

## Shadow Walking: Will a Ghost Walk Tour Affect Belief in Ghosts?<sup>7</sup>

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**Abstract:** There is a strong relation between personal experience and belief in ghosts. The research reported here investigated whether other people's experiences conveyed in a ghost walk tour could also influence belief. We surveyed participants before and after a ghost tour to evaluate changes in belief as a result of the tour. For participants who started out lower on ghost belief, the tour did increase their belief. The tour had no effect on non-ghost related paranormal beliefs. The data were evaluated against a model suggesting that the variables influencing the updating of beliefs are different from the variables related to the formation of belief. The model provided a good account for the data and suggests directions for future research.

*Keywords:* ghost belief, paranormal experience, others' experience

Clarke (1995) evaluated the frequency of various paranormal beliefs and the reasons given for those beliefs. Within the subset of ghost beliefs, personal experience was one reason given, but other people's experiences and media exposure were also provided as reasons for belief. Much attention has been paid to how personal experiences are related to belief. For example, Lange and Houran (1998) concluded that "poltergeists and kindred phenomena are delusional experiences that involve the affective and cognitive dynamics of percipients' interpretation of ambiguous stimuli" (p. 642). However, one of the motivations for their Study II was to have a more homogenous sample of experients to avoid participants responding "in terms of culturally transmitted information or second-hand accounts" (p. 641). Our purpose was to actually evaluate the effect of other people's experiences on belief in ghosts, in this case the role of attending a ghost walk tour on updating ghost belief.

Other people's experiences can take many forms (e.g., parents' beliefs, Braswell, Rosengren, & Berenbaum, 2012; or consumption of popular media, Auton, Pope, & Seeger, 2003; Sparks, Hansen, & Shah, 1994; Sparks, Pellechia, & Irvine, 1998). The popularity of beliefs also seems to factor into people's acceptance of them. For example, Ridolfo, Baxter, and Lucas (2010) found higher agreement with a report on ESP if participants had been told that it was popular.

Ghost tours are a popular activity and involve the transmission of other people's experiences (in

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support of this assertion, the Nashville Life website listed eight ghost tours in the Nashville area alone in October 2015; Murfreesboro, Tennessee, a medium-sized Nashville suburb, hosted two competing tours on its town square). All of these tours share local history and purportedly true ghost stories. The tour experience was investigated here, and the plan for this study was simple: Ask people about ghost belief before going on a tour, and then measure belief again after the tour. Can other people's experiences, acquired from a tour, increase belief in ghosts?

Again, personal experiences are relatively common (e.g., Haraldsson, 2009). It seems reasonable to expect experience to be related to belief, and a number of studies have documented an experience-belief link (Clarke, 1995; Irwin, 1985; Lawrence & Peters, 2004; Laythe & Owen, 2012; Pechey & Halligan, 2012; Wiseman, Watt, Stevens, Greening, & O'Keeffe 2003). Significant attention has been paid to the direction of the experience-belief relationship. Clarke's (1995) data, based on self-reports of ghost encounters, showed that people who believe in ghosts attribute their beliefs to experience. Hufford (2001) presented an "experiential theory" to account for supernatural belief. Lange and Houran (1998) suggested that an ambiguous experience, mediated by fear and moderated by gender and age, can lead to belief in a paranormal explanation. Once the belief has formed, subsequent experiences will be filtered through it, and this will create a feedback loop. If one conceptualizes experience as an ambiguous event in need of explanation, then there is evidence that this sort of experience will precede belief (e.g., Laythe & Owen, 2012; McNally & Clancy, 2005; Pechey & Halligan, 2012).

Garety, Kuipers, Fowler, Freeman, and Bebbington (2001) proposed a two-stage model for symptoms of psychosis, and Freeman, Garety, Kuipers, Fowler, and Bebbington (2002) demonstrated how the model could operate for persecutory delusions (note that we are choosing this model based on its structure and not necessarily to equate ghost belief with delusions). The basic idea is that a person with the right predisposition, in the presence of a triggering event can develop a delusion (Garety et al., 2001). Then, different processes (affected in large part by the existence of the delusion) take over to maintain and update that delusion. This model is very similar to Lange and Houran (1998), but makes a more explicit assumption about belief formation and belief maintenance being two separate steps. A variety of findings in the realm of paranormal belief can be accommodated within this model. For example, Sharps, Matthews, and Asten (2006) found that a set of variables was associated with belief in paranormal phenomena, whereas Sharps et al. (2010) found that these variables were not associated with the maintenance of these paranormal beliefs.

The study reported here is most closely associated with the maintenance and updating stage of belief rather than the formation of belief stage. It is unlikely that someone coming to a ghost tour would be completely naïve as to the existence of ghosts; they are likely to be rather high on ghost belief. Instead, the question is: what variables will influence the interpretation of a ghost tour in updating belief?

Research has demonstrated that prior belief is an important variable in determining how purportedly paranormal events will be interpreted. Some of these events involved personal experience. For example, Wiseman, Greening, and Smith (2003) exposed participants to a séance that included a suggestion that a table moved. Believers were more likely to recall that the table had, in fact, moved. Dagnall, Drinkwater, Denovan, and Parker (2015) found that after a video tour of a hospital that might

be haunted, believers were more likely to expect it to be haunted. This interpretation of the video could easily lead to a paranormal interpretation of ambiguous events in the actual hospital.

Laboratory demonstrations have also been shown to be interpreted based on a belief filter. Wilson and French (2008) had participants watch a psychic reading and found that believers interpreted it as genuinely psychic, even when no misinformation about the reading was presented. Wiseman and Morris (1995) presented video demonstrations of extra-sensory perception (ESP) and psychokinesis (PK), and found that believers were more likely to interpret them as genuinely paranormal.

Belief can also prevent demonstrations of non-paranormal events from affecting that belief. For example, Hergovich (2004) presented pseudo-psychic demonstrations as magic tricks, and found that believers were relatively unaffected by this information. Jones and Russell (1980) found that a demonstration of ESP did not have to “work” for high believers to accept it as successful. This failure to update belief in the face of disconfirming evidence is similar to the Bias Against Disconfirming Evidence (BADE) that is frequently found in people who experience delusions (e.g., Moritz & Woodward, 2006).

The research reported here had several goals. Primarily, how will other people’s experience fit into this model? Will prior belief affect the interpretation of other people’s experiences in the way that it affects personal experience? The study also allows an opportunity to evaluate the two-stage model described above. Would variables that are related to prior ghost belief also be related to the updating of belief that might happen as a result of the ghost tour?

The researchers evaluated the effect of a “ghost walk” experience. The Shadow Chasers of Middle Tennessee ghost investigation team host a *Shadow Walk* tour every October on the downtown square in Murfreesboro, Tennessee. The tour includes historical information about various locations, reports from eyewitnesses of ghost activities in those locations, and the results of the team’s investigations at each location. With the cooperation of the Shadow Chasers, the researchers surveyed *Shadow Walk* patrons before and after their tour to evaluate what effect the tour might have on belief. We also included questions about past ghost experiences to evaluate tour patrons’ pre-existing experience-belief relation.

This population offers a unique opportunity to evaluate the relation between experience and belief. Tour patrons voluntarily expose themselves to a ghost experience, indicating some level of interest. The tour is the type of “real world” exposure to other people’s ghost experiences that permeate popular media (Sparks, Nelson, & Campbell, 1997). In addition, this tour goes beyond the standard story-telling approach to also present evidence collected by the team. Describing evidence necessarily involves discussing how evidence is collected in a ghost investigation, and might lend an aura of scientific investigation to the tour information (Brewer, 2013, discussed the role of the “trappings of science” on increasing belief).

As part of evaluating whether variables affecting belief formation are also relevant for belief updating, we included two measures of personality. Smith, Johnson, and Hathaway (2009) found that sensation seeking was associated with paranormal belief. We expected that participants higher on sensation seeking would be more likely to expose themselves to experiences that could trigger ghost belief. Therefore, this variable was expected to influence the belief formation stage of the model. Private body

consciousness (Miller, Murphy, & Buss, 1981) measures participants' awareness of their bodily states. This sensitivity to bodily states could help participants to have "ghost" experiences in the first place, affecting the belief formation stage, or this sensitivity could help participants to re-experience the evidence reported on the tour, therefore influencing the updating stage of belief maintenance. Both of these measures can be administered with only a few survey items, making them appropriate for the research setting.

One additional feature of the research (motivated primarily for pragmatic reasons) was the fact that half of the tours were led by members of the Shadow Chasers team, and half were led by researchers. Researcher participation in leading tours was a necessary precondition for access to the tour patrons. The researchers participated in ghost investigations as part of their training and became eligible for team membership before the tours started. As will be described fully below, the researchers took advantage of this situation to incorporate an additional manipulation. Tours led by the researchers made use of technology that was not used by the Shadow Chasers guides and also included information about ghost hunting research methods prior to each tour (to maximize the "trappings of science" aspect discussed by Brewer, 2013).

## Method

### Participants

Five hundred and ninety-one people attended *Shadow Walk* tours over three weekends during October 2012. Patrons who arrived more than five minutes before a tour was scheduled to start were asked to participate in the research. Two hundred and four people completed pre-test surveys, 102 went on tours led by the two researchers and 102 went on tours led by Shadow Chasers team members. Most people came to the tour with someone; the number in their party ranged from 1-12, the mode was 2 ( $N_{\text{reporting}} = 189$ ). For the pre-test, there were 133 female and 69 male participants (two did not report gender). Of the 151 pre-test participants reporting age, the average was 36.4 ( $SD = 12.78$ , range 18-77).

Twenty-one participants had been on the *Shadow Walk* tour before ( $M_{\text{tours}} = 1.8$ ,  $N_{\text{reporting}} = 11$ , scores ranged from 1-5,  $SD = 1.33$ ). Seventy participants had been on another ghost tour ( $M_{\text{tours}} = 2.4$ ,  $N_{\text{reporting}} = 48$ , scores ranged from 1-12,  $SD = 2.32$ ). Sixteen participants had been on a ghost investigation ( $M = 2.6$ ,  $N_{\text{reporting}} = 9$ , scores ranged from 1-5,  $SD = 1.33$ ; three investigators with more than 20 investigations each were not included in these statistics).

One hundred and twenty-seven of the pre-test participants also completed a post-test at the end of the tour. Of these, 69 were on tours led by researchers and 58 were led by Shadow Chasers. Seventy-five women and 50 men completed post-tests (two did not report). Of the 93 post-test participants who reported their age, the average was 35.6 ( $SD = 13.05$ , ages ranged from 18-70).

## Researchers

The researchers were both male. One was a professor of experimental psychology and one was an experimental psychology graduate student in his late 20s working in the same research lab. Neither of them believes in ghosts, a fact that was known to the Shadow Chasers team. Leading the tour did not require revealing personal beliefs about ghosts, and the researchers received training and practiced the tour with the entire team to ensure that the evidence was presented in a consistent manner.

## Materials

The tour had 16 stops. Each stop had a brief history section (including a description of any notable deaths that might relate to ghosts). Eyewitness reports of unusual activity were also described at each stop. Twelve stops had been investigated by the Shadow Chasers team. The evidence from those stops was described.

There were eight tour guides, six Shadow Chasers team members and two researchers. Each guide was provided with a binder containing all of the information to be shared on the tour. To train the guides, the Shadow Chasers team (including the researchers) took the tour with an experienced guide and thoroughly discussed each stop. Each guide was then encouraged to study the binder and choose the content that they found to be the most compelling. Guides were allowed to customize the tour (e.g., focus more on investigations in which they participated). At a subsequent team meeting the guides went on the tour again, taking turns leading at each stop.

Shadow Chasers guides used the binder to present the tour. Their tour was primarily story-based; any pictures they chose to show were black and white photocopies in the binder. The researchers presented the tour in a *Keynote* slide show on iPads. The researchers' show began by presenting tools of the trade, a discussion of evidence and how to interpret it, examples of electronic voice phenomena (EVPs), and sample pictures. The researchers' show was more focused on pictures (original photographs of evidence, interior shots of the locations, and photos provided by tour participants were included). The researchers also played EVPs at one stop (including a voice saying "get out now"). The content of the researchers' tour was also drawn from the binder; some omissions were made to incorporate the additional visual evidence.

The pre-test consisted of personality measures, a belief scale, a ghost experiences measure, and demographic information. There were three "chunks" to the pre-test. The first chunk presented the two personality scales. The first of these was the 4-item *Brief Sensation Seeking Scale* (BSSS; Stephenson, Hoyle, Palmgreen, & Slater, 2003). The BSSS showed internal consistency, convergent validity with established measures of sensation seeking, and predictive validity (Stephenson et al., 2003). It was designed for use in large-scale survey projects such as the one presented here.

The second personality measure was the *Private Body Consciousness* scale (PBC; Miller et al., 1981). This measure presented five items assessing participants' awareness of their internal states (e.g., *I am sensitive to internal bodily tensions*). The scale has good reliability and validity (Miller et al., 1981). To simplify the task for participants, they responded to both measures with a five-point scale ranging from

*strongly disagree* (1) to *strongly agree* (5). These were the anchors used to validate the BSSS. The original PBC scale used the anchors *extremely uncharacteristic* and *extremely characteristic*.

The second chunk of the pre-test measured belief. There were two parts to the belief measure. The first part measured belief in ghosts, extraordinary life forms, and precognition. The restricted subset of belief items was driven by the need to keep the overall survey short enough to be completed at the tour. Houran, Wiseman, and Thalbourne (2002) had participants complete some measures after their tour, but this was not practicable here. Ghost belief was assessed with the question "*I believe in the existence of ghosts*" (Wiseman, Watt, Greening, Stevens, & O'Keeffe, 2002), and two items from different subscales of the *Paranormal Belief Scale* (PBS; Tobacyk & Milford, 1983): "*The soul continues to exist though the body may die*," (Traditional Religious Belief subscale) and "*It is possible to communicate with the dead*" (Spiritualism subscale). The ghost belief measure also included a question added by the researchers "*It is possible for places to be haunted*." Laythe and Owen, 2012, noted that haunt experiences are frequently omitted from paranormal belief measures.

For the 4-item ghost belief scale, Cronbach's alpha was .83. The items from the Extraordinary Life Forms and Precognition subscales were presented as in the original PBS (Cronbach's alphas were .88 and .72 respectively). All items were anchored with *strongly disagree* (1) and *strongly agree* (5). The final score for each scale was the participants' average response to items on that scale, resulting in a possible range for each scale of 1 – 5. The 10 belief questions were randomized into two different orders to allow counterbalancing of the scales between the pre- and post-tests.

The difficulty in interpreting specific subscales of the paranormal belief scale has been noted repeatedly. For instance, Lange, Irwin, and Houran (2000) pointed out that the *Revised Paranormal Belief Scale* has many scaling issues and, ultimately, only two factors. Our use of the precognition and extraordinary life form questions included items that evaluated beliefs that should not change as a result of a ghost tour, even if they are not entirely unique belief factors.

The second part of the belief measure asked participants if they had experienced a ghost encounter and, if they had, to report how many encounters they had experienced. Participants who had experienced a ghost encounter were also asked to report (thinking of all of their encounters combined) which aspects of a ghost encounter they had experienced: "*unusual emotional feeling*," "*sense of presence*," "*unusual sound*," "*unusual temperature (e.g., cold)*," "*unusual dizzy feeling*," "*unusual smell*," "*unusual sight*," "*unusual taste*," and "*sense of being touched*." The first eight were taken from Wiseman et al. (2002) and the last item was added by the researchers after consultation with the Shadow Chasers team (Haraldsson, 2009, also found that being touched was a commonly reported aspect of a ghost encounter). The response format was different from Wiseman et al. (2002) and used fewer items than Houran (2002) in an effort to facilitate participant responding.

The third chunk of the pre-test contained demographic items. Participants were asked why they came on the tour, their gender, age, how many people were in their party on the tour, whether they had been on this tour before, whether they had been on another tour before, and whether they had been on a ghost investigation. For the final three items, participants were asked to report how many of each if they answered "yes" to an item. The original plan was to collect post-test measures from participants



after a three-month delay, so participants were also asked to provide an email address if they were willing to be contacted for this later survey. Due to an abysmally low response rate,  $n = 3$ , we were unable to collect sufficient data to complete this part of the project.

The chunks were counterbalanced across different versions of the survey form. Two versions of the personality measures chunk presented either the SSS or PBC first. These were paired with either the first or second randomization of the 10 belief items so that we could also counterbalance belief item sets between the pre- and post-tests. Then, the belief chunk could appear either before or after the personality chunk. Demographic items always appeared last. This produced eight versions of the survey that were randomly assigned to participants. An additional “large print” version of the first counterbalance was made for participants who requested it.

The post-test form presented the belief questions again, counterbalanced so they were in a different random order from the pre-test form. Participants were also asked if anything unusual happened on the tour and, if so, to list any of the aspects of a ghost encounter they experienced, to describe the experience, and to rate whether they thought it was a ghost with the anchors *definitely yes* and *definitely no*. Participants were also given a second chance to provide contact information for the three-month follow-up survey.

## Procedure

All procedures were reviewed and approved by the Middle Tennessee State University Institutional Review Board (IRB) and all researchers and assistants received IRB training prior to their participation in the data collection. Over six nights there were 39 tours (20 were led by members of the Shadow Chasers team, 19 by researchers). The mean number of people on each tour was 18.3 ( $N_{\text{tours}} = 35, 4 - 30, SD = 6.7$ ). The average temperature was 14.4°C (7.2 – 24.4°C).

The researchers approached tour-goers as they waited for their tour to start and asked them to complete a survey. Everyone approached was offered the opportunity to submit a ticket to enter a draw for a gift card at the end of the tour. For people completing the survey, their participant number and counterbalance were on the ticket so their data could be matched with a post-test. Tour-goers did not have to complete either survey to participate in the draw. Participants completed their surveys individually in the tour waiting area. For post-tests, a table was set up at the last tour stop for tour-goers to turn in their tickets. Tour-goers were also asked to complete a post-test form.

## Results

### Pre-Test Results

Descriptive statistics are presented in Table 1. Eighty-seven (43%) of the participants reported a prior ghost encounter. Descriptive statistics for the number of ghosts encountered and the number of properties of a ghost encounter are also reported in Table 1. The frequencies for each property of a ghost encounter are reported in Table 2.

Table 1  
*Descriptive Statistics for the Dependent Variables*

Variable	Pre-Test				Post-Test			
	Mean	SD	Range	N	Mean	SD	Range	N
Ghost belief	3.81	0.92	1-5	195	3.92	0.87	1-5	122
Extraordinary life forms	2.80	1.03	1-5	193	2.87	1.00	1-5	122
Precognition	3.53	0.94	1-5	195	3.46	1.00	1-5	118
Sensation seeking	14.70	3.60	4-20	196				
Private body consciousness	18.91	3.27	7-25	188				
Number of ghosts <sup>a</sup>	4.04	5.52	1-30	56				
Number of properties <sup>b</sup>	4.01	2.34	1-9	87				

Note. Ghost belief, extraordinary life forms, precognition, sensation seeking, and private body consciousness were measured with a scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (5); only participants completing all items on a measure are included.

<sup>a</sup>The number of ghosts reported by the group of people who reported they had encountered a ghost (one participant with over 100 ghost encounters was removed).<sup>b</sup>The number of properties of a ghost experience (ranging from 0 to 9) endorsed by the participants who reported seeing a ghost.

Participants' demographic variables (age, gender, and prior ghost tour experience) were not related to any of the belief measures, sensation seeking, private body consciousness, likelihood of a ghost encounter, number of ghosts seen, or number of properties of a ghost experience. The demographic items were also not related to one another. Therefore, they will be excluded from all subsequent pre-test analyses.

Encountering a ghost was related to belief. For participants who had encountered a ghost, mean belief was 4.38 ( $SD = 0.64$ ), whereas for participants who had not encountered a ghost, mean belief was 3.41 ( $SD = 0.87$ ). This difference was significant,  $t(193) = -8.49$ ,  $p < .001$ ,  $d = 1.26$ .

Correlations between the pre-test measures are presented in Table 3. All three belief scales were significantly correlated with one another, replicating the relation between the extraordinary life forms and precognition scales in the original Tobacyk and Milford (1983) study. Sensation seeking and private body consciousness were both related to ghost belief. Private body consciousness was also related to precognition belief.



Table 2  
*Properties of a Ghost Encounter with Rasch Scaling Data (N = 87)*

Property	Frequency	Difficulty	(SE)
<i>Sense of presence</i>	72	-2.68	(0.31)
<i>Unusual sight</i>	50	-1.05	0.26
<i>Unusual emotional feeling</i>	47	-0.85	0.26
<i>Unusual sound</i>	44	-0.65	0.26
<i>Sense of being touched</i>	40	-0.37	0.27
<i>Unusual temperature (e.g., cold)</i>	38	-0.23	0.27
<i>Unusual smell</i>	28	0.58	0.31
<i>Unusual dizzy feeling</i>	20	1.49	0.37
<i>Unusual taste</i>	10	3.77	0.66

Note. Property refers to the components of a ghost experience that participants could check; Frequency is the number of times a property was checked; "Difficulty" is the item's score from the Rasch scaling procedure; SE is the standard error of the difficulty measure; Infit and Outfit are statistics to evaluate the model; they should be between 0.5 and 1.5 (Meyer, 2014).

To assess the relation between the intensity of an experience and belief, we originally followed Laythe and Owen (2012) and divided the haunt experience into lesser and greater properties. This analysis uncovered some interesting potential effects of intensity and belief. Because this analysis was post-hoc and somewhat arbitrary, and at the suggestion of the reviewers, we undertook a Rasch scaling of the haunt experience properties (see Houran et al., 2002, for a description of this procedure applied to the items from Wiseman et al., 2002). This scale provides a linear ordering of the properties and an overall score that indicates each participants' place in the ordering (higher scores are associated with higher intensity; Meyer, 2014). Scaling was conducted using the jMetric Rasch models module with the default parameter settings (<https://itemanalysis.com/>). The Rasch scaling data are included in Table 2. The nine properties were broken into lower, moderate, and higher intensity subsets of three items each based on their position in the Rasch scale. Scores for each subset of items were computed for each participant and used for the mild, moderate, and strong intensity measures.

Table 3  
*Correlations between Measures on the Pre-Test*

Variable	1	2	3	4	5
1. Ghost belief					
2. Extraordinary life forms	.35**				
3. Precognition	.63**	.32**			
4. Sensation seeking	.25**	.11	.15		
5. Private body consciousness	.31**	.11	.33**	.25**	

$N = 163$ , \*\* $p < .01$

The cross tabulation between belief and experience is presented in Table 4. For this analysis, we used a median split to create lower belief (average belief less than 4) and higher belief groups (average belief greater than or equal to 4). Experience was coded as “yes” or “no” based on the ghost encounter question. Two cells of the table are relatively easy to explain. Participants lower on belief without an experience and participants higher on belief with an experience can be seen as making a rational decision about belief based on evidence (or the lack thereof). A number of researchers have found that some people who have an experience are still lower believers, and a number of higher believers have never had an experience (e.g., Lawrence & Peters, 2004). In this study, 15 participants reporting lower belief (15% of the lower believers) reported having a ghost encounter, and 32 participants reporting higher belief (33% of higher believers) did not report a ghost encounter. We will address these “off-diagonal” groups more thoroughly in the discussion.

The correlations in Table 5 show some evidence of a belief-experience intensity relation. There was no overall correlation between belief and number of ghosts, but there was a relation between the number of properties of an experience and belief. Within the intensity measures, belief was not related to encounters of mild intensity, but it was to moderate and strong encounters. Belief was also related to the overall intensity measure.

Table 4  
*Ghost Belief as a Function of Ghost Experience*

	No ghost encounter	Ghost encounter
Lower belief	82	15
Higher belief	32	66

Note.  $\chi^2(1, N = 195) = 54.04, p < .01$ . Participants who failed to complete all ghost belief items were excluded from the analysis.

One possible reason for a low correlation between belief and the number of ghost encounters is that belief could be a step-function. People who have not encountered a ghost would be expected to have lower ghost belief. People who have encountered a ghost would be expected to have higher ghost belief. If this is true, then within the group of people reporting a ghost encounter, the correlation between the number of ghosts and belief will necessarily be low. The data in Figure 1 support this interpretation. People who reported that they had not seen a ghost were more likely to report lower belief. Once people reported that they had seen a ghost, the percentage who were higher believers increased dramatically and was relatively unaffected by the number of ghosts.

Table 5  
*Correlations between Ghost Belief, Number of Ghosts, Properties of the Ghost Encounter, and Encounter Intensity*

Variable	1	2	3	4	5	6	7
1. Ghost belief							
2. Number of ghost encounters	.25						
3. Number of properties	.33*	.45**					
4. Mild intensity	.13	.31*	.65**				
5. Moderate intensity	.29*	.42**	.78**	.15			
6. Strong intensity	.33*	.31*	.88**	.42**	.60**		
7. Overall intensity	.35*	.44**	.99**	.63**	.76**	.89**	

$N = 52, *p < .05, **p < .01$

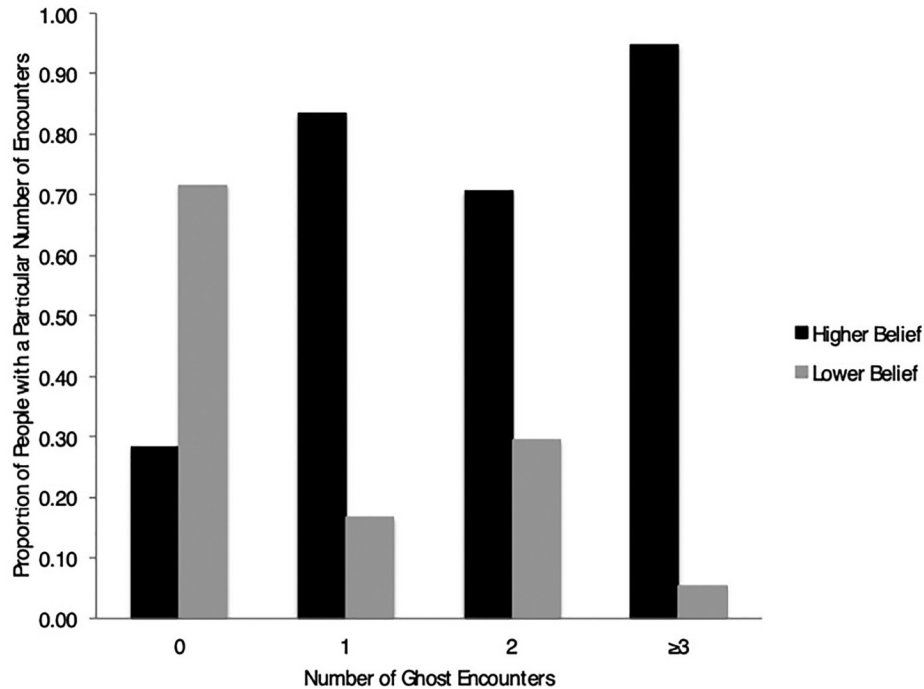


Figure 1. Proportion of ghost believers in each group who are higher or lower on belief

### Effect of the Tour

For all of the data presented below, there was no effect of guide type (shadow chaser vs. researcher). This will be evaluated more fully in the next section. For all analyses, participants were split into higher and lower believers (prior ghost belief) based on a median split of the average of the ghost belief items on the pre-test. The data were analyzed with two-way, mixed ANOVAs with prior ghost belief as the between participants factor and time (pre- or post-test) as the within participants factor. The dependent variable was either ghost belief, extraordinary life form belief, or precognition belief. For all analyses, alpha was set at .05.

For ghost belief, there was a significant main effect for prior ghost belief,  $F(1, 117) = 163.08$ ,  $MSE = 0.65$ ,  $p < .001$ ,  $\eta^2_p = .58$ . The mean for higher believers was 4.48 ( $SD = 0.57$ ), and the mean for lower believers was 3.14 ( $SD = 0.57$ ). This difference supports the effectiveness of the median split based on belief. The main effect of time was not significant,  $F(1, 117) = 3.00$ ,  $MSE = 0.08$ ,  $p = .09$ ,  $\eta^2_p = .02$ . The mean for the pre-test was 3.78 ( $SD = 0.58$ ) and the mean for the post-test was 3.84 ( $SD = 0.63$ ).

For the ghost belief analysis, the effect of interest was the interaction, and it was significant,  $F(1, 117) = 12.60$ ,  $MSE = 0.08$ ,  $p = .001$ ,  $\eta^2_p = .10$ . The means are illustrated in Figure 2a. For higher believers, the tour had no effect,  $t(65) = 1.56$ ,  $p = .12$ ,  $d = 0.15$ . For lower believers, the tour increased belief,  $t(52) = -3.11$ ,  $p = .003$ ,  $d = 0.26$ . To sum up, learning about other people's experiences did influence lower believers to increase their belief. The higher believers did not change (this is possibly due to a ceiling effect in their belief).

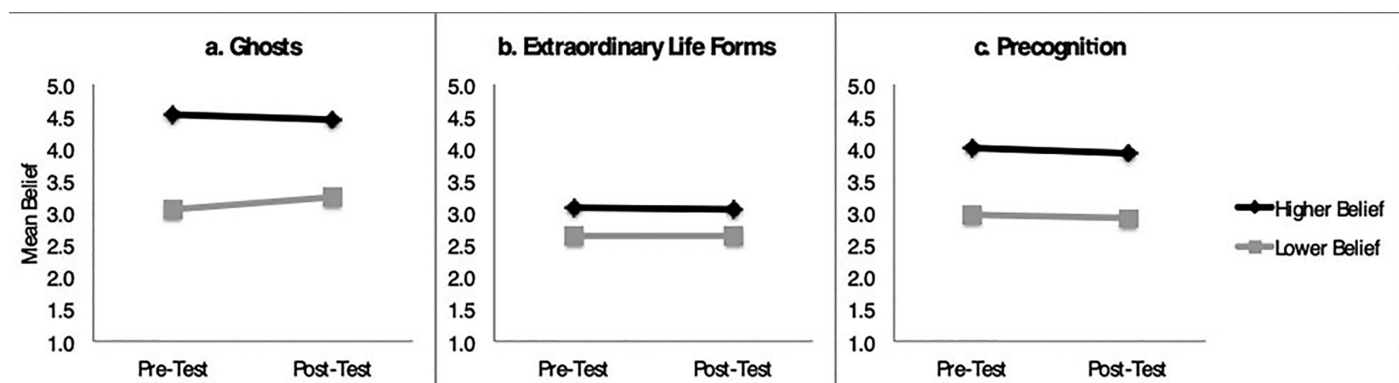


Figure 2. Change in belief as a function of prior belief in ghosts. Higher and Lower believers were determined by a median split on the average for the ghost belief items ( $< 4.0 = \text{lower}$ ,  $N = 97$ ;  $\geq 4.0 = \text{higher}$ ,  $N = 98$ ). Change in belief is presented for ghost belief (a), extraordinary life form belief (b), and precognition belief (c).

Note that the participants with lower belief were still relatively high on belief, around 3 on a 5-point scale. This may reflect the fact that tour goers were, on average, higher on ghost belief than the general population. A full evaluation of this possibility is beyond the scope of this report. However, in the fall 2012 semester, after the tours concluded, we did collect the same survey data from 117 students from the Middle Tennessee State University psychology department research pool as a control sample (average age = 19.25, 18-33; 81 female, 36 male). We selected all participants from the tour who completed a pre-test ( $N = 195$ ) and compared them to the control sample using a factorial ANOVA with sample (tour or control) and belief magnitude (median split higher or lower) as the independent variables and ghost belief as the dependent variable. In this analysis, there was no main effect of sample on belief,  $F(1, 308) = 2.91$ ,  $MSE = 0.34$ ,  $p = .09$ ,  $\eta^2_p = .01$ . The mean for the tour sample was 3.81 ( $SD = 0.92$ ) and the mean for the control sample was 3.63 ( $SD = 0.91$ ). The interaction between sample and belief magnitude was also not significant,  $F(1, 308) = 0.001$ ,  $MSE = 0.34$ ,  $p = .98$ . A  $t$  test comparing the mean belief for lower believers from the tour sample (3.10,  $SD = 0.73$ ) to lower believers from the control sample (2.99,  $SD = 0.72$ ) was not significant,  $t(159) = 0.98$ ,  $p = .33$ ,  $d = .15$ . In other words, to the extent that the data allow a comparison, the lower-belief tour goers did not differ from lower-belief control participants from the same time period.

For extraordinary life form belief, there was also a main effect of prior ghost belief,  $F(1, 110) = 5.29$ ,  $MSE = 1.94$ ,  $p = .02$ ,  $\eta^2_p = .05$ . The mean for higher ghost believers was 3.07 ( $SD = 0.98$ ) and the mean for lower believers was 2.64 ( $SD = 0.98$ ). This shows again that the three beliefs measured here were related. Higher believers on one subscale were also higher believers on the others. There was no main effect of time and no interaction,  $F_s < 1.0$ . In other words, the tour had no effect on belief in extraordinary life forms. The means are illustrated in Figure 2b.

Finally, for precognition belief, the main effect for prior ghost belief was significant,  $F(1, 105) = 43.98$ ,  $MSE = 1.27$ ,  $p < .001$ ,  $\eta^2_p = .30$ . The mean for higher ghost believers was 3.96 ( $SD = 0.80$ ) and the mean for lower ghost believers was 2.94 ( $SD = 0.80$ ). Again, belief on one paranormal belief subscale is

related to belief on others. The main effect for time was not significant,  $F(1, 105) = 1.57$ ,  $MSE = 0.13$ ,  $p = .21$ ,  $\eta^2_p = .02$ . The interaction between prior ghost belief and time was not significant,  $F < 1.0$ . Again, the tour had no effect on a belief that was not targeted by the information shared on the tour. These means are illustrated in Figure 2c.

### **Evaluation of the Model**

The study was not originally intended to evaluate a model similar to the one proposed by Garety et al. (2001). However, the data lend themselves to this analysis, and this evaluation might be instructive for the development of future research. In short, the model proposes that one set of variables will be related to the formation of belief (indexed here by prior belief), and a different set of variables will be related to the updating of that belief. For purposes of evaluating the model, we had 10 variables available: Demographic items (gender, age, and prior tour experience), personality (sensation seeking and private body consciousness), experience (whether or not participants had encountered a ghost), prior ghost belief (obviously not a variable used to predict prior belief), and properties of the tour (guide type—researcher vs. shadow chaser, temperature, and number of people on the tour). These variables were entered into two stepwise regressions, the first using prior ghost belief as the dependent variable, and the second using change in ghost belief as the dependent variable. The results are presented in Table 6.

Inspection of Table 6 reveals that prior ghost belief was influenced by whether or not participants had encountered a ghost (again suggesting an important role for experience in belief). Prior belief was also influenced by a personality measure (private body consciousness) and a demographic variable (age). Change in belief was not affected by personality or demographic variables. Instead, only prior ghost belief affected belief change.

It is important to note that none of the tour variables affected change in belief. On the one hand, this is not surprising. The tour was relatively constrained by the Shadow Chasers team to provide a somewhat consistent experience for tour patrons. However, given the role of social support in belief (e.g., Auton et al., 2003), it seems like the number of people on a tour should have had some effect. Similarly, it seems that guide type should have mattered given that researchers were using iPads to present a summary of tools of the trade and also included more evidence (Brewer, 2013). This point will be addressed more fully in the discussion.

### **Discussion**

The main research question was whether learning about other people's experiences on a ghost tour could change belief in ghosts. The answer was that it can. Lower believers significantly increased their belief in ghosts after the tour. The effect of the tour was specific to ghost belief; belief in extraordinary life forms and precognition did not change.



Table 6

*Stepwise Regression Analyses Evaluating the Contribution of the Independent Variables to Prior Ghost Belief and Change in Ghost Belief*

Variable	Model 1	Model 2	Model 3	
	<i>B</i>	<i>B</i>	<i>B</i>	95% CI
Prior ghost belief ( <i>N</i> = 127)				
Constant	3.37**	1.62**	1.11*	[0.15, 2.07]
Ghost encounter	1.01**	0.94**	0.91**	[0.62, 1.20]
PBC		0.10**	0.10**	[0.06, 0.15]
Age			0.01*	[0.00, 0.02]
<i>R</i> <sup>2</sup>	.25	.35	.37	
<i>F</i>	42.36**	33.10**	23.97**	
$\Delta R^2$		.09	.02	
$\Delta F$		18.09**	4.09*	
Ghost Belief Change ( <i>N</i> = 75)				
Model 1				
Variable	<i>B</i>	95% CI		
Constant	0.54**	[0.19, 0.89]		
Prior ghost belief	-0.12**	[-0.21, -0.04]		
<i>R</i> <sup>2</sup>	.10			
<i>F</i>	7.87**			

Note. Ghost encounter was coded no-ghost-encounter = 0, ghost-encounter = 1. These analyses exclude participants who did not complete all items on the measures.

\**p* < .05, \*\**p* < .01

A couple of aspects of this result merit further consideration. First, the higher believers were at ceiling on the measure used, so there is no way to determine if a more sensitive measure might have shown an increase in this group. If experience and belief form a feedback loop as suggested in the model (e.g., Garety et al., 2001; see also Lange & Houran, 1998), then even higher believers might still be able to increase their belief with additional experience. Second, our lower believers might represent a special subgroup of people lower on belief: those open to evidence that can change their belief. Their choice to come on a ghost walk tour would support this idea that they are more open to updating belief. More skeptical non-believers might not be swayed by the types of evidence presented on the tour. This also raises the possibility that participant expectations might play a role. In this case, it is likely that all participants expected to at least hear compelling ghost evidence because of the way the tour was promoted. These expectations may have played a role in influencing belief, but the design of the study does not allow us to evaluate the role of expectations on belief change.

A unique feature of this study was its relatively high external validity. Many studies have investigated haunt experiences in natural environments (Houran, 2002; Houran et al., 2002; Terhune, Ventola, & Houran, 2007; Wiseman et al., 2002; Wiseman et al., 2003). However, research investigating belief change is less likely to have been conducted in a natural environment (e.g., Wiseman & Morris, 1995). Whereas we did attempt a manipulation of the type of information contained in the tour, half of the participants received the “standard” tour that was unaffected by the researchers’ presence.

We did replicate a number of prior findings. There was a strong relation between experience and prior belief, as is common in this type of research (e.g., Pechey & Halligan, 2012). We also replicated the common finding that some participants are higher believers without a personal ghost experience, and some with an experience remain lower on belief (e.g., Clarke, 1995; Lawrence & Peters, 2004; Pechey & Halligan, 2012). These two groups appear to contradict the notion that beliefs are a response to an experience, and thus require additional consideration.

Participants lower on belief who reported a ghost encounter might provide support for Lange and Houran’s (2001) cusp model that predicts a possible “lag” in the formation of belief after experience. It is also possible that these participants are reporting a “local” experience that would normally be taken as evidence for an encounter, but some additional beliefs override the event’s ability to affect ghost belief (e.g., believing that ghosts are not physically possible, so the unexplained experience may be explainable even if they do not know what the actual physical cause was). Existing models focus more on how paranormal beliefs form (e.g., Garety et al., 2001), but this group of participants might allow a more careful evaluation of how beliefs *do not* form. For example, in Lange and Houran’s (1998) model perhaps these participants are higher on tolerance for ambiguity, younger, and male, reducing their fear response to ambiguous stimuli and therefore reducing the likelihood of an experience creating belief. Alternatively, a belief that ghosts are not real could operate as the “filter” in the maintenance and updating stage (Garety et al., 2001), leading to the interpretation of experiences as non-paranormal. Our data do not allow a full evaluation of these possibilities, but they warrant investigation in future studies.

Participants who believe without having an experience provide a conceptual challenge to our expectation (following Garety et al., 2001) that a precipitant event is necessary to initiate belief. However, we only measured one kind of experience in this study—personal experience. Irwin (1985) proposed

that an experience with one paranormal phenomenon (e.g., a psychic experience) might open the door to a general belief in the paranormal that is not tied to direct personal experience. So, our participants could have had an experience of another paranormal phenomenon, leading to ghost belief. The design of the current study does not allow us to evaluate this claim with respect to our participants' prior belief. A thorough evaluation of all types of experience within the same participants would provide evidence on this point, and we are currently collecting those data.

Within the area of the personality measures, we replicated the relation between sensation seeking and belief (Smith et al., 2009). We included private body consciousness as a measure because of its relationship to the properties of a ghost experience that are frequently reported (e.g., an unusual sensation). We expected that people more in tune with slight changes in their bodily state might be more likely to have experiences that could be interpreted as ghosts. The correlation between private body consciousness and ghost belief supports this expectation.

We also uncovered a relation between the intensity of the experience and belief within people who have had an experience, similar to Laythe and Owen (2012). It is important to note that the ordering produced by our Rasch scaling procedure was different from the ordering in Houran et al. (2002) even though both procedures were based on essentially the same items (both derived from Wiseman et al., 2002). Houran et al. (2002) suggested that contrasts in hierarchies could be diagnostic. In this case, the data might suggest that experiences reported in real time (as in Houran et al., 2002) might lead to a different hierarchy from retrospective experiences like those reported here. Taking one property as an example, a temperature change was a more intense experience in our hierarchy, possibly because the typical haunt environment presents temperature changes (e.g., Houran, 2002), making them common, but memory for them would only be available if they were more closely connected to an encounter. Determining if different hierarchies for haunt experiences reflect perceptual or memory processes would be a topic for future research.

The data also speak to a potential model of the formation and maintenance of paranormal beliefs similar to one proposed by Garety et al. (2001). The first stage proposes that a predisposed person (e.g., Smith et al.'s, 2009, "encounter-prone personality"), in the presence of the right ambiguous experience, will become a believer in a paranormal phenomenon. A great deal of information is available that suggests what makes a person predisposed. For example, Smith et al. (2009) found support for openness to experience and sensation seeking. Our data suggest private body consciousness. Hergovich, Schott, and Arendasy (2008) suggested schizotypy. Lange and Houran (2001) present a more thorough review of internal and external contextual variables that influence the perception of a haunt experience.

This research raises questions about the type of experience that can trigger belief. Does it have to be a personal experience, or can someone else's experience also lead to belief? Are the factors that make one predisposed similar for personal experiences as opposed to other people's experiences? There is some reason to expect that the two types of experience might be affected differently given that Sharps et al. (2006) found that different variables affect what makes one predisposed for different paranormal beliefs.

According to the model, once a belief has formed, different variables are responsible for maintain-

ing and updating that belief. Sharps et al. (2010) found this for the variables in Sharps et al. (2006). In our data, private body consciousness and age were related to prior ghost belief, but were not factors in change in belief. In fact, our data were that prior ghost belief was the only factor that was related to change in belief. This is similar to Wiseman et al.'s (2003) finding that their participants high on belief had more experiences and were more likely to attribute them to ghosts. Note that the overall variance accounted for by prior belief was relatively small, suggesting an avenue for future research to identify other variables involved in the updating of paranormal beliefs.

Our results raise questions about the way in which experience is filtered through belief. It seems relatively obvious that for a personal experience that requires interpretation by the person having it, belief would be an important variable. For someone else's experience, belief might also be important, but other variables, such as the credibility of the witness, might be more important. On that note, it would seem that our guide manipulation (shadow chaser vs. researcher) might have carried more weight. A number of factors may have contributed to a smaller effect. First, the shadow chasers had more credibility as ghost investigators. One of the researchers had been on two investigations prior to leading tours, the other had only been on one. That lack of experience may have overwhelmed a difference in presentation format. Also, the fact that people had come to a ghost tour billing itself a "real investigators presenting real evidence" may have provided an overall credibility boost that overwhelmed presentation format.

Another possibility is that there is no effect of guide type or tour variables because they do not matter. Terhune et al. (2007) reported a similar methodological approach to the one proposed here. Their measurement of contextual variables associated with the formation of belief provides a more comprehensive list of contextual variables than we measured for the tours. Similar to our data, they did not find much of a role for environmental contextual variables.

There is a lot of evidence that for the maintenance and updating stage, properties of the experience are less relevant (e.g., Irwin, 1985; Wiseman et al., 2003). In our case, none of the properties of the tour mattered, consistent with this finding. Rather, cognitive styles (like BADE, Moritz & Woodward, 2006) are more important as experiences are filtered through belief. Most of this work has been with believers, and has shown that they are more likely to interpret events as paranormal. In our case, the lower believers were the ones who changed. Is it the case, as Jones and Russell (1980) proposed, that "it would be relatively easy for a skeptic to become a believer" (p. 311) because they are open to all information, whereas believers are relatively closed and can only filter events through their existing belief? Perhaps hard-core skeptics are also filtering experiences based on their schemas, and only those with a moderate level of belief are susceptible to change? Such speculations are beyond the data of the present research, but our data do suggest that other people's experiences need to be incorporated in the model, both as an experience that can trigger belief, and as a factor in the maintenance and updating of belief.

In conclusion, we found that a ghost walk tour, a relatively common, real-world method for learning about ghosts, can increase belief in ghosts in people initially lower in belief. The variables affecting the updating of belief were different from those related to prior ghost belief, supporting a possible model for the formation and updating of paranormal beliefs.

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### **Marche dans l’Ombre: Est-ce qu’un Circuit Touristique dans un Lieu Réputé Hanté Va Affecter la Croyance aux Fantômes ?**

Résumé : Il y a une relation forte entre l’expérience personnelle et la croyance aux fantômes. La recherche relatée ici étudie si les vécus des personnes participant à un circuit touristique dans un lieu réputé hanté pouvait également influencer leur croyance. Nous avons sondé des participants avant et après un circuit hanté pour évaluer les changements de croyance résultants du circuit. Pour les participants qui débutaient avec une faible croyance aux fantômes, le circuit a augmenté leurs croyances. Le circuit n’a eu aucun effet sur les croyances paranormales non-relatives aux fantômes. Les données furent évaluées contre un modèle suggérant que les variables influençant l’actualisation des croyances étaient différentes des variables relatives à la formation de croyances. Le modèle produit une bonne adéquation avec les données et suggère des directions pour de futures recherches.

### **Wandern im Schatten: Wird eine Geistertour den Glauben an Geister beeinflussen?**

Zusammenfassung: Persönliche Erfahrungen und der Glaube an Geister hängen eng zusammen. Die hier vorgestellte Forschung untersuchte, ob die Erfahrungen anderer Menschen, die auf einer Geistertour vermittelt wurden, diesbezügliche Überzeugungen beeinflussen können. Wir befragten die Teilnehmer vor und nach einer Geistertour, um festzustellen, ob sich deren Einstellung im Anschluss an diese verändert hat. Für Teilnehmer, deren Glaube an Geister gering war, hat die Tour ihren Glauben erhöht. Die Tour hatte keinen Einfluss auf paranormale Überzeugungen, bei denen der Geisterglaube keine Rolle spielt. Die Daten wurden im Hinblick auf ein Modell ausgewertet, das aussagt, dass sich die Variablen, die die Aktualisierung von Überzeugungen beeinflussen, von den Variablen unterscheiden, die mit der Herausbildung von Überzeugungen zusammenhängen. Mit dem Modell lassen sich die Daten gut beschreiben, und es gibt Anregungen für weitere Forschung.

### **Caminar en la Sombra: ¿Afecta la Creencia en Fantasmas una Visita Guiada sobre Fantasmas?**

Resumen: Existe una fuerte relación entre la experiencia personal y la creencia en los fantasmas. La investigación reportada aquí investigó si las experiencias de otras personas mencionadas en una visita guiada sobre fantasmas también podrían influir las creencias. Encuestamos a los participantes antes y después de una visita guiada sobre fantasmas para evaluar los cambios en las creencias como resultado

de la visita. Para los participantes que comenzaron con una creencia más baja en fantasmas, el recorrido aumentó su creencia. La visita no tuvo efecto en las creencias paranormales no relacionadas con fantasmas. Los datos se evaluaron según un modelo que sugiere que las variables que influyen en la actualización de las creencias son diferentes de las variables relacionadas con la formación de la creencia. El modelo proporciona una buena solución de los datos y sugiere direcciones para futuras investigaciones.