of positive mood on cognitive processes (e.g., Wyer, Clore, & Isbell, 1999). Indeed, Epstein's description of the experiential system largely conforms to a summary of many of the essential findings with regard to PA and cognitive processes. For instance, the experiential system has been found to relate to the use of heuristic processing (e.g., Donovan & Epstein, 1997; Epstein, Denes-Raj, & Pacini, 1995; Shiloh et al., 2002). Similarly, research on mood and

cognition has shown that PA leads to increased reliance on heuristic cues (e.g., Bodenhausen, Kramer, & Süsner, 1994; Ruder & Bless, 2003). Epstein (1994) further described the experiential system as subject to broad generalizations. Research on mood and cognition has shown that happy people are more apt to use broad generalizations in the form of stereotypes when making social judgments (see Bodenhausen, 1993, for a review). The experiential system is also described as a source for creativity (Epstein, 1994; Raidl & Lubart, 2000–2001). Isen and colleagues (Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985) have found that the experience of PA leads to the flexible processing of information and creative problem solving. The experiential system is described as holistic. Research on affect and attentional focus has found that the experience of PA leads to a global or broadened focus (Fredrickson, 2001; Gasper & Clore, 2002; Isen, 1987). Building on Epstein's description (e.g., 1993), we suggest that the experiential system may represent a general knowledge structure in the sense that it represents the person's stockpile of experience and impressions and operates instantaneously and nonconsciously. In turn, research has shown that PA leads an individual to rely on his or her general knowledge structures (Bless et al., 1996).

Epstein (1998) has reviewed the distinctive ways that learning and habit formation occur within the experiential system. Because this system functions automatically and is highly susceptible to the enticement of PA, experientially motivated behavior is likely to be experienced as intrinsically rewarding and "natural" (Epstein, 1998, p. 17). Thus, there might be a special relation between the experiential system and PA. Pacini and Epstein (1999) suggested that the experiential system is the default mode and that the rational system functions to curb these experiential tendencies. Mild PA might be considered the default as well (e.g., Ito & Cacioppo, 1999, 2005; Larsen, 2000).

Given the clear parallels between the description of the experiential system and the effects of PA on cognitive processing, we propose that PA, particularly high levels of PA, may promote reliance on the experiential system.<sup>1</sup> PA is a sign that things are going well, that one is safe and secure (e.g., Fredrickson, 1998). In such a context, it is reasonable for the individual to rely on the gut instincts of the experiential system. In contrast, when things are not going well, negative mood offers feedback that there is a

<sup>1</sup> Indirect support for the notion that PA may play a role in activating the experiential system is provided by research in terror management theory (TMT). TMT holds that when an individual's mortality is made salient, he or she engages in worldview defense. In response to failures to replicate this effect, Simon et al. (1997) examined potential experimental artifacts. In these studies, experimenters who were instructed to act and dress casually elicited the predicted effect for mortality salience, whereas an experimenter who was more formal in dress and demeanor did not elicit the predicted outcome. These results were interpreted as indicating that the formal experimenter put participants in a rational mode of thinking, which reduced the power of mortality salience. The informal experimenter was able to make participants feel relaxed and comfortable, thereby putting them in an experiential mode of thinking and, subsequently, allowing them to experience increased worldview defense once their mortality was made salient. Although mood was measured in these studies, PA was not analyzed, because delineating death anxiety from negative affect was a central concern. These results are certainly in keeping with the notion that a safe and secure context (indicated by PA) is necessary for the experiential self to manifest itself.

problem (see Clore et al., 2001, and Schwarz, 2001 for reviews). At such a time, it is reasonable for the individual to slow down and to process a solution carefully, using the analytical skills of the rational system. If the experiential system is especially available to a person (depending on his or her level of dispositional experientiality), it may be that PA serves as a go signal for the individual to use that system for whatever task is at hand.

This line of reasoning leads to the notion that the influence of mood on cognition may depend on underlying individual differences that are promoted by that mood. PA promotes reliance on general knowledge structures (Bless et al., 1996), but individual differences may inform the content of the structures made available by that mood. That is, the content of general knowledge structures might vary across individuals depending on the accumulation of experiences (the experiential system) and preexisting dispositions (an individual's level of faith in intuition). If PA effectively shifts the balance of processing toward reliance on the experiential system, PA should lead to enhanced effects of experientiality on behavior. Thus, we would expect PA to interact with individual differences in experiential processing to predict outcomes.

An alternative explanation for such a result might be that PA simply enhances the likelihood of an individual engaging in his or her default or overlearned responses. Rather than sharing a special relationship with the experiential system, PA may simply increase the likelihood of a person's dominant cognitive responses. It may be that when in a good mood, people are simply more likely to rely on their automatic routine—whatever that routine contains. If this is the case, PA could be associated with enhanced reliance on rationality for those who are dominated by the rational system and with enhanced reliance on intuition for those who are dominated by the experiential system. The present studies address this possibility as well.

### *The Experiential System, Paranormal Belief, and Sympathetic Magic*

There are (at least) two domains of apparently nonrational belief and behavior that might benefit from the application of CEST. These domains include paranormal beliefs and behavioral indications of "sympathetic magic" (Rozin, Millman, & Nemeroff, 1986). In turn, we suggest that a fuller appreciation of the experiential system might be gained by exploration of the influence of experientiality in more purely experiential areas of life than have been examined in past research (e.g., Kirkpatrick & Epstein, 1992; Pacini, Muir, & Epstein, 1998). A weakness of the extant literature on CEST is that, typically, the tasks used to examine the behavioral outcomes associated with each system have been logical problems that have rational solutions (e.g., Kirkpatrick & Epstein, 1992; Pacini et al., 1998; Shiloh et al., 2002). The most common task used in CEST studies is designed around the ratio bias paradigm, which relies on the understanding of ratios (a rational process) and the inherent experiential appeal of the numerosity heuristic (Alonso & Fernandez-Berrocal, 2003; Pacini & Epstein, 1999; Pacini et al., 1998; Pelham, Sumarta, & Myakovsky, 1994). The ratio bias paradigm and similar measures pit the two systems against each other with the "correct" or optimal response always being the rational choice.

Similarly, researchers on the effects of mood on cognitive processes have not addressed aspects of processing related to the full range of nonrational human experience. Drawing on the conceptual

overlap between the effects of PA on processes similar to those described by Epstein (1994) as part of the experiential system, we propose that PA might have a role to play in other types of experiential phenomenon. In the present studies, we sought to examine domains in which the experiential system might be expected to play a large role, specifically paranormal belief and sympathetic magic.

### *The Experiential System and Paranormal Belief*

Study 1 examined the roles of experiential (and rational) processing and PA in paranormal beliefs. Paranormal beliefs may be defined as belief in phenomena that violate the basic principles of science (Tobacyk & Milford, 1983). Nonscientific beliefs persist to a degree that suggests that they represent a very broad human tendency. Gallup polls (Newport & Strausberg, 2001) have shown that belief in a number of paranormal phenomena increased from 1990 to 2001. For example, in 2001, 42% believed in hauntings (compared with just 29% in 1990) and 38% believed in ghosts (compared with 25% in 1990). Belief in supernatural phenomena is widespread and enduring. The response of psychologists to the popularity of such beliefs is well characterized by the conclusion of Royalty (1995) that such beliefs may be dismissed with only an elementary understanding of the laws of nature. Not surprisingly, then, research has examined supernatural or paranormal beliefs as they relate to faulty reasoning or other problematic aspects of the person (e.g., memory biases: Clancy, McNally, Schacter, Lenzenweger, & Pitman, 2002; critical thinking: Royalty, 1995; external locus of control: Tobacyk, Nagot, & Miller, 1988; uncritical inferences, dogmatism, and irrational beliefs: Tobacyk & Milford, 1983; lower self-efficacy: Tobacyk & Shrader, 1991; and lower college grade point average: Tobacyk, 1984).

To the extent that such beliefs appear to be common, researchers seeking a scientific approach to understanding them must account for their persistence using psychological processes that incorporate them, not as dysfunction but as a logical consequence of common psychological mechanisms. Epstein's (1994) conceptualization of the experiential system implicates intuition in the human capacity for belief. Indeed, FI has been found to relate to belief in the unusual and formal superstition (a measure of garden variety superstitions; Epstein et al., 1996). In the experiential system, events and reactions to events are experienced as self-evidentially valid (Epstein, 1991). Within the experiential system, seeing is believing. Thus, this system may be crucial to the emergence of paranormal and superstitious beliefs and the persistence of these beliefs in the face of contradictory information.

It may be that individuals who strongly hold paranormal beliefs are those who feel that they themselves have had paranormal experiences. This possibility is supported by findings from a study by Clarke (1995) in which personal experience was the main reason given for paranormal beliefs. Personal experience is open to the influence of individual differences, of course. Among all of those individuals who see, for instance, an ambiguous object floating in the night sky, some will believe it to be an unidentified flying object (UFO), whereas others may simply dismiss it as a meaningless aberration. We suggest that the kind of meaning ascribed to an ambiguous stimulus depends on individual differences in intuition. In Study 1, we examined whether spontaneous paranormal belief (in UFOs and ghosts) could be explained by the interaction of intuition and PA.

## *The Experiential System and Sympathetic Magic*

A second realm in which the experiential system may be expected to manifest itself was addressed in Studies 2 and 3—behavioral indications of sympathetic magic. Sympathetic magic refers to a variety of common magical beliefs and practices in traditional cultures (Frazer, 1890/1959; Mauss, 1902/1972; Rozin et al., 1986; Rozin & Nemeroff, 1990; Tylor, 1871/1974). Sympathetic magic relies on the formation of simple associations between objects (for instance, between a person and a voodoo doll of that person or between a person and that person's clothing). The law of similarity states that objects that resemble each other share fundamental properties—that “the image is the object” (Rozin, Markwith, & Ross, 1990, p. 383). The law of contagion states that objects that have come into contact can exchange essences (e.g., a cockroach and a beverage; see Rozin et al., 1986).

In describing the effects of sympathetic magic on participants' willingness to ingest sugar labeled arbitrarily as cyanide, Rozin, Markwith, and Ross (1990) stated that the participants “knew this reluctance was foolish, but felt the reluctance anyway. This suggests a ‘low-level’ gut feeling that can influence behavior in spite of countering cognitions” (p. 383). Rozin et al. (1990, p. 383) described this low-level system as “insensitive to modifications” and drew an analogy to the Freudian unconscious that jibes with Epstein's (1993) description of the experiential system. Of note, Rozin and colleagues did find considerable individual differences in susceptibility to sympathetic magic.

We suggest that the experiential system may be the low-level system that produces such susceptibility to sympathetic magic. Studies 2 and 3 examined whether individual differences in experiential processing related to enhanced susceptibility to the influence of the laws of similarity and contagion. In addition, we once again examined the potential role of PA in promoting reliance on the experiential system. Although the experiential system may be expected to exert a main effect on magical thinking, our previous discussion of PA as the go signal for experiential processing led us to examine the interactive effects of mood and processing style. We did not expect to observe mood effects on sympathetic magic. Rather, we suggest that PA serves to promote experiential processing only to the extent that a person has a rich experiential system on which to draw. Phenomena such as paranormal beliefs and sympathetic magic may reflect general aspects of human functioning, but we suggest that variation in these common phenomena may be explained by differences in experientiality, particularly in interaction with PA. The influence of the experiential system should be most clear when experienced affect indicates that relying on these gut feelings is appropriate.

### Study 1

In Study 1, we examined the role of PA and experientiality in the emergence of belief in the paranormal in a spontaneous context by specifically testing whether seeing becomes believing for those who are highly experiential. In this study, we measured experientiality and rationality, induced a positive or a neutral mood, and then examined the tendency to believe in the veridicality of videos purported to contain footage of actual UFOs and ghosts. We predicted that experiential tendencies would interact with manipulated mood, such that in the positive mood condition, FI would relate to believing in these paranormal phenomena and to finding the experiences meaningful, emotional, and exciting.

## *Method*

### *Participants*

Participants were 121 (88 women, 33 men) undergraduate students, ranging in age from 18 to 23 years ( $M = 18.58$ ,  $SD = .96$ ). Represented ethnic groups included 91% European American, 7% African American, 1% Asian American, and the remainder identified as “other” but not Hispanic. Participants were all enrolled in an introductory psychology class and received course credit for their participation.

### *Materials*

Participants completed some initial measures before being randomly assigned to a condition and completing the dependent measures. All measures were conducted in private cubicles on computers using MediaLab software (Empirisoft, New York, NY).

*Experientiality and rationality measurement.* We used the Experientiality (FI; 20 items) and Rationality (NC; 20 items) subscales of the Rational Experiential Inventory (REI; Pacini & Epstein, 1999). Items are rated on a scale of 1 (*not at all true of me*) to 7 (*extremely true of me*). A sample item from the FI subscale is “I believe in trusting my hunches.” A sample item from the rationality subscale is “I try to avoid situations that require thinking in depth about something” (reverse keyed). Both of these scales have been used in a variety of studies. The FI scale has been shown to relate to extraversion, emotional expressivity, stereotypical thinking, and Pollyanna-ish thinking (Epstein et al., 1996; Pacini & Epstein, 1999). The NC scale has been shown to relate to thoughtful analyses, logical problem solving, and reduced susceptibility to biases (e.g., Alonso & Fernandez-Berrocal, 2003; Ca-cioppo, Petty, & Morris, 1983; Verplanken, Hazenberg, & Pale-newen, 1992).

*Mood measure.* To control for preexisting mood, we asked participants to complete a brief measure of state PA upon arrival. This measure included four items (happy, pleased, joyful, and satisfied) derived from Diener, Emmons, Larsen, and Griffin (1985). Items were rated on a scale of 1 (*not at all*) to 7 (*a great deal*;  $\alpha = .90$ ;  $M = 4.62$ ,  $SD = 1.23$ ).

*Mood induction.* Participants in the positive mood condition were asked to read a brief story about a lost child being found by a passerby and reunited with her parents. Participants were told to put themselves in the role of the “hero” who rescues the child and write for 3 min about their feelings regarding the story (adapted from Tice, Bratslavsky, & Baumeister, 2001). Participants assigned to the neutral mood condition were asked to read a story about a person walking through the downtown area of the town in which they attend college and then to write for 3 min about the sights they saw.<sup>2</sup>

*UFO and ghost videos.* Four short clips of videos, two purportedly of UFOs and two purportedly of ghost sightings, were

<sup>2</sup> Although no appropriate mood manipulation check was included in this study, this manipulation has been shown to induce positive mood (Tice, Bratslavsky, & Baumeister, 2001). Additionally, in an independent sample ( $N = 65$ ), participants were randomly assigned to each condition and later completed measures of PA. The predicted difference did emerge,  $t(63) = 3.03$ ,  $p < .01$ , with those in the positive mood induction condition showing higher PA than those in the neutral condition (5.38 vs. 4.30).

presented. Video clips were taken from public domain sites on the Internet. Several videos were pretested, and four were selected on the basis of how authentic the raters considered the video to be. Average length of the clips was 17 s. Participants were told they were about to view videos of "alleged paranormal activity." After each video clip was presented, participants were asked to rate the videos on various dimensions via the following questions: "To what extent do you believe the author's claim that this is a video of a UFO (or ghost)?" "How excited would you be if you were at the location while the video was being shot?" "How emotional would you be if you were at the location while the video was being shot?" and "How meaningful would it be if you were at the location while the video was being shot?" Items were scored on a scale of 1 (*not at all*) to 7 (*very much*). These items served as the dependent variables for this study.

### Procedure

Participants were randomly assigned to either the positive mood condition or the neutral mood condition. Participants first completed the state PA measure and then read the brief story about either a lost child reunited with her parents (positive condition) or about a person taking a walk around town (neutral condition). Participants then wrote for 3 min about their thoughts and feelings regarding the story (positive condition) or the sights they may have seen on the walk around town (neutral condition) before viewing and rating the four UFO or ghost video clips.

## Results

### Preliminary Analyses

Table 1 shows the correlations and descriptive statistics for the primary measures in Study 1. As indicated by the reliabilities reported in Table 1, each of the dependent variables showed strong agreement across the videos. Note that although the videos contained UFOs or ghosts, ratings for these quite different paranormal phenomena were highly correlated, suggesting that they tap into a common tendency. We created a composite measure for each variable by averaging the scores across the videos.<sup>3</sup> As can be seen in Table 1, FI was positively related to a participant's prediction of being more emotional had he or she been at the scene of the event but was not related to the other dependent measures. NC was negatively related to the emotional rating. Also, reported believability of the videos was positively related to a participant's prediction of being more excited and more emotional had he or she been at the scene of the event and to a participant's report of finding the experience more meaningful.

### Experientiality, PA, and Belief

To examine the effects of FI and PA on the video ratings, we computed four hierarchical regression equations. For all equations, FI scores were converted to mean deviation scores to represent the main effect of intuitive processing; condition (0 = *neutral*, 1 = *positive*) was used to represent the main effect of mood; and the product of these variables was used as the interaction term (following Aiken & West, 1991). The first equation, which is shown in Table 2, examined whether FI and PA interacted to predict the belief that the videos were authentic.<sup>4</sup> The premeasure of state PA

Table 1  
*Descriptive Statistics, Reliabilities, and Correlations Among Measures, Study 1*

	1	2	3	4	5	6
1. FI	.88	-.16	.04	.01	.20*	.08
2. NC		.84	.11	.04	-.21*	-.09
Video ratings						
3. Believable			.80	.30**	.39**	.42**
4. Excited				.82	.58**	.68**
5. Emotional					.83	.61**
6. Meaningful						.85
<i>M</i>	4.57	4.88	3.14	3.63	3.77	3.20
<i>SD</i>	0.75	0.72	1.60	1.60	1.61	1.62

Note.  $N = 121$ . Coefficients on the diagonal are alpha reliabilities. FI = Faith in Intuition score; NC = Need for Cognition score.

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

was entered on the first step as a control variable and did not contribute to a significant change in  $R^2$ . The main effects entered on the second step did not contribute to a significant change in  $R^2$ ; however, the two-way interaction, entered on the third step, did contribute to a significant change in  $R^2$ . As predicted, the FI  $\times$  Condition interaction was significant, indicating that individuals in the positive mood condition who were high in FI were more likely to believe that the paranormal activity in the videos was real (for the positive mood condition:  $\beta = .32$ ; for the neutral mood condition:  $\beta = -.18$ ). Figure 1 shows the means generated for those high and low (one  $SD$  above and below the mean) in FI within the mood-induction conditions. As can be seen in Figure 1, the pattern of results conformed to expectations. For those low in FI, mood had little influence on the perceptions of the videos. However, for those high in FI, positive mood was related to enhanced belief in the phenomena portrayed in the videos.

The same hierarchical regression was computed for the dependent variable of perceived meaningfulness of the experience depicted in the videos. The control variable of PA was entered on the first step but did not contribute to a significant change in  $R^2$  ( $R^2_{\text{change}} = .002$ ,  $p = .66$ ). The main effects of condition and FI were entered on the second step but, again, did not contribute to a significant change in  $R^2$  ( $R^2_{\text{change}} = .02$ ,  $p = .43$ ). The two-way interaction ( $\beta = .32$ ,  $p = .02$ ) was entered on the third step and, as predicted, did contribute to a significant change in  $R^2$  ( $R^2 = .064$ ;  $R^2_{\text{change}} = .05$ ,  $p = .02$ ). As predicted (and following the same pattern for how real the videos seemed), individuals who were in the positive mood condition and high in FI were more likely to report the experience as meaningful (for the positive mood condition:  $\beta = .30$ ; for the neutral mood condition:  $\beta = -.13$ ). Figure 2 shows the generated means for those high and low in FI for each mood condition. Once again, the patterns (shown in Figure 2) conformed to predictions. Seeing ambiguous stimuli that might be UFOs or ghosts was rated as a more meaningful experience.

<sup>3</sup> Analyses revealed no main effects or interactions with sex in this study. Thus, all analyses collapse over sex.

<sup>4</sup> We dropped 4 participants from this hierarchical regression because their data were more than two standard deviations away from the mean on the dependent variable.

Table 2  
*Hierarchical Regression Predicting Believability of Videos as a Function of Manipulated Mood and Faith in Intuition, Study 1*

Variables entered on step	B	$\beta$
Constant	3.54	
Covariate ( $R^2_{\text{change}} = .001, ns$ )		
Pretest PA	-0.03	-.02
Main effects ( $R^2_{\text{change}} = .023, ns$ )		
Condition	-0.46	-.15
Faith in intuition	-0.57	-.27*
2-Way interactions ( $R^2_{\text{change}} = .08, p < .01$ )		
Condition $\times$ Faith in Intuition	1.19	.40**

Note. Multiple  $R = .32$ ,  $R^2 = .10$ ,  $F(4, 116) = 3.29$ ,  $p = .01$ ; condition was coded: 0 = neutral mood, 1 = positive mood. PA = state positive affect.

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

rience by those who were both high in FI and were experiencing positive mood.

Results for the other two dependent measures were essentially the same as those shown in Figures 1 and 2. The same significant FI  $\times$  Condition interaction emerged in the other two hierarchical regression analyses positively predicting how excited the individual would be if he or she were at the location while the video was being shot (interaction  $\beta = .43$ ,  $p = .001$ ) and how emotional the individual would be if he or she were at the location while the video was being shot (interaction  $\beta = .27$ ,  $p = .04$ ). Thus, the results of all four analyses converge to strongly suggest that individuals in a positive mood who are also high in experiential processing tended to be more believing of the video content and generally more engaged in the videos themselves.

### Rationality, PA, and Belief

We conducted analyses examining the potential role of rationality in emergence of belief using the same dependent variables as in the previous analyses. Again, the premeasure of state PA was entered in the first step of the analyses as a control variable. The main effects of NC and condition (0 = neutral, 1 = positive) were entered on the second step, and the product of these two variables was entered on the third step. The NC  $\times$  Condition interaction did not predict the believability of the videos ( $p = .79$ ), how excited ( $p = .50$ ) or emotional ( $p = .39$ ) the individual would be, or how

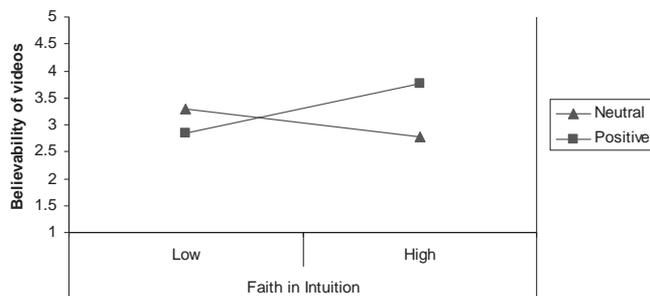


Figure 1. Believability of unidentified flying object or ghost videos as a function of Faith in Intuition score and mood induction, Study 1.

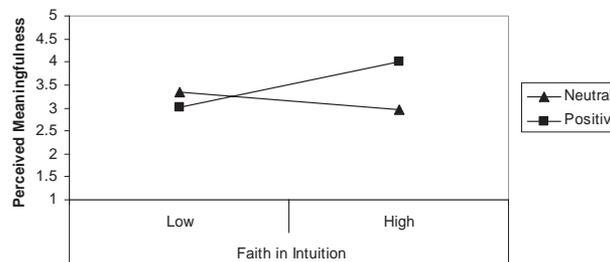


Figure 2. Perceived meaningfulness of unidentified flying object or ghost videos as a function of Faith in Intuition score and mood induction, Study 1.

meaningful ( $p = .57$ ) the experience would be to the individual if he or she were at the location while the video was being shot.

### Discussion

Study 1 adds to our knowledge of the relations of FI to paranormal beliefs because it moves beyond self-report measures of belief toward belief occurring in a more spontaneous context. The tendency to interpret an experience as a meaningful instance of paranormal phenomena may play a role in the development of longer standing beliefs. Paranormal beliefs are certainly one commonly recognized aspect of nonrational processes, but even spontaneous beliefs require some sort of self-conscious report in order to be measured. Does the same pattern hold for more behavioral measures?

To more fully explore the proposed relevance of PA to the promotion of experiential processing in another more experiential domain than has previously been investigated, we examined in Study 2 state PA and its interaction with FI in predicting susceptibility to sympathetic magic. In this study, we focused not on specific self-conscious paranormal beliefs but on behaviors relevant to the primitive associations described by the laws of sympathetic magic. In particular, we focused on the operation of the law of similarity as a function of PA and FI.

### Study 2

In this study, participants completed measures of FI, state measures of PA, and a task designed to activate sympathetic magic, in particular the law of similarity (i.e., the notion that the image of an object shares an essential relationship with the object itself). The task that we used in this study was throwing darts at a picture of a baby. We first predicted that we would see evidence of similarity interfering with task performance. Specifically, we predicted that participants would have difficulty hitting a picture of a baby with darts. Once we examined the effects of sympathetic magic on this task, we predicted that we would find a significant two-way interaction such that sympathetic magic results would obtain most particularly for those high on both PA and experientiality.

### Method

#### Participants

Participants in this study were 208 (164 women, 44 men) undergraduate psychology students who participated to fulfill re-

search requirements in psychology courses (mean age = 19.69 years,  $SD = 1.39$ ). Participants were mostly European American (87%) with represented ethnicities including Latino American (5%), Asian American (3%), and African American (5%).

### Procedure

Upon arrival in the laboratory, participants were escorted into a small seminar room where they completed a packet of questionnaires. The questionnaire packet included the main measures of interest in this study, the REI (FI:  $M = 3.40$ ,  $SD = .39$ ; NC:  $M = 3.65$ ,  $SD = .44$ ) as well as a variety of filler questionnaires. Upon completion of the packet, participants were taken one at a time to other rooms where the rest of the study activities took place. Prior to completing the task, participants completed a brief mood measure in which they described how much they were feeling each of the mood descriptors at that moment. The measure included five positive affect descriptors, including “happy,” “pleased,” “enjoyment/fun,” “satisfied,” and “excited.” The PA measure materials ( $M = 3.83$ ,  $SD = 1.38$ ,  $\alpha = .90$ , prior to throwing darts) was completed while the experimenter prepared the task.

Participants were led to a room in which there was a dart board hanging on the wall. They were told that this part of the study concerned manual dexterity at common tasks and that they would be asked to throw six darts at the dartboard and would be paid a quarter for each dart they successfully landed on the bull’s eye. At this point, participants were given six practice throws. They were then told that to make the task more interesting, they would be throwing the darts at different shapes. For all participants, the first shape was a face-sized circle drawn with black ink. The face-shaped circles were tacked (at the corners) to the dart board over the bull’s eye. Participants then threw six darts and were paid a quarter for each one that hit the face-shaped circle. After the participants completed these throws, the experimenter tacked a second “shape” to the dartboard, this time a photograph of a baby; the photograph was the same size as the face-shaped circle used for practice. Participants were again paid a quarter for each of the six darts that hit the baby’s face. Hits for both the face-shaped circle and the baby picture were recorded by the experimenter, who was blind to questionnaire scores as well as to the hypotheses of the study.

## Results

### Preliminary Analyses: The Law of Similarity

Recall that participants had thrown darts at a face-shaped circle and then had thrown darts at a picture of a baby. We predicted that sympathetic magic would lead to participants’ having more difficulty in hitting the baby’s picture as the target because of the law of similarity. Indeed, there was a significant difference between hits for the face shaped target vs. the photograph of the baby, paired  $t(206) = 3.00$ ,  $p < .004$ , with the circle being hit significantly more often than the baby’s picture ( $M = 1.48$  vs.  $0.87$ ). This effect is somewhat remarkable, running counter to the practice effects one might expect. Given that throwing darts at a picture of a baby did conform to the law of similarity, we then turned to examining whether experiential processing and PA played a role in this effect.<sup>5</sup>

### Dart Accuracy as a Function of Experientiality and PA

To examine performance as a function of the variables of interest, we first calculated change in dart hits from the practice circle to the picture of a baby. An examination of the bivariate correlations among the variables of interest revealed that there were no systematic relations among them (i.e., the drop in dart hits was not related to intuition or PA, and these predictor variables were essentially independent of each other as well).

In order to examine predictions, we regressed the difference score on (centered) PA, FI and their interaction.<sup>6</sup> Results are shown in Table 3 and Figure 3. Main effects were entered on the first step, contributing nonsignificantly to the equation. The two-way interaction was entered on the second step, revealing a significant PA  $\times$  Intuitive Processing interaction. Figure 3 shows that the generated means conformed to predictions—individuals high in both PA and FI showed the highest decrease in performance and therefore the highest level of sympathetic magic.<sup>7</sup>

### Dart Accuracy as a Function of Rationality and PA

To test the alternative hypothesis that PA simply enhanced the likelihood of one’s dominant response, we examined the same dependent measure as a function of NC and PA. This equation revealed no significant main effects and, more important, no interaction. Apparently, with regard to this magical thinking task, rationality did not play a role in mediating accuracy. An equation regressing dart performance on both NC and FI (along with the other predictors) produced results that were parallel to those for FI alone.

<sup>5</sup> Gender effects were examined in Study 2. No main effects or interactions were found for gender in this study, though the low number of men may have prevented us from detecting the effects of gender.

<sup>6</sup> We also examined these effects with analyses of residualized performance rather than a difference score. We computed a hierarchical regression equation with hits as function of the target (0 = *face-shaped circle* vs. 1 = *photograph of a baby*), FI and PA (centered), and their interactions. In addition to the main effect for target ( $\beta = -.15$ ,  $p < .04$ ) and in accord with predictions, a significant Target  $\times$  PA  $\times$  FI interaction emerged ( $\beta = .22$ ,  $p < .04$ ).

<sup>7</sup> Results of Study 2 support the notion that PA and experientiality interact to predict susceptibility to sympathetic magic; however, it might be noted that throwing darts at a picture of a baby could be viewed as an activity that would influence mood itself. Anecdotally, the most common observed reaction to the task of throwing darts at a picture of a baby tended to be nervous giggling, which might indicate that the activity itself changed mood in an important way. To address the possibility that the mood effects of throwing darts at a picture of a baby would influence accuracy, we conducted a replication study to examine the PA  $\times$  FI interaction in a sample of participants ( $N = 132$ ) who completed the measure of PA immediately after the dart throwing. On Step 1, the main effects for the centered variables of post-PA and FI were entered. On Step 2, the interaction term of post-PA  $\times$  FI was entered. There was a significant change in  $R^2$  at Step 2 ( $R^2 = .05$ ,  $R^2_{\text{change}} = .03$ ,  $p = .035$ , one tailed), and a significant PA  $\times$  FI interaction emerged ( $\beta = .18$ ,  $p = .035$ ). Once again, in the absence of main effects, we found the predicted interaction, suggesting that PA, whether measured prior to or after the dart exercise, moderated the effect of FI on dart accuracy.

Table 3  
Regression Equation Predicting Dart Accuracy for Picture of Baby as Target as a Function of Positive Affect and Faith in Intuition, Study 2

Variables entered on step	B	SE B	$\beta$
Main effects ( $R^2_{\text{change}} = .02$ )			
Positive affect	0.10	.12	.11
Faith in intuition	0.34	.32	.11
Interaction ( $R^2_{\text{change}} = .05^*$ )			
Positive Affect $\times$ Faith in Intuition	0.50	.19	.23*
Constant	-0.14		

Note. For the equation, multiple  $R = .25$ ,  $F(3, 124) = 2.68$ ,  $p = .05$ . Dependent measure = drop in accuracy when target was a baby versus a face-sized circle.

\*  $p < .05$ .

### Discussion

These results support the hypothesis that the experiential system can help to explain susceptibility to sympathetic magic, particularly when a person is high in PA. No main effects for mood or FI were observed; rather PA was related to enhanced susceptibility to sympathetic magic only for those high on FI. Notably, Study 2 relied on naturally occurring mood. To examine the potentially causal role of PA in these effects, we manipulated mood in Study 3 to determine the relation of experientiality to susceptibility to another aspect of sympathetic magic, the law of contagion.

### Study 3

The law of contagion means that if two objects come into contact, they may be viewed as exchanging essential elements. The law of contagion has been shown to hold specifically for negative associations (e.g., Rozin et al., 1986). Contagion has previously been shown to occur when students were hesitant to drink from a glass that had come into contact with a (sterilized) cockroach or to try on a sweater previously worn by Adolf Hitler (Rozin et al., 1986; Rozin, Nemeroff, Wane, & Sherrod, 1989).

Study 3 focused on the law of contagion in two ways. First, we examined the willingness of individuals to sit in close proximity to someone who had come into contact with excrement. Second, we examined self-reported liking of that individual. Corroborating popular belief, research has shown that feces elicits feelings of disgust (see Rozin & Fallon, 1987; Rozin, Haidt, & McCauley, 2000, for review) and may have social implications as well (e.g., reminding us of our creaturely nature, Goldenberg et al., 2001, and leading to devaluations of occupational status, van Dongen, 2001). The aversive qualities of excrement have also been previously shown to activate sympathetic magic in a study by Rozin et al. (1986) showing that many participants were reluctant to eat chocolate fudge that has been molded to resemble dog feces. Given these powerful negative associations with feces, we predicted that individuals high in experientiality and PA would distance themselves from a partner who had stepped in excrement and would report liking the person less.

These predictions were notable because they run counter to previous findings showing positive associations between both experientiality and PA and sociability. Experientiality has been

shown to relate positively to extraversion (Pacini & Epstein, 1999). Furthermore, the strong relation between PA and sociability is well established (Csikszentmihalyi & Wong, 1991; Headey & Wearing, 1989; Lucas, Diener, Grob, Suh, & Shao, 2000; Mroczek & Spiro, 2005). Given that both PA and FI are positively related to liking people, a reasonable prediction (although the direct opposite of ours) would be that those high on PA and high in FI should like their partners the most. Thus, in this study, we predicted that when an individual was tainted by contact with excrement, we would see an unusual (and perhaps counterintuitive) effect—that happy, intuitive people would show a tendency to distance themselves from the person and report liking the partner less.

### Method

#### Participants

Eighty undergraduates enrolled in psychology classes participated to receive course credit. The sample was predominantly female (59) and mostly European American (76%), with other ethnicities represented including African American (6%), Hispanic American (7%), "other" (2%), and 9% not reporting their ethnic background. Ages ranged from 19 to 33 years, with a mean of 20.50 ( $SD = 1.8$ ).

#### Materials

Participants completed the REI in a packet of questionnaires prior to coming to the laboratory. For FI,  $M = 4.77$  ( $SD = .76$ ). For NC,  $M = 4.80$  ( $SD = .79$ ).

#### Procedures

Upon arrival in the laboratory, participants completed a few questionnaires, including a mood measure identical to the measure used in Study 1 ( $M = 4.44$ ,  $SD = 1.00$ ), and then they were randomly assigned to one of two mood induction conditions (positive or neutral).

**Mood induction.** To induce mood, we asked the participants to use headphones attached to a computer to listen to a 4.5-min clip of music. Those randomly assigned to the positive mood induction condition listened to J. S. Bach's "Brandenburg Concerto No. 3" (Hubert Laws, 2002, track 5). The neutral mood condition listened to "Common Tones in Simple Time" by John Adams (1990, track 5). These particular music clips were selected because they have been used successfully in previous research to induce positive and neutral moods, respectively (Wenzlaff, Wegner, & Klein, 1991). Embedded in a list of questions about various qualities of the

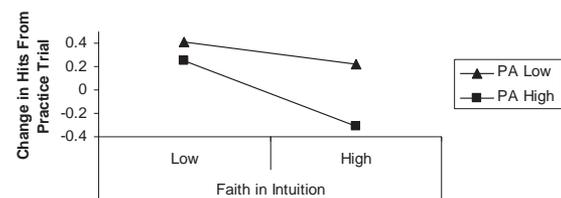


Figure 3. Change in dart hits with baby picture as target as a function of Faith in Intuition score and positive affect (PA), Study 2.

musical selection participants had heard was one manipulation check item, "How happy or sad did this music make you feel?" Participants were asked to indicate their answer on a scale from 1 (*very sad*) to 7 (*very happy*; grand  $M = 4.68$ ,  $SD = 1.10$ ).

*Social interaction.* After the mood induction procedure, participants received a computer message, informing them that they would next be interacting with another participant. They were told that in order to become acquainted before their face-to-face meeting, they would communicate first via computer. Participants were asked to complete a few brief demographic questions, including age, hometown, and academic major. Then, they were asked to write a description of an interesting or unusual fact about their lives that had occurred during the past 24 hr. When they had completed their unusual fact, participants pressed *Send* and then saw a screen message that said, "Please wait while your partner's message is being retrieved." The screen featured an icon of two computers with a pulsating connection running between them. For all participants, the message from the partner listed the target's age as 19; hometown as Springfield (no state given); and major as undecided. (Gender was not mentioned in the partner description). The partner's interesting or unusual fact read as follows:

Well, my day was pretty normal until a few hours ago when I had to use the restroom after my class in GCB [General Classroom Building]. I wasn't paying much attention when I opened the stall door. As soon I walked into the stall, I realized I had stepped in something and the toilet had overflowed. When I looked down, I realized there was some poop on the floor and on my shoe. Needless to say, I had to go home and change my shoes.<sup>8</sup>

After reading the description, participants were escorted into an empty room with two folding chairs stacked against the wall. The experimenter then told the participants "I am going to go get your partner; would you mind setting up the chairs for your interaction? Thanks." The experimenter returned and reported that the partner had had to leave so the participant would not be engaging in the interaction, after all. The participant was then taken to a final room where he or she completed measures described below.

After the participant had left the room, two research assistants (blind to the study hypotheses, mood condition, and personality scores) then measured the chairs at two points—the distance between each of the front legs of the chairs. These measures were highly correlated ( $r = .75$ ). Thus, the measurements were averaged to create a measure of proximity ( $M = 87.60$  cm,  $SD = 19$  cm). Problems in recording the measurements for 7 participants required that they be dropped from consideration for this variable.

*Partner ratings.* Finally, participants were asked to rate aspects of the person they would have interacted with in the previous exercise. All ratings were made on a scale from 1 (*not at all*) to 7 (*extremely*). These ratings were done for two reasons: first, to gauge interest in meeting the person, and second, to confirm that mentioning excrement did not render the person utterly abnormal to participants. Partner liking was, then, based on a total of four items: "How much did you like your partner?" "Was the person likeable?" "Would you interact with this person again?" and "How much did you want to interact with him or her?" These items were highly intercorrelated (mean  $r = .67$ ), so they were aggregated into a composite liking variable ( $M = 4.53$ ,  $SD = .99$ ;  $\alpha = .89$ ). The normalcy item asked, "How normal was the person?" ( $M = 4.52$ ,  $SD = .93$ ). Also, embedded in a list of personality descriptors was

a question asking participants to rate how "gross" the person was ( $M = 2.55$ ,  $SD = 1.45$ ). Ten participants did not respond to the liking items, entering "N/A" or noting on the questionnaire that they had not actually met the person (supporting the notion that participants believed that the partner was real and the interaction a real possibility). Analyses of the partner ratings were based on a total of 70 participants. All participants were thoroughly debriefed in a later group setting.

## Results and Discussion

### Preliminary Analyses

First, we examined the mood item to ensure we had successfully induced a positive mood in the PA condition. An analysis of covariance was conducted to examine whether the mood induction indeed promoted positive mood. Controlling for preexisting mood ( $\beta = .07$ , *ns*), we found a significant main effect of condition on the mood check item ( $M_s = 5.88$  vs. 4.43, for positive and neutral mood respectively;  $F(1, 77) = 4.09$ ,  $p < .05$ ).

Collapsing across the mood conditions, we found no systematic relations in our examination of the bivariate correlations between FI and the variables of interest with one exception. Although FI was unrelated to chair proximity or to judgment of the partner as gross or normal, FI was related to participants who rated the partner as more likeable ( $r = .34$ ,  $p < .01$ ). NC was not related to any of these measures. It is worth noting that, in general, the partner was rated quite positively by all participants and the mean for liking was significantly greater than that for gross in both mood induction conditions (paired  $t(73)$  for the overall  $M_s = 10.12$ ,  $p < .0001$ ). Also of note is that although both chair proximity and liking were considered measures of sympathetic magic, these two

<sup>8</sup> Participants were specifically requested to give an experience that had occurred during the last 24 hr to make it seem more plausible and less odd that someone might write about stepping in feces (i.e., it would be difficult to come up with anything very interesting or unusual that had occurred during a relatively short span of time). In addition, in order to confirm that mentioning stepping in excrement did not render a person completely bizarre to participants, we pretested this message in an independent sample ( $N = 122$ ) of individuals who participated in a brief hypothetical scenario study. Participants in this sample rated their positive mood on four adjectives (happy, joyful, pleased, and enjoyment/fun) and were randomly assigned to read the message about stepping in feces or an identical passage in which a person stepped in a puddle and had to change his or her shoes. These participants were asked to imagine that they had participated in an interaction study and to rate the person on the same items used in Study 3. There were no mean differences for liking ( $M = 4.20$  vs. 4.55, for puddle vs. excrement respectively) or for how normal the person was rated ( $M = 4.75$  vs. 4.76, for puddle vs. excrement). There was a significant difference on the "gross" rating ( $M_s = 1.97$  vs. 3.32,  $t(122) = 5.60$ ,  $p < .001$ , though both ratings were relatively low on a 1–7 scale. Not unexpectedly, PA was correlated with rating the partner as more likeable and more normal, regardless of whether the person stepped in a puddle or excrement ( $\beta_s = .29$  and  $.27$ , for likeable and normal, respectively, controlling for condition). PA did not interact with condition to predict these variables. PA was unrelated to ratings of how gross the partner was rated. Thus, results for this supplemental sample suggest that contact with excrement might render a person more disgusting but not less likeable or less normal. Furthermore, they support the contention that PA would relate to increased liking of a person, regardless of whether he or she had stepped in feces.

variables were not related ( $r = -.07, ns$ ). We next turn to the main analyses concerning experientiality and manipulated mood as predictors of susceptibility to the law of contagion.

### Experientiality, PA, and Contagion

**Partner proximity.** The first dependent variable of interest was the distance between the two chairs set up by participants for their interaction with a partner who had come into contact with excrement. Recall that we predicted that individuals high in FI who were also in the positive mood condition would be least likely to sit close to the individual. We converted FI scores to mean deviation scores (following Aiken & West, 1991). The mood induction condition was coded 0 (for *neutral*) and 1 (for *positive*). We computed the interaction of these variables using their product. A hierarchical multiple regression equation, shown in Table 4, was computed. Entered on the first step was mood prior to the induction, as a control variable. Entered on the second step were the main effects of mood induction condition and FI. Neither of these steps contributed significantly to  $R^2$  (though the significant main effect of FI is apparent in Table 4). The two-way interaction did contribute significantly to the prediction of proximity. The negative beta weight for this interaction indicates that in the positive mood condition, FI was associated with the participant arranging the chairs so that he or she would be sitting farther away from the partner. Figure 4 shows the generated means for individuals low and high in FI by mood condition. Examination of Figure 4 indicates that at high levels of FI, mood was particularly important.

To probe this interaction, we computed separate regression equations for each mood condition, regressing the distance measure on FI. In the neutral condition, the unstandardized beta weight was  $-10.23$ , suggesting that for those in a neutral mood, every unit increase in FI was associated with sitting about 10 cm closer to the partner. In the positive mood condition, the unstandardized beta weight was  $6.55$ , indicating that for those in a positive mood, each unit increase in FI was associated with sitting nearly 7 cm farther away from the partner. Ratings of liking, normalcy, or how gross the partner was perceived to be were not related to proximity and did not contribute significantly to the prediction of proximity. Recall that FI is associated with extraversion, and PA is associated with sociability. Those who were high on both of these "sociable"

Table 4  
Hierarchical Regression Predicting Distance of Chairs as a Function of Manipulated Mood and Faith in Intuition, Study 3

Variables entered on step	B	$\beta$
Constant	0.116	
Covariate ( $R^2_{\text{change}} = .003, ns$ )		
Pretest PA	-0.05	-.05
Main effects ( $R^2_{\text{change}} = .05, ns$ )		
Condition	0.18	.09
Faith in intuition	-0.52	-.39*
2-Way interactions ( $R^2_{\text{change}} = .11, p < .01$ )		
Condition $\times$ Faith in Intuition	0.88	.51**

Note. Multiple  $R = .34, R^2 = .11, F(4, 67) = 2.15; p = .01$ . Condition was coded: 0 = neutral mood, 1 = positive mood. PA = state positive affect.

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

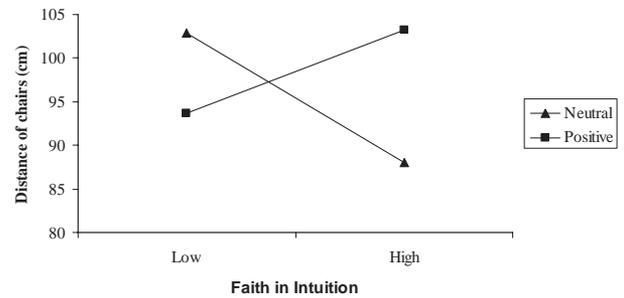


Figure 4. Proximity to partner as a function of Faith in Intuition score and positive affect as measured by distance placed between participants' and partners' chairs, Study 3.

variables sat farthest from the partner who had stepped in excrement.

**Partner liking.** Finally, we examined the ratings of partner liking as a function of pretest mood, FI, condition, and the interaction of condition and FI. On the first step, pretest PA contributed significantly and positively to liking ( $R^2_{\text{change}} = .14, p = .002, \beta = .37$ , indicating that pretest PA was related to increased liking). On the second step, main effects were entered but did not significantly contribute to the prediction of liking ( $R^2_{\text{change}} = .03, ns$ ). The two-way interaction contributed significantly,  $R^2_{\text{change}} = .05, p = .03; \beta = -.35, p = .02$ ; multiple  $R^2$  for the equation = .22,  $F(4, 66) = 4.57, p = .002$ . Decomposing this interaction by condition we found that in the neutral condition, FI was actually associated with high partner liking ( $\beta = .39$ ). In the positive condition, the beta was negative ( $\beta = -.24$ ). The generated means for this equation are shown in Figure 5.

The pattern of results in Figure 5 is intriguing. For those low on FI, only those in the positive condition showed a high degree of liking their partner, which is likely due to the fact that happy people tend to be more sociable and to like others more than unhappy people do (Lyubomirsky, King, & Diener, 2005). It is also notable that for those people in a neutral mood, individuals high on FI demonstrated a greater degree of liking their partner than those low in FI. Because FI is positively related to extraversion (Pacini & Epstein, 1999), it is understandable that those high in FI are predisposed to like their partners. As noted previously, a reasonable prediction might be that those high in PA and high in FI should like their partners the most. However, this was clearly not the case in this study—those high in FI assigned to the positive mood condition were among the lowest in ratings of how much they liked their partner. When it comes to liking others, contam-

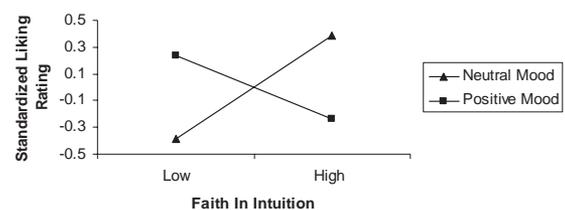


Figure 5. Liking of partner as a function of Faith in Intuition (Experientiality) score and positive affect, Study 3.

ination with excrement reverses the tendencies of happy, intuitive people.

This pattern of results was also obtained when we controlled for how “normal” participants rated their partner ( $\beta = .31$  for normalcy rating;  $\beta$  for the PA  $\times$  FI interaction =  $-.47$ , when we controlled for how normal the partner was rated). The ratings of how gross the partner was did not contribute to the prediction of liking, and the significant interaction remained ( $\beta = -.48$ ,  $p = .05$ ). These results suggest that the combination of FI and PA tended to dampen the enthusiasm of relatively sociable individuals when the partner was someone who had come into contact with excrement. Note that the lack of effects for ratings of normalcy and grossness tends to speak against a rational explanation of the effect of excrement on participants. Apparently, they “knew” the partner was not really gross or abnormal but nevertheless found the person less likeable and were less willing to sit near the person.

*Rationality, PA, and contagion.* Finally, as in the previous studies, we analyzed the main effects of NC, mood condition, and their interaction as predictors of susceptibility to sympathetic magic. Regression equations examining these possibilities revealed no significant effects.

### General Discussion

The present studies were designed to address two goals: to examine whether superstitious beliefs and sympathetic magic are relevant to the experiential system and to examine the possibility that PA might interact with the experiential system in predicting such beliefs and behaviors. In these studies, we examined the emergence of paranormal beliefs, and two forms of sympathetic magic arising from the principles of similarity and contagion. In general, results showed a consistent pattern: Experientiality (FI) was related to paranormal beliefs and sympathetic magic only when individuals were also high in PA (whether naturally occurring or induced). Rationality (NC) was related to just one of the variables of interest (the emotionality ratings in Study 1) and did not interact with mood to predict any of the outcomes. These studies are provocative because they suggest that a full accounting of the dynamics of the rational and experiential systems requires attention to mood as a factor in shifting the balance in processing systems. In this case, results suggest that PA shifts that balance toward the experiential system. We view these results as indicating the importance of both mood and processing systems in predicting spontaneous belief and behavior.

Study 1 examined belief in the existence of supernatural phenomena, specifically the emergence of belief after viewing videos. Study 1 found evidence that PA and experientiality together led to seeing becoming believing. Experientiality may predispose individuals to interpret experience in paranormal ways—to more readily explain experiences as supernatural, particularly when they are under the influence of positive mood. Previous research using self-report questionnaires of superstitious beliefs would seem to imply that individuals who are highly experiential should have been more likely to believe in the videos in general, given their predilection for paranormal beliefs (Epstein et al., 1996). However, the only systematic correlation between video responses and the measure of FI was the positive relationship with how emotional the person believed it would be to actually be there while the sighting of the UFO or ghost was taking place. This relationship

may indicate that intuitive individuals recognize that they are prone to engagement with such experiences—that they may have an intuitive sense of the kind of psychic gravity that these events have for them. It is notable that, in Study 1, rationality also related (negatively) only to the rating of how emotional the person would feel if present for the sighting. This symmetry is intriguing and suggests that emotional engagement in experiences may play a role in the capacity of these experiences to evoke responses indicative of individual differences in processing styles. This pattern of results supports the notion that paranormal beliefs are particularly relevant to the experiential system and are most likely to hold sway when the person is in a good mood. For the person who is high in FI, a potential UFO or ghost sighting emerges as an exciting, emotional event, and this emotional response heightens belief in apparently paranormal phenomenon. In contrast, rationality is unrelated to such beliefs, regardless of mood, perhaps because rational individuals are less emotionally engaged in such experiences from the start.

Of importance, the main effect step in our regression analyses never contributed to a significant increment in the prediction of paranormal belief (in Study 1) nor to indications of sympathetic magic (in Studies 2 and 3 although the individual beta weights for FI were significant in some analyses). Instead, intuition related significantly to belief in the videos as well as to behavioral indications of sympathetic magic only in conjunction with (induced or naturally occurring) positive mood. Past research has shown that self-reported superstitious and unusual beliefs do relate to FI (Epstein et al., 1996). Descriptions of the operation of sympathetic magic certainly resonate with Epstein’s (1994) conceptualization of the experiential system, yet no main effects for experientiality emerged in the present studies. Perhaps such straightforward effects ought to be expected only when the superstitious beliefs are part of the conscious self-concept. In all of the studies presented here, we incorporated more spontaneous measures that differ from longstanding beliefs. Indeed, in past research, main effects for the experiential system have been rare (e.g., Pacini & Epstein, 1999). It is notable that in an effort to explain a main effect for rationality but the lack of a main effect for experientiality in a ratio bias paradigm task, Pacini and Epstein (1999) drew the conclusion that experiential tendencies are so fundamental in nature that everyone experiences them to some degree, and therefore an important function of the rational system is to control the maladaptive tendencies of the experiential system. Placing our results in the context of the mood and cognition literature, we might suggest that PA could be a way to override the influence of the rational system by signaling that the rational system is not needed for the task at hand.

The results of Studies 2 and 3 are notable because they are the first to show that reliable individual difference variables explain differential susceptibility to sympathetic magic. The original studies (e.g., Rozin et al., 1986; 1990) on sympathetic magic effects have garnered a well-earned status in social psychology as landmarks. In the present investigation, we conceptually replicated these sympathetic magic effects in a dart-throwing paradigm and a proximity measure. Although the strengths of the effect varied, in every case, engaging in sympathetic magic was associated with high levels of PA and experientiality. These studies support the wisdom of looking for reliable individual differences in “human universals” (Kosslyn et al, 2002). Although the effects of sympa-

thetic magic are thought to be rooted in primitive mechanisms that are part of our common heritage as members of the human race, the variation that exists in such phenomena can be explored to illuminate the processes that contribute to their persistence and power.

What is it that PA is doing to enhance the effects of FI with regard to paranormal beliefs and sympathetic magic? It might be that PA gives the go-ahead to act on what everyone else is (also) thinking but not doing. That is, perhaps everyone in these situations, on some level, is thinking, "It's just not right to throw darts at a baby," but those in a good mood are more likely to act on this mental experience. Of course, experientiality is a crucial component of this effect. PA only led to enhanced susceptibility to sympathetic magic in those who also scored high on experientiality. Bless's (2001) description of the effects of PA on the use of general knowledge structures applies well here. We suggest that experientiality enhances the likelihood that the person experiences throwing darts at a picture of a baby as wrong (i.e., that experientiality informs the content of the knowledge structure), whereas PA sends the message that trusting that gut instinct is the right thing to do. Future research might include such methods as thought listing in these contexts to test the possibility that experientiality relates to the prevalence of thoughts related to sympathetic magic, whereas PA may relate to putting those thoughts into action.

For Studies 2 and 3, one might question how magical our attempts to manipulate sympathetic magic were. In Study 2, participants were asked to throw darts at a picture of a baby. Although we did find that hitting the picture of the baby was clearly more difficult than hitting a practice circle, it is notable that throwing darts at a picture of a baby may be viewed as socially undesirable. Thus, some higher level psychological process (fear of being judged as heartless, for instance) might have played a role in performance. However, even this fear is based on a nonrational notion—that somehow hitting a picture of a baby with darts "means" something in reality. Indeed, the degree to which a person found hitting the picture of the baby with darts to be reprehensible seems to fit the very definition of the law of similarity—the baseless concern that a picture of an object shares an essential relationship with the object itself.

In Study 3, participants were asked to set up chairs for an interaction with someone who had come into contact with excrement. In the absence of a control condition in which a person had not come into contact with excrement, the notion that our effects were driven by magic is not empirically discernible. However, given the relations of PA to sociability and of experientiality to extraversion, it seems difficult to imagine a theoretical reason, aside from the fact that the partner had stepped in feces, to explain the dampened enthusiasm for happy, intuitive people for interacting with or sitting close to that person. Clearly, even if these effects are less than magical, they do show a tendency toward nonrational behaviors.

Another issue that warrants some consideration is the extent to which nonrational beliefs and behaviors tap into a unified conceptual domain. How similar are the beliefs in UFOs, ghosts, and indications of sympathetic magic? The consistency of responses across videos for UFOs and ghosts does suggest that these aspects of the domain cohere. In Study 3, no such evidence emerged. Further identification and delineation of the domain of nonrational beliefs and behaviors remain for future research.

### *Implications for Research on PA and Cognitive Processes*

CEST is a provocative theory that could bring a unifying framework to the vast literature on mood and cognition. The mood and cognition literature provides a plethora of interesting findings that do not always cohere. For example, PA leads to reliance on heuristics, yet also elicits creative associations; PA leads to the endorsement of social stereotypes, yet also leads to adoption of a broadened perspective. These findings are difficult to reconcile without a unifying conceptual framework from which to draw a larger understanding. Rather than a set of disparate findings for PA, incorporating the notion that PA could promote reliance on the experiential system would suggest that these findings all involve the activation of a whole processing system (see Bless, 2001, for an alternative explanation).

If being in a positive mood leads to reliance on the experiential system, then this effect may, in part, account for the previously documented effects of PA on cognitive and behavioral processes. That is, the activation of the experiential system may not only mediate the effects of PA on cognitive processes but also may provide the theoretical framework needed to reconcile the disparate findings concerning the influence of PA on cognitive processes. Moreover, researchers on mood and cognitive processes may have overlooked an important individual characteristic (i.e., dispositional levels in the experiential system) that may moderate the influence of PA on cognitive processes.

Additionally, CEST might provide additional avenues for study of the effects of PA on cognitive processing. Some aspects of the experiential system as they might relate to PA, for example, have not been studied. Epstein (1994) described the experiential system as being encoded as narratives, concrete images, and metaphors as well as leading to the experience of and reliance on vibes. Future research might seek to develop operationalizations of these aspects of the experiential system to examine the validity of the provocative claims of CEST and, of course, in light of the current findings, the potential role of affect in their operations.

### *Implications for the Psychology of Belief and the Nonrational*

The present results also have implications for psychology's approach to beliefs in a more general way. Rather than examining nonscientific beliefs as exceptions to the logical or rational processes thought to underlie human decision making, CEST allows for an examination of these beliefs as a product of the experiential system, which is present (to varying degrees) in each person. It is particularly notable that in none of the studies reported here was rationality strongly implicated in paranormal beliefs or sympathetic magic. Low levels of rationality did not relate to heightened paranormal belief or susceptibility to sympathetic magic. High levels of rationality were similarly independent of these outcomes. This substantial lack of findings regarding rationality lends further evidence that the two systems of CEST work independently. What matters in the prediction of spontaneous paranormal beliefs and magical behavior is intuition and not rationality.

These nonrational beliefs, rather than being an exception to otherwise ideal human reasoning, may best be understood as deriving from a side of human personality that functions implicitly and automatically and that grasps the world through a meaningful

(if illogical) story. The rational system is largely unrelated to such beliefs, suggesting that these beliefs ought to be difficult to change. These results further suggest that attempts to combat erroneous or faulty beliefs with logic and rational argument are likely to be ineffective, because such beliefs derive from an independent system that is not likely to be influenced by such a strategy.

Our conclusions might spur psychologists to turn their attention not toward wiping out or dismissing such beliefs but rather toward exploring the ways that these beliefs contribute to a sense of meaning and purpose for those who hold them. Given the high prevalence of supernatural beliefs of some sort (Newport & Strausberg, 2001), a framework that considers such belief as common rather than an exception is essential. Religious faith, which clearly stems from the capacity for belief, is, after all, a strong correlate of well-being (e.g., Myers, 1992; Steger & Frazier, 2005). Of interest would be research examining whether the experiential system also relates to mainstream religious faith and observances—as individuals participate in the expanded narrative of religious life by attending services and observing holidays. It may be that the experiential system performs an important function in allowing people to surrender to faith and that the PA that emerges from participation in faith communities may reinforce belief itself. In addition, we might begin to explore the role of intuitive processes in dysfunctional belief systems (e.g., beliefs in objectively harmful cults, beliefs in religious leaders bent on taking economic advantage of their followers) and acknowledge the role of the experiential system, as well as the role of PA, in the maintenance of these beliefs. These results suggest that behaviors indicative of human irrationality may arise from an admixture of experiential processing and positive mood—“irrationality armed with passion,” to return to our opening quote.

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