

## SUGGESTION, BELIEF IN THE PARANORMAL, PRONENESS TO REALITY TESTING DEFICITS AND PERCEPTION OF AN ALLEGEDLY HAUNTED BUILDING

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**ABSTRACT:** The present study investigated whether suggestion, level of belief in the paranormal, and proneness to reality testing deficits influenced participants' expectation of haunt-related phenomena. Participants watched a short slideshow outlining the history of a fictitious, abandoned hospital. Suggestion occurred in the final sentence of the presentation narration and stated that the hospital administrative building had either a history of ghostly activity or structural problems. Following the slideshow, to ensure participants attended to the suggestion, they read a transcript of the presentation narration. The experimenter then informed participants that they would see the internal features of the administrative building via a soundless, black and white video tour. On conclusion of the filmed sequence participants completed measures assessing environmental perceptions and phenomena, haunt-related opinions and feelings, belief in the paranormal (Revised Paranormal Belief Scale), and proneness to reality testing deficits (Inventory of Personality Organization). Within the experimental phase, only level of paranormal belief and proneness to reality testing deficits affected haunt-related ratings; suggestion had no effect. Second phase inquiry, using path analysis, revealed that haunting history (the extent to which participants believed the administrative building had a history of being haunted) mediated the relationship between paranormal belief and expectation of haunt-related phenomena.

*Keywords:* suggestion, paranormal belief, reality testing, haunting 

Definitions of ghosts vary over time and across cultures (Houran & Lange, 2001). The term “ghost” refers traditionally to the notion that spirits of the dead (human and animal) persist after corporeal death and exert an influence on the physical world. More precisely, as defined by Laythe and Owen (2012), haunting experiences denote internally perceived phenomena (e.g., sensations of a presence) or externally witnessed phenomena (e.g., objects moving), ascribed to spirit activity.

Belief in and experience of ghosts persists within modern society. Indeed, opinion polls report consistently that a substantial proportion of the general population believe in the existence of ghosts (Williams, Ventola, & Wilson, 2010). Illustratively, a 2005 Gallup survey, incorporating telephone interviews with 1,002 American adults, found that 32% of interviewees believed that ghosts (spirits of dead people) could return to certain places/situations; 37% considered houses could be haunted (Moore, 2005). These figures are commensurate with an earlier 2001 Gallup survey (Newport & Strausberg, 2001). MORI polls evidence similar levels of endorsement in Britain. The 2007 Survey on Beliefs, comprising telephone interviews with a representative quota sample of 1,005 adults, noted that 38% of interviewees believed in ghosts and 36% claimed to have seen a ghost (MORI, 2007). These figures concur with the 1998 MORI Paranormal Survey, which found that 40% of respondents believed in ghosts and 37% reported personal experience of ghosts (MORI, 1998). The prevalence of ghost-related beliefs and relatively frequent reporting of haunting experiences indicates the socially important nature of haunting phenomena and designates ghosts/hauntings as an important research area worthy of academic consideration.

Empirical attempts to explain ghost and haunt-related perceptions centre frequently on psychological factors. One significant variable is suggestibility. Generally, research has found associations between suggestibility and belief in the paranormal (Dafinoiu, 1995) and that experimental manipulation of

verbal suggestion can influence perception and recall of paranormal phenomena. For example, Wiseman, Greening, and Smith's (2003) study of séance phenomena, using self-selected delegates attending a Fortean Times convention, observed that participants who affirmatively answered the question "Do you believe that paranormal phenomena sometimes occur during séances?" were more susceptible to verbal suggestion about a séance-consistent phenomenon, movement of a hand-bell, than nonbelievers. Participants also reported experiencing unusual phenomena often associated with "genuine" séances; about a fifth believed the staged séance contained authentic paranormal phenomena, and a significantly greater percentage of believers considered this to be the case.

Similarly, Wiseman and Greening (2005) found that verbal suggestion affected perception of alleged paranormal key bending. Participants viewed footage of a performer (professional close-up magician) and an interviewer sitting at a table containing several objects (keys, pack of cards, cutlery, etc.). The camera showed a close-up of the performer's hands as he selected the key. They then used specious psychokinetic ability to produce a bend in the stem of the key (sleight of hand produced the distortion). The performer placed the key back on the table and the videotape footage concluded with a 6-second close-up of the distorted key. In the suggestion condition, a verbal comment on the soundtrack implied that the key continued to bend. The no-suggestion condition did not include this "bending" comment. Participants in the suggestion condition were more likely to report the key continuing to bend. In addition, participants reporting bending were highly confident that their testimony was reliable and were less likely to report the fake psychic's suggestion.

Wilson and French (2008) examined whether suggestion influenced recall of a psychic reading. Participants watched a scripted video of a reading followed by a "manipulated" interview in which the sitter commented upon the accuracy of the reading. In one version, the sitter declared correctly that the psychic mentioned the name Sheila and that Sheila was their mother's name. In the other version, the sitter asserted incorrectly that the psychic stated that their mother's name was Sheila. Wilson and French (2008) found believers showed a strong tendency to misremember the manipulated section of the reading, regardless of whether they received misinformation or not. Nonbelievers tended to remember the reading more accurately if no misinformation was present; however, in the misinformation condition their memories were as distorted as those of the believers.

Collectively, research shows that verbal suggestion can influence the perception and recall of supposed paranormal phenomena, especially when the suggestion is consistent with existing paranormal beliefs. Pertinently, research indicates that suggestion may play a critical role in the reporting of haunting phenomena (O'Keefe & Parsons, 2009). For example, Lange and Houran (1997) investigated whether the suggestion that a location was haunted would be sufficient to induce poltergeist-like perceptions (e.g., sensed presence). Participants attending an indoor performance theatre took part via random allocation to either the suggestion (paranormal activity) or control (renovation) condition. Each group went on a tour in which they visited five main theatre areas and completed an experiential questionnaire assessing their psychological and physiological perceptions. More intense experiences across measures demonstrated that mere suggestion could stimulate paranormal-type experiences.

Similarly, Terhune and Smith (2006), using a psychomanteum (mirror gazing task), established that suggestion could induce apparitional experiences. In the suggestion condition, instructions specified that mirror gazing could result in anomalous sensations (including seeing an apparition); the nonsuggestion condition advised only about the possibility of experiencing unusual bodily sensations/perceptual distortions. Suggestion influenced participants' perceptions; the suggestion condition produced more reports of visual and auditory apparitions.

Research has shown suggestibility (hypnotic and imaginative) is associated with the induction of anomalous/unusual experiences (Kumar & Pekala, 2001; O'Connor, Barnier, & Cox, 2008) and the stimulation of hallucinatory experiences (McConkey & Barnier, 2004). A notable example is the White Christmas paradigm (Barber & Calverey, 1964). The White Christmas test instructs participants to close their eyes and imagine hearing the famous Bing Crosby White Christmas song. After 30 s, participants rate the intensity of their imagery. Typically, a significant percentage of participants report hearing the song clearly. Mintz and

Alpert (1972) reported that the majority of schizophrenic patients (85%) and a nontrivial minority (40%) of controls reported a clear auditory image during the test (Merckelbach & van de Ven 2001). This finding illustrates that “normal” people will readily report suggested auditory events (Barber & Calverey, 1964).

Cumulatively, research demonstrates that the presentation of haunt-related suggestions can induce and heighten haunting-related perceptions (O’Keefe & Parsons, 2009). The relationship between suggestion, paranormal belief, and the reporting of unusual (ghost-related) experiences, however, is not a simple one and results across studies have been inconsistent. A classic illustration of this is the large-scale study conducted by Wiseman, Watt, Greening, Stevens, and O’Keefe (2002). They found that the frequency with which participants reported experiencing unusual phenomena in the past and attributed their experiences to ghosts varied as a function of level of belief. Believers reported experiencing seven of the eight unusual phenomena (feelings, sense of presence, sounds, changes in temperature, smells, sights and tastes). The only phenomenon not reported more frequently by believers was an unusual sense of dizziness. Believers were also significantly more likely to attribute their experiences to ghosts. Similarly, when walking around Hampton Court Palace, an allegedly haunted location, believers noted more haunt-related experiences and demonstrated a greater tendency to attribute these experiences to a ghost.

Wiseman et al. (2002) also manipulated suggestion. In the positive suggestion condition, researchers told participants that an area was associated with increased reports of unusual phenomena. Contrastingly, in the negative suggestion condition, the researchers stated that the area was not associated with unusual phenomena. Suggestion had no effect on participants’ expectations of experiencing unusual phenomena during the experiment or their tendency to attribute unusual phenomena to ghosts. In addition, the belief by suggestion interaction produced mixed results. When participants visited the allegedly haunted area, more believers reported unusual experiences in the positive suggestion condition. Generally, however, findings proved nonsignificant.

Overall, the results of haunt-related suggestion research are inconclusive and difficult to interpret. Generally, findings suggest that believers in the paranormal are particularly susceptible to suggestion and more easily deceived. However, this assumption is inconsistent with previous critical thinking research, which has failed to find consistent differences between believers and nonbelievers (Hergovich & Arendasy, 2005; Moore, Thalbourne, & Storm, 2010). In this context, philosophical bias may affect susceptibility to suggestion. Believers are prone to wrongly endorsing paranormal phenomena, whilst sceptics are inclined to deny the existence of paranormal effects. Hence, sceptics would be unlikely to detect genuine effects (if they exist).

The present study built on the work of Wiseman et al. (2002) in a number of important ways. First, to avoid problems linked to prior influence, the location used was fictitious. Real, historical locations (Hampton Court, Edinburgh Vaults, etc.) are often associated with hauntings and knowledge of this may influence participants’ perceptions (Houran, Wiseman, & Thalbourne, 2002). Secondly, the manipulated suggestion appeared consistently throughout the presentation phase. It occurred on three occasions: the end of the narrative, within the narrative text, and as part of instructions prior to producing ratings. Contrastingly, Wiseman et al.’s (2002) use of suggestion was subtle (embedded within a talk about their experiment) and stated only once. Thirdly, only the haunting condition referred to the notion of haunting. This avoided any potential confound arising from stating that the location was not haunted. Mention of haunting, regardless of valence, may influence expectations, attention, and report rates. Previous work has indicated that attentional mechanisms play an important role in haunting experiences (Houran & Lange, 1996, 2001; Terhune, Ventola, & Houran, 2007). For this reason, the present study employed a haunted vs. control (structure) manipulation.

Finally, to avoid the possible influence of external variables (magnetic fields, drafts, etc.) the current study took place in a controlled experimental setting. This ensured that participants’ experiences were similar and prevented the introduction of physical conflates (temperature fluctuation, lighting variations, magnetic, electric fields, etc.). Using a controlled, nonhaunted location avoided issues arising from individual differences in perceptual acuity/sensitivity. There is evidence to suggest that believers in the paranormal may be more reactive to perceptual stimuli generally, and specifically more sensitive to possible paranormal

effects (Houran, Hughes, Thalbourne, & Delin, 2006; Thalbourne, 2010).

A further development was the inclusion of a reality testing measure, the Inventory of Personality Organization, IPO-RT (Lenzenweger, Clarkin, Kernberg, & Foelsch, 2001). Several studies report an association between proneness to reality testing deficits and unconventional beliefs, particularly belief in the paranormal and endorsement of urban legends and conspiracies (Drinkwater, Dagnall, & Parker, 2012; Irwin, 2004), and there have been no reported failures. Reality testing refers to the preference to test critically the coherent credibility of beliefs (Irwin, 2004). Reality-testing deficits bias individuals away from analytical-rational processing towards intuitive-experiential interpretations of anomalous events. Believers in this context are dependent upon, or favour, intuitive-experiential processing and consequently appraise perceptions and experiences less critically (Lindeman, 1998). Accordingly, they are more inclined to report unusual perceptual sensations (seeing things that do not exist, hearing things when there is no apparent reason, etc.). Similarly, emotion-based reasoning predicts level of paranormal belief (Irwin, Dagnall, & Drinkwater, 2012). Thus, believers tend to endorse paranormal occurrences because of their emotional rather than rational appeal (Sappington, 1990). In this context, the authors anticipated that participants scoring high on proneness to reality testing deficits would score higher on haunt-related expectancy measures. Similar to paranormal belief, the relationship between proneness to reality testing deficits and susceptibility to suggestion was less certain and, hence, worthy of investigation. This was tested in Phase 1 alongside the paranormal hypotheses.

The study comprised two distinct but related phases. Phase 1, experimental manipulation, examined the effects of verbal suggestion on paranormal believers (vs. nonbelievers) and perception of the fictitious hospital building. It was hypothesised, consistent with previous research, that believers (vs. nonbelievers) would expect the building to contain more haunt-related phenomena, and the differences would be greater with suggestion. Given the inconsistent nature of suggestion effects, the latter prediction was tentatively stated.

As outlined above, Phase 1 also addressed the relationship between suggestion and proneness to reality testing deficits. Previous research has found a positive association between belief in the paranormal and proneness to reality testing deficits (Drinkwater et al., 2012; Irwin, 2003, 2004). This relationship suggests, consistent with belief-in-the-paranormal research, that participants scoring high on proneness to reality testing would be more susceptible to manipulation of suggestion. In the context of the present study, the suggestion that the building was haunted was likely to coincide with personal subjective, intuitive-experiential evaluations and existing paranormal-related schemas of haunted locations (antiquated, deserted, isolated, former hospital, etc.). Thus, we hypothesized that participants scoring high for proneness to reality testing deficits would correspondingly rate the expectation of haunt-related phenomena higher, and that this effect would be heightened when it was suggested that the location was haunted.

Phase 2 explored relationships between paranormal belief, proneness to reality testing deficits, the degree to which participants believed the building was haunted, and anticipation of haunt-related phenomena.

## Method

### Participants

One hundred eighty participants, recruited via opportunity sampling from undergraduate students and staff at Manchester Metropolitan University (faculties of Humanities, Languages & Social Sciences and the Department of Psychology), participated in the study. Mean age 20.89 years ( $SD = 4.99$ ), range 18–48. The sample was 75% female ( $M = 20.96$ ,  $SD = 5.42$ , 18–48 years) and 25% male ( $M = 20.71$ ,  $SD = 3.48$ , 18–38 years). Participants responded to general emails, noticeboard advertisements, or personal requests to take part in a psychological study.

### Hospital Photographs

A slideshow containing 24 photographs of hospitals was constructed. Pictures were obtained via an Internet search using the term “disused hospitals.” Selected images were public domain, colour, non-distorted, taken during daytime, and representing a range of internal and external architectural features. Col-

lectively, images appeared to depict a single derelict hospital. Each image was mounted and fitted to a single PowerPoint 2010 slide (4:3 on screen; 25.40cm x 19.05 cm). Slide presentation was set to 5 s and the slideshow ran for 2 min in total. A standard narration, read by a male member of staff, accompanied the slideshow and outlined the building's (fictitious) history. Recording of the narration was via a tablet and the initial recording was edited using Audacity software.

### **Suggestion Manipulation**

The suggestion stated that the building had either a history of ghostly activity (haunted manipulation) or structural problems (structure manipulation): "In the years prior to its closure patients, staff and visitors reported ghostly sightings/structural problems and the building developed a reputation for being haunted/outdated. The centre of spectral activity/architectural concerns was the Administrative Building." To ensure equivalence between conditions, changes were restricted to three statements of the key manipulation phrase. These occurred at the end of the narrative, within the narrative text, and as part of instructions prior to producing ratings.

### **Video Tour of Administrative Building**

After the slideshow, participants undertook a virtual (video) tour of the Administrative Building. The video comprised handheld camera footage of a building walkthrough, was in colour, and contained no sound. Filming was from the first person perspective and no people appeared in the shoot. The building was actually a disused location on one of the University campuses. Prior to the video shoot, the internal features of the building (i.e., doorways, staircase, furniture, room size, and décor) and the photographs of disused hospitals were carefully matched. This control ensured that participants were unlikely to perceive a mismatch between the slideshow and the virtual tour. Editing reduced the original recording to 10 min; coverage featured a range of internal features. Filming started on the ground floor, moved down to the cellar, and then progressed up through the second and third floors. Shooting concluded as the camera started to move back down the stairs. Recording used a Panasonic HC-V130EB-R Camcorder. Editing was via CyberLink PowerDirector.

### **Test Booklet**

After watching the slideshow and finishing the virtual tour, participants completed a test booklet containing the following measures.

**Environmental Perceptions and Phenomena Scale (EPPS).** The EPPS is an 18-item measure adapted from previous research on hauntings and contains questions on a range of perceptions and sensations typically associated with hauntings (Laythe & Owen, 2012; Wiseman et al., 2002). Instructions asked participants to consider how they would feel when visiting and exploring the hospital Administrative Building late at night: "Within the Administrative Building would you expect to encounter the following phenomena?" Participants rated the extent to which they expected to encounter the following unusual, haunt-related phenomena (sensations and perceptions): unexplained voices; feeling of a sensed presence; fleeting visual shadows; heard footsteps; bouts of ringing in the ears; headache/migraine; perception of being touched; bouts of dizziness; periodic feelings of foreboding; heard bangs/raps; heard music from an unexplained source; unexplained odours; mist, lights, shadows, or other unexplained visual phenomena; notice of animals reacting to something that isn't there; sudden extreme cold or heat; heard or seen unexplained movement; and feelings of being watched. In this context, the EPPS provided a measure of the degree to which participants expected to encounter haunt-related phenomena within the Administrative Building. Participants rated each phenomenon on a Likert scale (0% = "certainly not" to 100% = "certainly").

**History of Haunting (HH).** A further question assessed whether participants believed the location was haunted: "To what extent do you believe that there is a history of paranormal activity (ghostly activity) at the location observed in the video (the Administrative Building)?" Participants responded on a 7-point

Likert scale (1 = “definitely not” to 7 = “definitely”).

**Haunting-Associated Opinions and Feelings (HAOF).** A single item assessed general attitudes to the existence of ghosts; “To what extent do you believe that ghosts exist?” Responses were again assessed using a 7-point Likert scale (1 = “definitely not” to 7 = “definitely”).

Two items measured the degree of anxiety (“How anxious do you feel when you think about ghosts?”) and fear evoked by the notion of ghosts (“How fearful of ghosts are you?”). Responses were recorded on a 7-point Likert scale (1 = “not at all” to 7 = “extremely”).

**Revised Paranormal Belief Scale (R-PBS).** The R-PBS is a self-report measure containing 26 questions measuring belief in seven facets of paranormal belief: Traditional Religious Belief, Psi Belief, Witchcraft, Spiritualism, Superstition, Extraordinary Life Forms, and Precognition (Tobacyk, 2004). The scale is a modified version of Tobacyk and Milford’s (1983) Paranormal Belief Scale. Items are presented as statements (e.g., “I believe in God” and “Black magic really exists”) measured on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Prior to analysis, scores were recoded 0–6 to facilitate Rasch scaling (Irwin, 2009). Final potential scores ranged from 0–156, with higher scores reflecting greater belief in the paranormal. Rasch scaling produced a 2-factor solution: New Age Philosophy, NAP, and Traditional Paranormal Belief, TPB (Lange, Irwin, & Houran, 2000). NAP (11 items) assesses belief in psi, reincarnation, altered states, and astrology, whilst TPB (5 items) measures traditional Western religious concepts such as the devil and witchcraft (Irwin, 2004). The Rasch scaling procedure (Andrich, 1988) produces scores ranging from 6.85 to 47.72 on NAP, and 11.16 to 43.24 on TPB. Previous research has established that the R-PBS is psychometrically and conceptually satisfactory (Tobacyk, 2004).

**The Inventory of Personality Organization Reality Testing Subscale (IPO-RT).** The IPO-RT (Lenzenweger et al., 2001) assesses proneness to reality testing deficits, and the capacities to differentiate self from non-self and intrapsychic from external stimuli and to maintain empathy consistent with ordinary social criteria of reality (Kernberg, 1996). The IPO-RT also measures information-processing style (e.g., “I have heard or seen things when there is no apparent reason for it”) without reference to psychotic symptomatology. The scale contains 20 items assessed via a 5-point Likert scale (1 = “never true” to 5 = “always true”). Scores range from 20 to 100 (low scores indicate high reality-testing ability). The IPO-RT is temporally stable with nonclinical populations and is psychometrically established, demonstrating good retest reliability and construct validity (Lenzenweger et al., 2001).

**Subjective Paranormal Experiences Scale (SPES).** In addition to the previously outlined measures, participants completed the SPES, which measures participants’ general paranormal history and assesses incidence of subjective paranormal experiences. The measure was not analysed in the present study because the number of respondents reporting hauntings was low.

## **Procedure**

Ethical approval was granted as part of a wider research project examining the relationship between paranormal beliefs and anomalous experiences. Prior to testing, all participants provided informed consent and were aware of their right to withdraw from the study at any time.

Participant testing occurred in groups or individually and haunt condition allocation was random (suggestion manipulation: haunted vs. structure).

Prior to testing, instructions informed participants that the session would involve attending to a brief slideshow and accompanying audio narrative about an old disused hospital. Participants first watched the slideshow containing the hospital photographs and simultaneously listened to the supporting audio narrative. The first presentation of the suggestion manipulation occurred within the concluding sentence of the narrative. On conclusion of the presentation, participants read a text version of the narrated commentary in preparation for the virtual (video) tour of the old Administrative Building. This served to reinforce the previously narrated suggestion (second presentation of the suggestion manipulation). After allowing sufficient reading time, the recording (virtual tour) was played. Following the virtual tour, instructions guided participants to complete the test booklet containing the study measures. The instructions preceding the test

measures stated the suggestion manipulation a third and final time.

Participants completed the environmental measures (EPPS and HH) and the HOAF first to avoid priming paranormal ideation. To avoid potential order effects the sequence of the remaining measures (R-PBS and IPO-RT) was counterbalanced. Guidelines instructed participants to complete all questions and that there was no time limit. At the end of the testing session, testers debriefed the participants, thanked them for engaging with the research, and provided follow-up details.

## Results

### Primary Analysis: Reliability and Scale Descriptives

Prior to the main analysis, Cronbach's alpha ( $\alpha$ ) assessed the internal reliability of the measures. All scales proved psychometrically acceptable: The Environmental Perceptions Phenomena scale (EPPS;  $\alpha = .93$ ), proneness to reality testing deficits measure (IPO-RT;  $\alpha = .90$ ) and Revised Paranormal Belief Scale, (R-PBS;  $\alpha = .89$ ) demonstrated excellent internal reliability. The two R-PBS factors (New Age Philosophy, NAP; and Traditional Paranormal Belief, TPB) produced alpha coefficients in the good (NAP,  $\alpha = .83$ ) to acceptable TPB ( $\alpha = .70$ ) range (see also George & Mallery, 2003). Scale descriptive statistics appear in Table 1.

Table 1  
Scale Descriptive Statistics ( $N = 180$ )

	$\alpha$	$M$	$SD$	Range
EPPS	.93	43.73	18.09	2.35–82.94
R-PBS	.89	51.97	24.01	4.00–116.00
NAP	.83	21.60	3.88	6.85–31.41
TPB	.70	22.59	4.56	11.16–39.23
IPO-RT	.90	42.81	11.91	20.00–83.00
HH	NA	4.12	1.84	1.00–7.00
OG	NA	4.18	2.04	1.00–7.00
FA	NA	3.61	1.86	1.00–7.00
FF	NA	3.41	1.92	1.00–7.00

*Note.* EPPS = Environmental Perceptions Phenomena Scale, R-PBS = Revised Paranormal Belief Scale, NAP = New Age Philosophy, TPB = Traditional Paranormal Belief, IPO-RT = Proneness to Reality Testing Deficits, HH = History of Haunting, OG = Opinion Ghosts Exist, FA = Feeling Anxiety, FF = Feeling Fear.

EPPS correlated positively with level of paranormal belief and IPO-RT, indicating that expectancy of haunt-related phenomena increased as a function of level of paranormal belief and reality testing deficit. Paranormal belief (R-PBS, NAP, and TPB) correlated positively with IPO-RT. All observed inter-scale correlations were in the moderate range (see Table 2).

### Experimental Manipulation: Paranormal Belief, Proneness to Reality Testing Deficits, Suggestion, and Haunting-Related Ratings

Consistent with previous research, median splits classified participants as either low or high (below vs. above median) on R-PBS and IPO-RT. This procedure is an established methodological convention within parapsychological and individual differences research (Wilson & French, 2014; Wiseman &

Greening, 2005) that has recently received disapproval. Ubiquitously cited criticisms of median split often reference MacCallum, Zhang, Preacher, and Rucker (2002), who outline potential negative analytical consequences arising from dichotomization of continuous variables (i.e., loss of information about individual variability, ensuing loss of power and effect size, and the undermining of measurement reliability). Accordingly, MacCallum et al. (2002) concluded that dichotomization is rarely defensible because it produces misleading results.

Table 2  
*Matrix of Pearson Product Moment Correlations Between Study Variables*

	1	2	3	4	5	6	7	8	9
1. EPPS									
2. R-PBS	.57*								
3. NAP	.52	.85							
4. TPB	.44	.81	.65						
5. IPO-RT	.40	.35	.37	.21					
6. HH	.66	.59	.52	.49	.20				
7. OG	.52	.61	.54	.52	.21	.74			
8. FA	.41	.32	.23	.31	.22	.39	.43		
9. FF	.33	.29	.17	.29	.19	.33	.39	.84	

*Note.* EPPS = Environmental Perceptions Phenomena Scale, R-PBS = Revised Paranormal Belief Scale, NAP = New Age Philosophy, TPB = Traditional Paranormal Belief, IPO-RT = Proneness to Reality Testing Deficits, HH = History of Haunting, OG = Ghosts Exist, FA = Feeling Anxiety, FF = Feeling Fear.

\*All  $p < .01$ .

A recent paper by Iacobucci, Posavac, Kardes, Schneider, and Popovich (2014) challenges and re-evaluates this view. Iacobucci et al. (2014) conducted an examination of median splits, which revealed that spurious effects were negligible and limited (usually) to instances where predictor variables correlated significantly among themselves, that is, cases of acute multicollinearity. Indeed, even when variables are nonorthogonal, the robust nature of a 2 by 2 factorial design typically negates extreme distortions (Iacobucci et al., 2014). Finally, it is worth noting that multicollinearity generally does not promote type I errors. Instead, it reduces effect sizes and increases the likelihood of type II error (Iacobucci et al., 2014).

We assessed the validity of our findings in two ways. Firstly, following Iacobucci et al.'s (2014) recommendation, we demonstrated orthogonality by computing correlation coefficients between the median split variables (belief in the paranormal and proneness to reality testing deficits) and the experimental factor (level of suggestion). The correlations were nonsignificant: R-PBS,  $r(178) = .02$ ,  $p = .37$ ; IPO-RT,  $r(178) = .00$ ,  $p = .50$ .

As a second validity check, consistent with Wilson and French (2014), we conducted a series of multiple regressions (not reported), which replicated the pattern of results observed from the ANOVAs reported below (see Tables 3 and 4).

ANOVA analysis was preferred to regression analysis because suggestion was an experimental manipulation and we were concerned primarily with exploring potential interactions. Separate ANOVAs for level of paranormal belief (R-PBS) and proneness to reality testing deficits (IPO-RT) were justified because the correlation between these two factors was in the low (see Hinkle, Wiersma, & Jurs, 2003) to moderate (see Cohen, 1992) range. Thus, effects of level and suggestion on environmental perceptions (EPPS) and history of haunting (HH) were analyzed via separate 2 (level of paranormal belief/level of reality testing: high vs. low) x 2 (suggestion: structure vs. haunted) independent ANOVAs.



## Paranormal Belief

Means and standard deviations appear in Table 3.

Table 3  
Level of Paranormal Belief (R-PBS) as a Function of Haunt-Related Attitudes  
(Environmental Perceptions Phenomena Scale, EPPS, and History of Haunting, HH)

	Level of Paranormal Belief					
	Below Median		Above Median		Overall	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>EPPS</b>						
Suggestion Type						
Structure	35.58	18.21	51.15	16.02	43.28	18.78
Haunted	36.62	16.67	52.63	14.33	44.19	17.48
Overall	36.12	17.35	51.88	15.14		
<b>HH</b>						
Suggestion Type						
Structure	3.53	2.02	5.07	1.32	4.29	1.87
Haunted	3.10	1.73	4.88	1.40	3.95	1.81
Overall	3.31	1.88	4.98	1.36		

**Environmental Perceptions Phenomena Scale (EPPS).** No significant main effect on EPPS was found for suggestion (structure,  $M = 43.28$ ,  $SD = 18.78$  vs. haunted,  $M = 44.19$ ,  $SD = 17.48$ ),  $F(1, 176) = 0.27$ ,  $p > .05$ ,  $\eta^2 = .002$ . A significant main effect was found for level of paranormal belief,  $F(1, 176) = 41.68$ ,  $p < .001$ ,  $\eta^2 = .19$ . Participants scoring above the median on paranormal belief scored higher on the EPPS ( $M = 51.88$ ,  $SD = 15.14$ ) than participants below the median ( $M = 36.12$ ,  $SD = 17.35$ ). Higher EPPS scores indicate a higher expectancy of haunt-related phenomena within the Administrative Building. No significant interaction was found between suggestion and level of paranormal belief on EPPS,  $F(1, 176) = .01$ ,  $p > .05$ ,  $\eta^2 = .00$ .

**History of Haunting (HH).** No significant main effect on HH was found for suggestion (structure,  $M = 4.29$ ,  $SD = 1.87$  vs. haunted,  $M = 3.95$ ,  $SD = 1.81$ ),  $F(1, 176) = 1.56$ ,  $p > .05$ ,  $\eta^2 = .009$ . A significant main effect was found for level of paranormal belief,  $F(1, 176) = 45.53$ ,  $p < .001$ ,  $\eta^2 = .21$ . Participants scoring above the median on paranormal belief scored higher on HH ( $M = 4.98$ ,  $SD = 1.36$ ) than participants below the median ( $M = 3.31$ ,  $SD = 1.88$ ). Higher HH scores indicate a higher expectancy of haunt-related phenomena within the Administrative Building. No significant interaction was found between suggestion and level of paranormal belief on HH,  $F(1, 176) = 0.25$ ,  $p > .05$ ,  $\eta^2 = .001$ .

## Proneness to Reality Testing Deficits

Means and standard deviations appear in Table 4.

**Environmental Perceptions Phenomena Scale (EPPS).** No significant main effect on EPPS was found for suggestion (structure,  $M = 43.28$ ,  $SD = 18.78$  vs. haunted,  $M = 44.19$ ,  $SD = 17.48$ ),  $F(1, 176) = 0.12$ ,  $p > .05$ ,  $\eta^2 = .001$ . A significant main effect was found for IPO-RT,  $F(1, 176) = 17.92$ ,  $p < .001$ ,  $\eta^2 = .092$ . Participants scoring above the median on IPO-RT scored higher on the EPPS ( $M = 49.28$ ,  $SD = 16.98$ ) than participants below the median ( $M = 38.32$ ,  $SD = 17.57$ ). Higher EPPS scores indicate a higher

expectancy of haunt-related phenomena within the Administrative Building. No significant interaction was found between suggestion and IPO-RT on EPPS,  $F(1,176) = .05, p > .05, \eta^2 = .00$ .

Table 4  
Level of Proneness to Reality Testing Deficits (IPO-RT) as a Function of Haunt-Related Attitudes  
(Environmental Perceptions Phenomena Scale, EPPS, and History of Haunting, HH)

	Level of RT					
	Below Median		Above Median		Overall	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>EPPS</b>						
Suggestion Type						
Structural	37.57	18.54	49.12	17.34	43.28	18.78
Haunted	39.05	16.73	49.43	16.82	44.19	7.48
Overall	38.32	17.57	49.28	16.98		
<b>HH</b>						
Suggestion Type						
Structural	3.80	2.04	4.80	1.53	4.29	1.87
Haunted	3.74	1.88	4.16	1.73	3.95	1.81
Overall	3.77	1.95	4.47	1.66		

**History of Haunting (HH).** No significant main effect on HH was found for suggestion (structure,  $M = 4.29, SD = 1.87$  vs. haunted,  $M = 3.95, SD = 1.81$ ),  $F(1, 176) = 1.69, p > .05, \eta^2 = .010$ . A significant main effect was found for IPO-RT,  $F(1, 176) = 6.86, p = .01, \eta^2 = .038$ . Participants scoring above the median on IPO-RT scored higher on the HH ( $M = 4.47, SD = 1.66$ ) than participants below the median ( $M = 3.77, SD = 1.95$ ). Higher HH scores indicate a higher expectancy of haunt-related phenomena within the Administrative Building. No significant interaction was found between suggestion and IPO-RT on HH,  $F(1, 176) = 1.15, p > .05, \eta^2 = .007$ .

### Haunt Associated Opinions and Feelings (HAOF)

In light of the lack of a suggestion effect and for brevity's sake, subsequent analysis focused on only belief in the paranormal and proneness to reality testing deficits. A series of independent *t* tests assessed differences on the opinion and feeling measures (HAOF), as shown in Table 5.

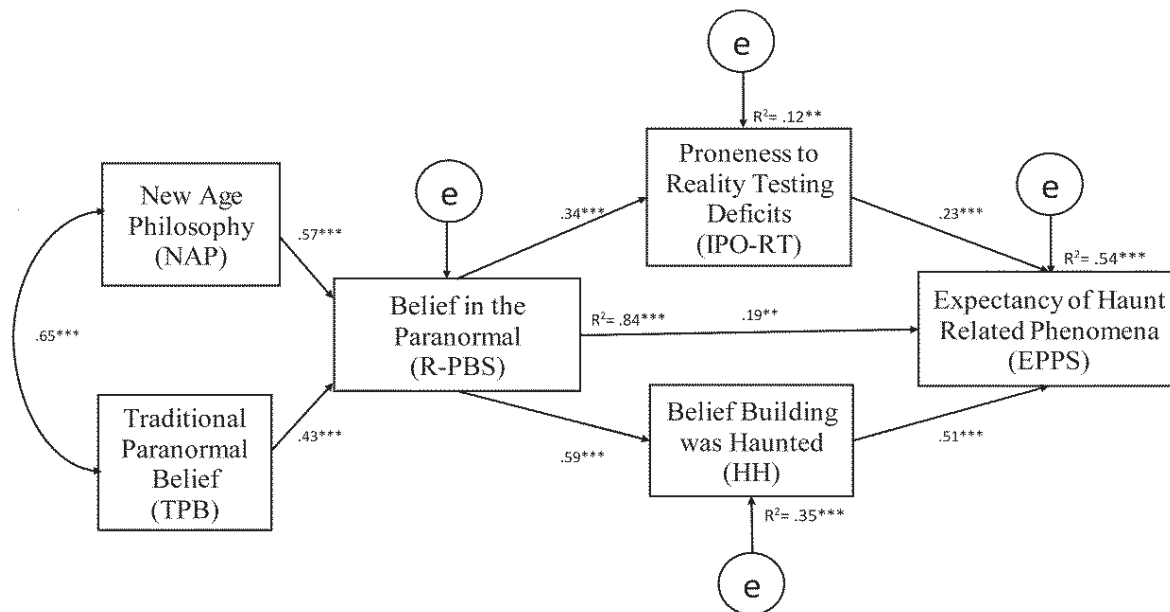
Participants high (vs. low) on R-PBS scored higher on the opinion (ghosts exist) and feeling measures (anxious and fearful). Participants high (vs. low) on IPO-RT scored higher on opinion (ghosts exist). Following application of a Bonferroni correction for multiple comparisons, the feeling measures (anxious and fearful) were not significant. The adjusted alpha level was based upon the notion of family: the smallest set of meaningful inferences within a set of analyses. There were three planned comparisons within each independent variable assessing levels of paranormal belief and proneness to reality testing deficits; hence, the corrected alpha was  $p = .017$ .

### Path Analysis: Paranormal Belief, Reality Testing, and Haunt-Related Phenomena

Within these data, there were no issues with multicollinearity; all correlations were below .9 (see Table 2 for zero-order correlations). All correlations were significant and in the expected direction. A path model examining direct effects (R-PBS on EPPS) and indirect effects (R-PBS on EPPS, mediated by IPO-RT and HH) was constructed.

Table 5  
 Paranormal Belief and Reality Testing Comparisons (Low vs. High)  
 on Haunt-Associated Opinions and Feelings (HAOF)

	Level				<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Below Median		Above Median					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Paranormal Belief								
Opinion								
Ghosts Exist	3.32	2.00	5.09	1.65	-6.49	175.50	<.001	.97
Feelings								
Anxious	3.17	1.96	4.08	1.64	-3.38	175.80	<.001	.50
Fearful	2.96	1.94	3.90	1.79	-3.39	177.96	<.001	.51
Proneness to Reality Testing Deficits								
Opinion								
Ghosts Exist	3.81	2.05	4.55	1.96	-2.46	178	.008	.37
Feelings								
Anxious	3.34	1.90	3.89	1.79	-1.99	178	.025	.30
Fearful	3.13	1.98	3.70	1.82	-1.99	178	.024	.30



$p < .05^*$ ,  $p < .01^{**}$ ,  $p < .001^{***}$

Figure 1. The outcome of AMOS 19 path analysis, putative relations between paranormal beliefs subscales (NAP and TPB), level of paranormal belief (R-PBS), proneness to reality testing deficits (IPO-RT), belief the building was haunted (HH) and haunt-related expectations (EPPS). The effects of extraneous variables are depicted by the use of “e” to denote error term.

Standardized estimates, covariance, and regression coefficients ( $R^2$ ) appear in Figure 1. Kline (2005) recommends several criteria for assessing goodness-of-fit: chi-square, the comparative fit index

(CFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). These indices indicated very good overall model fit; chi-square is nonsignificant,  $\chi^2(7, N = 180) = 7.79, p = .35$ ; CFI = .99; SRMR = .02; and RMSEA = .02. Hu and Bentler (1999) examined indices cutoffs and suggested that type I and type II errors were best minimized via a combination of relative fit indices (CFI  $\geq 0.95$  is indicative of good fit) and absolute fit indices (SRMR, good models  $< .08$ ; or RMSEA, good models  $< .06$ ). Path coefficients were significant at the  $p < .05$  level. Paranormal belief (R-PBS) had a significant effect on proneness to reality testing deficits (IPO-RT), the belief the building was haunted (HH), and haunt-related expectations (EPPS). IPO-RT and HH also significantly affected EPPS.

### Direct and Indirect Effects

To assess whether direct and indirect effects were statistically significant, a mediation analysis using the bias-corrected bootstrap 95% confidence intervals (CI) procedure (Hayes, 2013) was applied with 5000 bootstrap samples (findings are reported in Table 6). This analysis further examined the specific influence of each proposed mediator; AMOS is unable to examine the unique influence of two or more mediators when they are simultaneously included in a path diagram.

Table 6  
*Mediation Analysis Direct and Indirect Effects*

	Standardized Direct Effect (DE)	Bias-Corrected 95% CI (DE)	Standardized Indirect Effect (IE)	Bias-Corrected 95% CI (IE)
Haunt-Related Expectations (EPPS)				
Paranormal Belief (R-PBS)	.18	.48–.66*	.37*	.28–.47*
Belief Building Haunted (HH)	.50	.19–.46*	None	None
Reality Test Deficits (IPO-RT)	.24	.07–.31*	None	None

\* $p < .001$

Significant direct effects were observed on EPPS, R-PBS, HH, and IPO-RT. Paranormal belief (R-PBS) had a significant indirect effect on haunt-related expectations (EPPS). To discern the influence of each proposed mediator (HH and RT) on the relationship between R-PBS and EPPS, Preacher and Hayes' (2008) INDIRECT bootstrapping macro was run. The direct relationship between R-PBS and EPPS was nonsignificant ( $b = .12$ ), indicating that belief the building was haunted (HH) and reality testing deficit (IPO-RT) mediated the relationship between R-PBS and EPPS. Further inspection revealed that IPO-RT was not a significant mediator between R-PBS and EPPS at the 99% confidence level across bias-corrected (99% CI =  $-.01$  to  $.13$ ) point estimates. HH, however, emerged as significant, and the indirect effect of R-PBS and EPPS through HH was significant at the 99% confidence level across bias corrected (99% CI =  $.05$  to  $.34$ ) point estimates. The overall model accounts for 53% of the total variance on EPPS.

### Discussion

Prior to replication, significant effects within the present study require cautious interpretation. The present paper produced a number of key findings. Within the experimental phase, expectation of haunt-related phenomena as measured by the Environmental Perceptions Phenomena Scale and belief the building was haunted increased as a function of level of paranormal belief and proneness to reality testing deficits. Suggestion, however, had no effect on expectation of haunt-related phenomena. Phase 2 confirmed and expanded upon these findings. Path analysis revealed significant relationships between belief in the paranor-

mal, proneness to reality testing deficits, belief the building was haunted, and expectation of haunt-related phenomena. Further analysis found belief the building was haunted significantly mediated the relationship between paranormal belief and haunt-related expectations. Finally, whilst correlating positively with each other, both belief in the paranormal and proneness to reality testing deficits (information processing style) explained unique variance within haunt-related expectations. The contribution of reality testing deficits, however, in comparison to belief was relatively minor.

The observed association between level of paranormal belief and haunt-related expectations concurs with Wiseman et al. (2002), who found a relationship between belief in ghosts, reporting paranormal experiences, and attributing unusual experiences to a ghost. In the present study, believing in the paranormal predisposed participants to anticipate haunt-related phenomena within the fictitious Administrative Building, especially when participants considered the location haunted. This finding is consistent with previous work on context mediation and psychological haunting research generally (Harte, 2000; Houran & Lange, 1996, 2001; Lange & Houran, 1997). Expectation in the context of real-world locations (disused structures, historical buildings, battlefields, etc.) may arise from physical characteristics (appearance, age, structure, etc.) and social characteristics (e.g., history and reputation). Similarly, proneness to reality testing deficits, and an associated preference for intuitive-experiential information processing, predisposed participants to expect more haunt-related phenomena within the fictitious location. This finding adds to the emergent body of research revealing associations between proneness to reality testing deficits and unconventional beliefs (Drinkwater et al., 2012; Irwin, 2004).

The observation that suggestion had no influence in the current study requires careful elucidation. Previous research has produced mixed results. Generally, research indicates that suggestion affects the perception and recall of paranormal phenomena (French & Wilson, 2006; Wiseman & Greening, 2005; Wiseman et al., 2002), especially in believers, when the suggestion is consistent with a particular belief. Haunting findings, however, are less conclusive. For example, Wiseman et al. (2002) found mixed results. Suggestion had no effect on perception of unusual phenomena in the current study, nor did it influence the degree to which participants attributed unusual events to a ghost. The only prediction to reach significance was that believers (vs. disbelievers) in the positive suggestion condition reported more experiences.

Although the present manipulation failed to produce significant effects, suggestion may still play a role in priming haunt-related experiences. Indeed, previous work has evidenced that suggestion can influence haunt-related perceptions (cf. Houran & Lange, 1996). Clearly, further work is required to identify factors effecting susceptibility to haunting experiences. One obvious potential manipulation is cue salience. The present study used a virtual tour, whilst the significant effect found by Houran and Lange (1996) occurred within a “real” physical setting. Note that Wiseman et al. (2002) failed to find compelling effects in a real-life setting (Hampton Court).

Collectively, haunting research indicates that the effects of suggestion are subtle and less important than belief in the paranormal. More generally, suggestion may influence perception and recall of paranormal events such as spoon bending, fake séances, and psychic readings. Thus, future studies need to explore the conditions under which suggestion influences haunt-type perceptions and recollections. The main factors to consider are whether participants high in haunting belief are more inclined to be affected by haunt-related suggestions (specific beliefs), environmental manipulation (allegedly haunted vs. manufactured setting), and past experience (haunting vs. no haunting). This would produce a set of complex variable manipulations sensitive to potential suggestion effects. Finally, believers gave higher ratings for believing the building was haunted and ghost existence. In addition, believers produced higher anxiety and fear ratings.

This study has some potential limitations. For example, participants completed general questionnaire measures in a single test session. Whilst the order of measures was counterbalanced, previous studies found that personality measures administered in this way may be prone to context effects (Council, 1993). Context effects occur when correlations between measures vary as a function of whether scales were completed in a single testing session (resulting in a high correlation) or in separate/unrelated sessions (resulting in a lower or no correlation). Context effects arise within single session testing situations because participants wrongly infer relationships between scales and become inadvertently motivated to provide consistent responses (Council, Kirsch, & Hafner, 1986). For example, Council (1993) found the typically

cited positive correlation between hypnotisability and absorption only when participants completed both measures in a single testing session. Whilst context effects are a consideration, likelihood of occurrence differs according to the characteristics of specific personality measures and research situations. Pertinent to the present study, Roig, Bridgeman, and Jackson (1998), using the Paranormal Belief Scale and the Irrational Beliefs Inventory, found that whilst correlation coefficients between the measures became weaker as a function of context controls, there were no statistically significant effects of context. Similarly, Nadon, Hoyt, Register, and Kihlstrom (1991) failed to find evidence that the repeatedly observed correlations between absorption and hypnosis measures were artifacts of testing context.

Subsequent studies could extend the current study by including a suggestibility measure. Previous research has found associations between the reporting of anomalous experiences and belief in paranormal phenomena (Kumar & Pekala, 2001). Thus, individuals scoring high on suggestibility may be more likely to respond to the verbal suggestion and report higher expectations, especially when the suggestion is consistent with their beliefs. Suggestion may be less likely to affect participants with low suggestibility regardless of whether the suggestion is consistent with their belief or not (cf. McGeown et al., 2012).

Further evaluation of haunt-related expectations could examine the distinction between proneness to anomalous experiences and tendency to draw upon paranormal interpretations. The present study included a range of phenomena associated with, but not exclusive to, haunt-related experiences. Participants imagining entering an unfamiliar environment may anticipate strange sensations and perceptions but not necessarily attribute them to ghosts. Further work could consider the relative contribution of attentional and attributional processes and investigate whether believers and nonbelievers differ on both expectations for unusual and haunt-related phenomena, using, for example, The Survey of Anomalous Experiences (Irwin, Dagnall, & Drinkwater, 2013).

Analysis of direct and indirect effects demonstrated that the belief the building was haunted mediated the relationship between paranormal belief (R-PBS) and expectations of haunt-related phenomena. The emergent haunting model contributes to the work of Houran and Lange (Houran & Lange, 1996; Lange & Houran, 1997). They found that context cues and demand characteristics could induce poltergeist-like perceptions and stimulate paranormal-type experiences. The present study explicates that this is most likely to occur when belief in the paranormal is high and the location considered haunted, especially when the individual believes hauntings are genuine. This finding is an important addition to the literature because, as Laythe and Owen (2012) note, the generally utilised measure of paranormal belief, the R-PBS (Tobacyk, 2004), fails specifically to assess specific haunt-related content and hence underestimates the relationship between belief and perceived ghostly activity. In the present study we used the R-PBS for two reasons. Firstly, the measure is conceptually and psychometrically satisfactory (Tobacyk, 2004). Secondly, the R-PBS is the most widely used instrument of paranormal belief (Goulding & Parker, 2001). Our findings, however, suggest that specific haunt-related beliefs rather than general belief in the paranormal increases haunt-related expectations. Thus, specific beliefs may provide a cognitive framework for structuring haunting-related events and experiences (Houran et al., 2002). This is consistent with Wiseman et al.'s (2002) finding that those who believed in ghosts (vs. nonbelievers) reported more unusual experiences as they walked around Hampton Court Palace. Thus, believers in hauntings, via their beliefs, are inclined to expect haunt-related phenomena in purportedly haunted locations.

As a brief postscript, we would like to contextualize our conclusions. Whilst our results indicate that beliefs may give rise to haunting-like perceptions, they do not imply that all haunting/ghost experiences are explainable via psychological mechanisms. As Broughton (1991) eloquently notes, conventional explanations of hauntings and ghost-related phenomena have yet to provide comprehensive theories that account for the breadth of encounters reported. The present study adds to the body of research demonstrating that psychological processes can explain haunting-like phenomena.

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### **Abstracts in Other Languages**

