

“SEEING IS BELIEVING”: DOES EXPERIENCE MEDIATE THE RELATIONSHIP  
BETWEEN OBSESSIVE-COMPULSIVE TENDENCIES AND SUPERNATURAL  
BELIEFS?

by

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A Thesis Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Arts in Psychology

Middle Tennessee State University

May 2020

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## ACKNOWLEDGEMENTS

I thank my committee members for their guidance in my completion of this project, from start to finish. My advisor and mentor, Dr. William Langston, has been incredibly helpful in working with me to refine my research interests and career goals over the past two years. Dr. Thomas Brinthaupt and Dr. Cameron Gordon have provided excellent advice, as well, and they have encouraged me to think about my research from a variety of perspectives. Additionally, I thank Dr. John Pennington for his literature recommendations and his feedback on questionnaire items in the early stages of the project.

I would also like to thank my family and friends—especially my parents—for their continued support of my endeavors, not only in academics but also in life more broadly. They have put me in the best possible position to succeed, and I never take that for granted.

I am indebted to my two personal heroes, Socrates and Dr. Gregory Graffin, who have provided an unwavering beacon of inspiration in my quest to understand what it means to be human, even during my toughest times. Lastly, I thank my non-human companion, Autumn, for being the most emotionally supportive cat that one could ask for during my time as a graduate student.

## ABSTRACT

This study was an attempt to determine the personality traits, including obsessive-compulsive (OC) tendencies, implicated in the formation of paranormal and religious belief systems and whether experience may mediate this relationship. Furthermore, the study examined the relationship of identity with experience and belief. A battery of questionnaires on personality, experience, and belief was administered in a student sample ( $N = 211$ ) and in a community sample ( $N = 81$ ). Results indicated that OC tendencies was not a helpful variable in distinguishing paranormal and religious believers, but other personality predictors' (e.g., absorption, transliminality) relationships with belief were significantly mediated by experience depending on the belief system.

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## CHAPTER I: INTRODUCTION

Beliefs are fundamental to the human condition. Each day people are faced with the challenge of making sense of their life experiences and the world around them, and their beliefs are integral in helping them do so. A number of scholars (Bering, 2011; Haidt, 2013; Shermer, 2011) posit an evolutionary and social basis for beliefs. For example, Shermer (2011) argues that humans have innate tendencies to detect patterns ("patternicity") and to detect intentionality and meaning ("agenticity") in events; in turn, these tendencies helped our ancestors to form beliefs about their environment that were conducive to their survival and reproduction. Beliefs may function not only to integrate everyday experiences but also to explain anomalous experiences, including those pertaining to paranormal or religious phenomena. Furthermore, it is evident that not everyone experiences or believes the same things in this domain. For instance, in presenting his case for the neurological underpinnings of hallucinations, Sacks (2012) acknowledges that these anomalous experiences may be interpreted differently by individuals with different belief systems (e.g., religious believers vs. paranormal believers vs. skeptics), and these belief systems themselves are situated within a social and cultural context.

Evolutionary explanations and general hypotheses about the function of beliefs (e.g., meaning, comfort, social cohesion, control, understanding death, etc.) notwithstanding, what makes individuals believe different things about paranormal and religious phenomena? Are there experiences and personality traits that predispose someone toward particular beliefs? The primary aim of this thesis project was to address these questions empirically. Furthermore, we sought to examine the role of clinically-

relevant variables—chiefly, obsessive-compulsive tendencies—in paranormal and religious beliefs and experiences, the hope being that understanding how such variables relate to these (oftentimes adaptive) beliefs and experiences will shed light on how those with psychological disorders form, maintain, and change disorder-specific maladaptive beliefs.

## **Literature Review**

### ***Experience and belief***

It may seem banal to say that beliefs are formed based on people's experiences. After all, beliefs do not appear out of thin air. If, for example, one believes that it is going to rain today, the belief probably is founded on their past experience: The sky is dark and full of clouds, and on many occasions in the past when they witnessed this, rain did indeed fall. Nevertheless, is this intuition borne out by the data? Additionally, what other factors are at play in shaping someone's beliefs or in shaping their experiences in the first place?

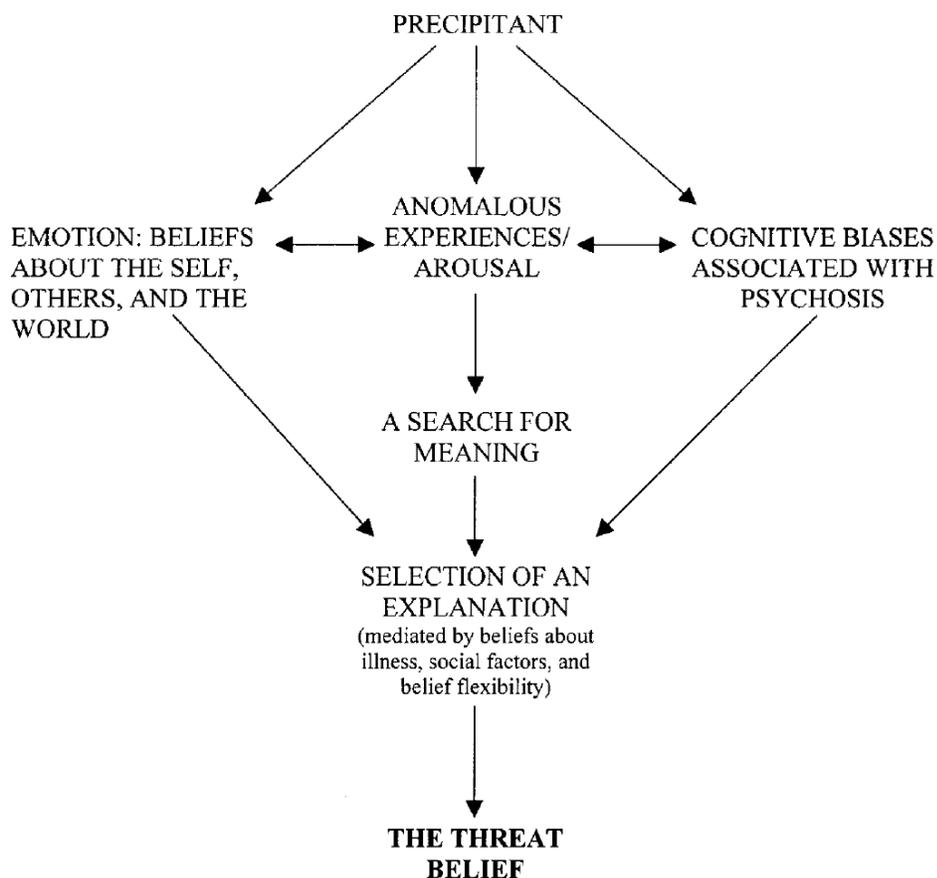
Freeman et al. (2002) proposed a cognitive model for the formation of persecutory delusions (see Figure 1). Importantly, there are two steps within this formation model: (1) having an experience in the first place and (2) converting the experience into a belief. In their model, "threat beliefs" (i.e., beliefs about the imminence of personal danger; p. 332) are crucially reliant upon prior experiences. The experiences connected with the threat beliefs are generated by and, in turn, colored by underlying personality dispositions, emotional states and traits, cognitive biases, and other preexisting beliefs. All these factors combine to generate experience and influence the

individual's interpretation of an experience, which results in the formation of a belief.

Furthermore, different variables may be differentially important at each step in the model.

**Figure 1**

*Cognitive Model of the Formation of Persecutory Delusions*

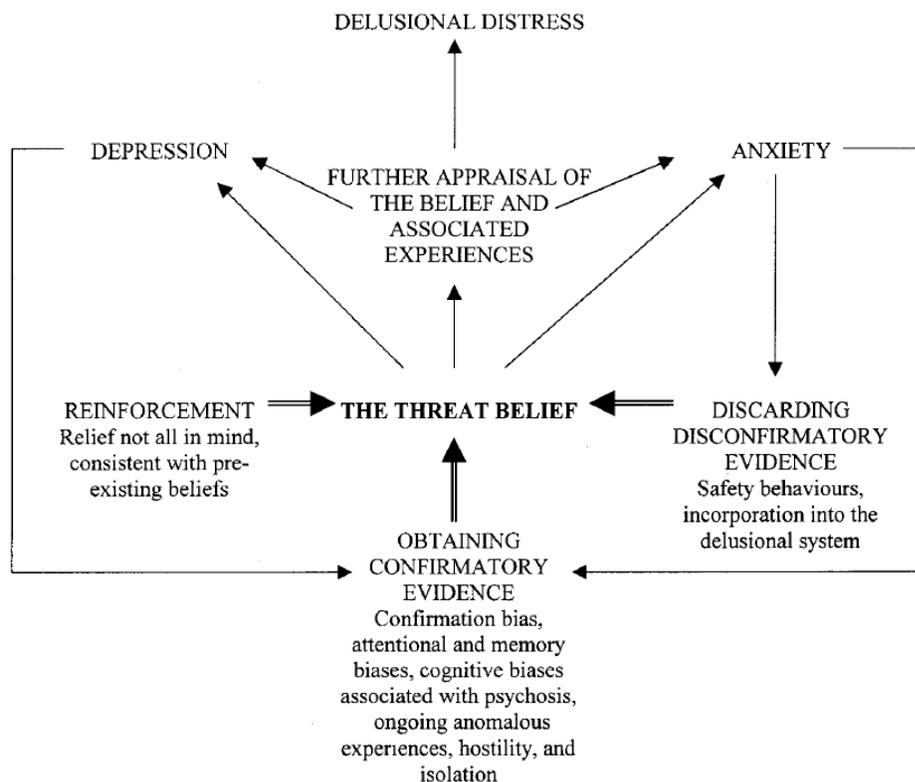


*Note.* Figure adapted from Freeman et al. (2002).

The model of persecutory delusion formation is nested within a larger belief model by the same authors that also includes the *maintenance* of threat beliefs (see Figure 2). This stage is characterized by emotional and cognitive biases affecting the

individual's appraisal of the current threat belief (i.e., viewing it as the most plausible explanation for a given situation). A feedback loop may form such that additional experiences are interpreted in light of the current threat belief and then serve as further evidence supporting the threat belief. As it does in the formation stage of the model, experience plays a central role in the maintenance of persecutory delusions.

The threat beliefs in the model above are of everyday concern to believers. The content of the belief pertains to the believer's social relationships and personal safety. Despite the mundanity of the content, the authors contend that the threat beliefs are a function of *anomalous* experiences. Paranormal and religious phenomena are ostensibly anomalous, as well. Might paranormal and religious beliefs, then, be a function of anomalous experiences? This was the rationale for testing whether the model of persecutory delusions—specifically, the formation stage—may be applicable to other classes of beliefs. It should be noted that we are using this model as an analogy rather than directly testing it, insofar as our conception of belief begins with personality rather than with experience.

**Figure 1***Cognitive Model of the Maintenance of Persecutory Delusions*

*Note.* Figure adapted from Freeman et al. (2002).

### **Paranormal and Religious Experience and Belief.**

Given the prevalence of beliefs in some form of the supernatural, there have been surprisingly few recent empirical studies (Aarnio & Lindeman, 2007; Clarke, 1995; Hood et al., 1990; Langston, Fehrman, et al., 2018; Langston, Frosh, et al., 2018; Langston & Hubbard, 2014; Langston & Hubbard, 2019; Thalbourne, 2004; Zhong et al., 2018) that have examined directly the role of experience in paranormal and religious beliefs. The results of the majority of these studies do provide some evidence of an experience-belief relationship (e.g., Langston & Hubbard, 2014).

Aarnio and Lindeman (2007) surveyed a sample of students and employees of Finnish educational institutions to examine personal and experiential variables that differentiate paranormal believers, religious believers, and nonbelievers. They hypothesized that believers would report having “witnessed more mystical experiences [and would] have close others with more positive attitude[s] for supernatural phenomena” than would nonbelievers (p. 3). The results of the study provided support for their hypothesis. They indicated not only that experience is highly predictive of paranormal and religious belief but also that intense belief in both the paranormal and in religion is uncommon. The authors attributed this latter finding to a person’s level of commitment to religious doctrine rather than to their amount of experience: Compared to nonbelievers, all types of believers reported more mystical experience and a more positive attitude of close others toward the supernatural. Thalbourne (2004) discovered similarly high positive correlations between paranormal experience and paranormal belief in two samples consisting primarily of Australian college students but added the caveat that, overall, there tend to be higher numbers of paranormal believers than paranormal experiencers. A study by Zhong et al. (2018) suggests some relationship between experience and belief, as well, but specific conclusions are not able to be drawn readily because only one belief category (magical ideation) and one experience category (religious) were measured.

Utilizing a combination of quantitative and qualitative methods, Clarke (1995) found that different types of paranormal experience (i.e., personal experience, close others’ experience, and media experience) were associated with different paranormal beliefs. In a sample of New Zealand college students, the author measured degree of

belief in 14 different paranormal phenomena. Then, participants chose one of these phenomena and gave reasons for their belief or disbelief, including whether they had experienced the phenomenon in some way. In the subset of questionnaires for which the author analyzed the written content, it was significantly more likely for participants who had experience with the paranormal phenomenon to believe in it than for them not to believe. Additionally, some beliefs were more likely to be formed based on media experience than were others (e.g., astral projection as compared with astrology). Nevertheless, personal experience (or close others' experience, if it was sufficiently compelling) proved to be more important than media experience in influencing paranormal belief.

Langston, Fehrman, et al. (2018) had similar findings in their survey of college students' friends and families. They measured participants' paranormal beliefs, paranormal experiences, and religious beliefs along with a host of other personality variables. Ghost encounters were significantly positively correlated with ghost belief, but ghost experience did not relate consistently to religious belief. While the aforementioned studies measured only one experience category, Langston, Frosh, et al. (2018) took both paranormal and religious experiences into account in surveying attendees of a "haunted tour." As hypothesized, they found significant positive correlations between ghost experience and ghost belief and between religious experience and religious belief; but, the relationships of the experience with the "opposite" type of belief (e.g., paranormal experience and religious belief) were not significant. Their results suggest that the experience-belief relationship may be content-dependent—that it is far more likely than not for the type of experience to match the type of belief.

Other research has examined the role of preexisting belief in the interpretation of *new* experience. Hood et al. (1990) tested experimentally whether different types of religious believers (intrinsically religious, extrinsically religious, and indiscriminately pro-religious; explained further in the section on identity below) would interpret a standardized experience in an isolation tank differently. The authors separated participants into groups based on instruction set. In one group, it was suggested to participants that they may have a religious experience in the isolation tank, but there was no such cueing in the other group. In accordance with their hypotheses, the extrinsically religious participants tended to interpret the experience non-religiously, regardless of cueing; the intrinsically religious participants tended to interpret the experience religiously, regardless of cueing; and the indiscriminately pro-religious participants' interpretation tended to be subject to the cueing. This result appears to support the second step of the belief formation model insofar as preexisting beliefs and environmental factors played a role in the interpretation of an experience. Nevertheless, the questions of how participants acquired their religious beliefs in the first place and to what extent experience was involved in the acquisition of their beliefs remain unanswered.

The foregoing results serve as evidence, albeit qualified, for a relationship between experience and belief with respect to paranormal and religious phenomena. However, the direction of causation remains unclear, and most likely there are other variables (per the model outlined at the beginning of this section) that influence this relationship. The precise nature of the experience-belief relationship with respect to paranormal and religious phenomena remains unresolved for the time being, but examining personality traits may help to shed light on this issue.

### ***Belief and Obsessive-Compulsive Tendencies***

According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), *obsessions* may be defined as “recurrent and persistent thoughts, urges, or images that are experienced as intrusive and unwanted” and *compulsions* as “repetitive behaviors or mental acts that an individual feels driven to perform in response to an obsession or according to rules that must be applied rigidly” (“Obsessive-Compulsive and Related Disorders,” para. 2). The maintenance, frequency, and negative impact of particular obsessions and compulsions are the hallmarks of obsessive-compulsive disorder (OCD).

However, obsessions and compulsions can be experienced by anyone from time to time, and their occasional presence does not mean that someone has a clinical disorder. Because of this, it seems reasonable to treat obsessive-compulsive (OC) tendencies as any other personality trait (e.g., introversion/extraversion) that falls along a spectrum, without necessarily implying the presence of mental disorder. Hence, a number of primarily correlational studies have examined the relationship between OC tendencies and paranormal and religious beliefs in *both* clinical and nonclinical samples (Abramowitz et al., 2002; Abramowitz & Jacoby, 2014; Agorastos et al., 2012; Buchholz et al., 2019; Cogle et al., 2013; Inozu et al., 2012; Marino et al., 2008; Mauzay et al., 2016; Pirutinsky & Rosmarin, 2018; Siev et al., 2010; Williams et al., 2013; Witzig & Pollard, 2013; Yorulmaz et al., 2011). The quasi-magical nature of many (but not necessarily all) OC tendencies makes them a good candidate for a personality trait that can aid in parsing the relationship between paranormal and religious experience and belief.

### **Thought-Action Fusion (TAF).**

Despite the fairly large number of recent studies, there have been mixed findings thus far regarding the relationship between OC tendencies and paranormal and religious beliefs (Inozu et al., 2012; Mauzay et al., 2016). The insight that obsessive-compulsiveness, paranormal beliefs, and religious beliefs all seem to share some elements of “magical thinking” (Yorulmaz et al., 2011) has led some researchers to examine another key construct that may provide the link between OC tendencies and these beliefs: thought-action fusion. *Thought-action fusion* (TAF) is defined by Siev et al. (2010) as the “tendency to treat mental states as similar to behavior in terms of physical or moral consequence” (p. 309). TAF typically is manifested in one of two ways: (1) morally (i.e., TAF-Moral), as a “general belief that thoughts and intentions carry moral weight corresponding to enacting those mental states behaviorally” (e.g., thinking about murdering someone is nearly as immoral as actually doing it); or (2) probabilistically (i.e., TAF-Likelihood), as the belief that “thinking or talking about an occurrence increases the probability of that outcome” (e.g., thinking about getting into an accident will increase the chance that it will actually happen; p. 309). It has been demonstrated empirically that those with greater OC tendencies have significantly greater tendencies toward TAF than do those with less OC tendencies (Shafran et al., 1996).

Yorulmaz et al. (2011) conducted one such study that aimed to clarify the relationship between paranormal beliefs and OC tendencies by appealing to TAF. Included in their survey completed by Turkish undergraduates were questionnaires about paranormal beliefs (a proxy for magical thinking), TAF, thought control and suppression, and OC tendencies. They found that high paranormal believers tended to exhibit

significantly higher levels of OC tendencies (particularly, obsessive thoughts and checking behaviors) than did low paranormal believers. Importantly, they also found that high paranormal believers exhibited significantly higher levels of TAF-Likelihood than did low paranormal believers. This finding was replicated by Mauzay et al. (2016) in their large ( $N = 925$ ) sample of primarily nonclinical undergraduates. Paranormal beliefs significantly predicted OC tendencies; however, much of the relationship between paranormal beliefs and OC tendencies was explained by the mediator of TAF-Likelihood. As a point of contrast, Agorastos et al. (2012) failed to find significant differences in paranormal beliefs or magical ideation among those with OCD, those with other anxiety disorders, and healthy controls. While they did not measure TAF, the authors suggested that similarly magical kinds of beliefs may have been correlated with OC tendencies in past research due to contamination of the instruments used to measure magical ideation and not due to a true underlying relationship.

There has been more empirical support for a link between TAF (specifically, TAF-Moral) and religious beliefs. Marino et al. (2008) found significant positive correlations between TAF-Moral and religiosity and between OC symptoms and religiosity in their sample of nonclinical undergraduates. Additionally, TAF and OC symptoms were found to significantly predict whether individuals would attempt to neutralize unwanted thoughts, another hallmark of OCD. Siev et al. (2010), on the other hand, failed to find a significant relationship between religiosity in general and OC symptoms in a sample of nonclinical undergraduates; but, they did find differences between Christians and Jews in TAF-Moral (Christians tended to score higher) as well as differences between Christians and Jews in the relationship between TAF-Moral and OC

symptoms (significant relationship for Jews, but not for Christians). The authors suggest that if a religion (e.g., Judaism) places its main emphasis on the morality of actions (as opposed to the morality of thoughts), then high TAF-Moral beliefs in an adherent of that religion “may [not] be a marker of healthy religious beliefs...but a sign of, or a risk factor for, obsessiveness” (p. 311).

Similarly, Williams et al. (2013) found an indirect relationship between OC tendencies and religious beliefs in their sample of undergraduate students. Notably, their study was one of the only quasi-experimental (rather than strictly correlational) studies conducted in this body of literature thus far. Christians tended to score higher on TAF-Moral than did Jews or Atheists/Agnostics, and TAF-Moral and OC tendencies were significantly correlated for Jews, but not for Christians (significant moderation), replicating the findings of Siev et al. (2010). They found TAF to be a significant mediator of the relationship between religiosity (regardless of affiliation) and OC tendencies, lending further support to the notion that OC tendencies and religious beliefs are not necessarily directly linked.

Inozu et al. (2012) did find a positive correlation between religious belief and OC tendencies in both Canadian (primarily Christian) and Turkish (primarily Muslim) samples. Their samples were pre-screened such that participants were divided into high- and low-religiosity groups based on responses to a religious fundamentalism measure. Specifically, the researchers found that particular subtypes of obsessive beliefs (e.g., feeling responsible for one’s thoughts, a belief that may have some overlap with TAF) and generalized guilt mediated the relationship between OC tendencies and religious belief in both the Canadian and Turkish samples. Mauzay et al. (2016), too, found that

TAF-Moral significantly mediated the relationship between religious beliefs and OC tendencies.

Taken together, the findings detailed in this section constitute evidence for TAF's important role in the relationship between OC tendencies and paranormal and religious beliefs. Although TAF may be considered as another personality, rather than experiential, variable, it makes the case that there may not be a direct relationship between personality and belief. Instead, a mediator—be it a different personality variable or be it experience—may be necessary to fully understand the formation and change of paranormal and religious beliefs (and perhaps beliefs, in general).

### **Scrupulosity.**

There is evidence to suggest that there are religiously-themed obsessions and compulsions—often referred to in the literature as *scrupulosity*—that affect a substantial number of individuals with other strong OC tendencies or clinically-diagnosed OCD (Abramowitz et al., 2002; Abramowitz & Jacoby, 2014; Buchholz et. al, 2019; Cogle et al., 2013; Mauzay et al., 2016; Pirutinsky & Rosmarin, 2018; Witzig & Pollard, 2013). Abramowitz et al. (2002) define *scrupulosity* as “persistent doubts about sin [and subsequent punishment from God] and irresistible urges to perform excessive religious behavior” (p. 825). Like TAF's role in the relationship between OC tendencies and supernatural beliefs, scrupulosity may be another variable with promising explanatory power when it comes to the relationship between and OC tendencies and religious beliefs, particularly. However, as will be explained below, the evidence for scrupulosity's existence as a construct and its role in the relationship has been more ambiguous than it has been for TAF.

Pirutinsky and Rosmarin (2018) wanted to determine whether there would be differences in scrupulosity among Orthodox and non-Orthodox Jews and, for Orthodox Jews in particular, among those with clinical OCD, those with other anxiety disorders, and those with non-related psychological disorders. In the nonclinical sample, they found that both Orthodox and non-Orthodox Jews' degree of scrupulosity was significantly correlated with religious practice, but not with every other dimension of religiosity that was measured. Secondly, although Orthodox Jews tended to score higher on scrupulosity than did the non-Orthodox, there were no significant differences between the two groups in terms of OC tendencies and other OCD-related constructs measured. In the clinical sample, individuals with OCD exhibited a greater degree of scrupulosity than did those with other anxiety disorders or non-related psychological disorders. The researchers concluded from these results that the construct of scrupulosity appears applicable for Orthodox Jews, but it is not clear if it generalizes to other religious groups, and it may be contaminated by the construct of general religiosity to some extent.

In keeping with the premise that scrupulosity more likely will be found among religious than among non-religious people, Witzig and Pollard (2013) randomly surveyed Anabaptist church members via mail in an effort to determine the relationship between scrupulosity and religious fundamentalism, in particular. As would be expected, they found a significant and strong positive correlation between scrupulosity and obsessive beliefs. Additionally, they found that (1) scrupulosity and religiosity and (2) scrupulosity and spiritual well-being were significantly negatively related, likely because healthy religious beliefs by definition tend to exclude unhealthy ones (i.e., scrupulosity). Contrary to expectation, though, the researchers found no relationship between

scrupulosity and fundamentalism. They suggest that, while both phenomena appear to be “absolutist,” the former goes beyond what the religion teaches and tends to cause distress whereas the latter involves adhering to religious tenets strictly and tends to provide an adaptive system of meaning to the individual.

Other research has attempted to compare individuals of different religious affiliations to determine whether scrupulosity is indeed a generalizable construct. In their sample of individuals with clinically-diagnosed OCD, Buchholz et al. (2019) found no significant differences in OCD symptoms among Catholics, Protestants, Jews, and religiously unaffiliated individuals. Catholics’ degree of scrupulosity was significantly greater than that of Jews and the unaffiliated, but there were no significant differences between Catholics and Protestants, Jews and Protestants, or Jews and the unaffiliated. Furthermore, religious affiliation only moderated the relationship between scrupulosity and OCD for select symptoms. The researchers suggest that current measures of scrupulosity may not be sensitive enough to detect it among all religious groups (e.g., Jews) and that the apparent difference between Catholics and Jews in scrupulosity could be explained as a difference in TAF-Moral, which would accord with past findings.

The findings outlined in this section underscore the fact that OC tendencies and paranormal and religious beliefs are not necessarily directly related. TAF and scrupulosity are constructs that offer promise in clarifying this relationship, but further work in this area is needed. Additionally, OC tendencies’ relationship to *experience* remains understudied at this time. The key point is that most likely the relationship between personality (including OC tendencies) and belief is mediated, so work must be done to clarify the role of experience as well as the roles of additional personality

constructs such as TAF and scrupulosity—treating them not only as mediators of the OC tendencies-belief relationship but also as predictor variables in their own right when framing them in the context of experience and belief.

### ***The Role of Identity***

The research on identity with respect to paranormal and religious beliefs is sparser and less direct. We understand *identity* to mean (1) the degree of integration of a *belief system* into one's sense of self (i.e., personal identity) and (2) the degree of identification with a *social organization* centered on that belief system (i.e., social identity). With respect to religion particularly, religious identity often is conflated with religious affiliation (a social category, such as Christianity) in the literature. While the particular group with which one identifies religiously—and, therefore, the *content* of the beliefs that the religious group holds—certainly represents a component of religious identity, our definition also includes the *extent* of one's integration of the religious belief system and the religious group into their overall sense of self.

The definition of identity we propose here is based loosely on two strands of research in social psychology: (1) Tajfel and Turner's (1979) Social Identity Theory (SIT) and (2) Allport and Ross's (1967) theory of motivations for religious belief. Tajfel and Turner (1979) define a “group” as

a collection of individuals who perceive themselves to be members of the same social category, share some emotional involvement in this common definition of themselves, and achieve some degree of social consensus about the evaluation of their group and of their membership in it (p. 40).

They go on to define “social identity” as “aspects of an individual's self-image that derive from the social categories to which he [sic] perceives himself [sic] as belonging” (p. 40).

In the context of religion, for example, people may identify socially as Muslims and incorporate this group affiliation into their sense of self. It is reasonable to hypothesize that there is a positive association between an individual's identification with a social group (e.g., Muslims) and the strength of belief in the group's core tenets (e.g., Islam's theological doctrines)—or, at very least, strength of belief in what people *think* that their fellow group members also believe. Furthermore, it is reasonable to hypothesize that a strong believer also strongly *personally* identifies with the belief system. Thus, from Tajfel and Turner's concept of social identity, we derive our concept of personal identity as a distinct but related construct. Van Camp et al. (2016) support our interpretation, stating the following:

Fundamental to SIT [social identity theory] is the idea that an individual's self-concept is in part derived from their individual identity but also in part from their social identity. Two levels of self are therefore thought to exist within a person, the individual self, the "I," which focuses on individual regard and judgments, and the social self, the "we," which focuses on collective regard and judgments linked to the group. Both are critical to our overall sense of self and are considered part of our identity (p. 25).

In a somewhat related vein, Allport and Ross (1967) distinguished among three types of religious orientations based on individuals' motivations for belief. They provided the following rough typology of religious believers: "Perhaps the briefest way to characterize the two poles of subjective religion is to say that the extrinsically motivated person *uses* his [sic] religion, whereas the intrinsically motivated *lives* his [sic] religion" (p. 434). In other words, intrinsically motivated religious believers believe because they are convinced of the underlying truth or inherent value of the religion, whereas extrinsically motivated religious believers believe for the sake of some other end (e.g., social desirability). A third type, the "indiscriminately pro-religious," endorses both

intrinsic and extrinsic reasons for belief highly, as compared with the “intrinsic” and “extrinsic” types (p. 438). They found that indiscriminately pro-religious individuals were the most racially prejudiced of the three types, suggesting the presence of stronger group identity. Their findings tie into Tajfel and Turner’s (1979) SIT insofar as the latter found that people behave more discriminatorily when there is an outgroup present (i.e., when group identity is made salient), even if group designations are completely arbitrary and even if they do not stand to gain anything from acting in a discriminatory manner. Very few studies have attempted to synthesize the insights from these two lines of research to develop comprehensive measures of religious identity (e.g., Van Camp et al., 2016). This synthesis was not the main objective of the present study, but we did attempt to create a measure capturing personal and social aspects of one’s identity with respect to religious beliefs.

While there is some theoretical basis for studying religious identity, there has been virtually no research on identity with respect to paranormal beliefs. At the time that the literature review was conducted, a search for “paranormal belief AND identity” on the PsycINFO database turned up meager overall results and zero empirical studies on the relationship of paranormal belief and paranormal identity. Thus, the present study’s treatment of paranormal belief and identity may also be regarded as exploratory.

#### ***Other Potentially Relevant Personality Variables***

While a full accounting of all personality variables that potentially may be related to paranormal and religious beliefs and experiences goes beyond the scope of this project, it is worth mentioning a few of them that have been measured in past research (Langston, Fehrman, et al., 2018; Langston, Frosh, et al., 2018; Langston & Hubbard, 2014;

Langston & Hubbard, 2019) and are being investigated by the research team in current projects. It bears repeating that the nature of the research on personality variables implicated in paranormal and religious beliefs and experiences is exploratory.

Private body consciousness has been defined as “awareness of...the private...aspects of the body” and is “nonevaluative” (Miller et al., 1981, p. 398). One might hypothesize that those who are more aware of their bodily sensations will be more aware of anomalous sensations, rendering them more vulnerable to paranormal or religious experience.

Sensation seeking is defined in the literature as a “personality trait...that expresses as a need for physiological arousal, novel experience, and a willingness to take social, physical, and financial risks to obtain such arousal” (Stephenson et al., 2003, p. 279). One might hypothesize that those willing to take such risks to satisfy their need for adventure could open themselves up to experiencing paranormal or religious phenomena, as these experiences may evoke strong emotions in the experiencer.

Schizotypy, the personality variable associated with symptoms of schizophrenia (e.g., delusions, hyperawareness of patterns, etc.), could predispose individuals toward having paranormal experiences and developing paranormal beliefs. Hergovich et al. (2008) found evidence in their sample of Austrian adolescents that schizotypy is predictive of some types of paranormal beliefs (e.g., witchcraft). Langston, Fehrman, et al. (2018) found that different aspects of schizotypy were associated with ghost belief and religious belief.

Transliminality is “a hypothesized tendency for psychological material to cross thresholds into or out of consciousness... consist[ing] of items that span magical ideation,

mystical experience, absorption, hyperaesthesia, manic experience, dream interpretation, and fantasy proneness” (Lange et al., 2000, p. 594, 613). The overlap with paranormal and religious experiences and beliefs embedded in the definition makes it a good candidate for a related personality variable to examine. Langston, Fehrman, et al. (2018) found that transliminality was more positively associated with ghost belief than with religious belief.

Critical thinking may be expected to have a negative relationship with paranormal and religious experience and belief because those high in critical thinking may be more apt to reject ambiguous evidence as inconclusive (e.g., they may not interpret an experience as paranormal if they cannot rule out other explanations first). Pennycook et al. (2012) found evidence that analytic cognitive style has such a relationship with religiosity and paranormal beliefs in their sample of Amazon Mechanical Turk participants.

Paranoia may be related to magical kinds of thinking and open people to anomalous experience. Per Freeman et al.’s (2002) model of persecutory delusions outlined earlier, paranoid individuals may have more anomalous experiences and be more prone to interpret these experiences in the light of a threat belief.

Tolerance for ambiguity can play into how people interpret experiences and whether they do so on paranormal or religious terms. It could factor into Freeman et al.’s (2002) model insofar as those low in ambiguity tolerance may demonstrate a more urgent need to select an explanation for an experience. Furthermore, it may be hypothesized that tolerance for ambiguity has some relationship with OC tendencies, as it bears a

resemblance to intolerance of uncertainty, which past research has shown to be a marker of OCD (Abramowitz & Jacoby, 2014).

Absorption—the capacity for providing one’s full attention to objects in consciousness, and not always voluntarily so (Jamieson, 2005)—may be related to paranormal and religious experiences and beliefs for similar reasons as transliminality may be. As they did with transliminality, Langston, Fehrman, et al. (2018) found that absorption was more positively associated with ghost belief than with religious belief.

Finally, one’s attitude toward science likely plays a role in shaping paranormal and religious beliefs (Hartman et al., 2017). Distrust of science or of scientists may bias individuals toward paranormal or religious explanations of events for which an alternative, scientific explanation might be offered, and it could also have the effect of making them “double down” on their prior commitments.

### **Present Study**

The present study intended to clarify previous findings about the relationships among paranormal beliefs, religious beliefs, and personality traits, including OC tendencies and related constructs. Additionally, the study made use of more precise measurement instruments, including several items assessing the qualities of individuals’ paranormal and religious experiences as well as a more comprehensive measure of religiosity than has been used in most of the previous studies. The study also was an attempt to address several unresolved (or even unexplored) areas in the research literature—namely, (1) the nature of the relationship between paranormal and religious *experiences* and beliefs, (2) the role of OC tendencies in experience and the experience-belief relationship (no study of which we are aware has examined this in detail), and (3)

the role of personal and social identity in experience and belief. It should also be noted that this study examined the correlates of *current* belief only; the study of the variables implicated in belief *change* will be reserved for future projects.

### ***Hypotheses***

The following hypotheses were made based on the literature reviewed earlier. It should be noted that there were two samples that completed slightly different sets of questionnaires, so not all hypotheses were tested in each sample (further explanation provided in the Method and Results):

*Hypothesis 1:* Experience will predict belief, and this relationship will be content-specific (e.g., ghost experience will predict ghost belief). This will be tested by computing correlations for these variables:

1a: Ghost experience will be positively correlated with ghost belief.

1b: Religious experience will be positively correlated with religious belief.

*Hypothesis 2:* Personality will be related to experience and belief, and the relationship between personality and belief will be mediated by experience. This will be tested by computing correlations among these variables as well as by conducting a series of mediation analyses using personality as the predictor variable, experience as the mediator variable, and belief as the outcome variable. Additionally, we make the following specific predictions about OC tendencies' relationship to religiosity:

2a: OC tendencies will be positively correlated with frequency of private religious practices.

2b: OC tendencies will be positively correlated with negative religious coping and negatively correlated with positive religious coping.

2c: OC tendencies will *not* be correlated with any other form of religiosity.

*Hypothesis 3:* Other constructs directly relevant to OC tendencies (i.e., TAF and scrupulosity) will explain the relationship between OC tendencies and belief. This will be tested by computing correlations for these variables as well as by conducting a series of mediation analyses using OC tendencies as the predictor variable, the OC-relevant construct as the mediator variable, and belief as the outcome variable. Specifically, we expect the following:

3a: TAF-Likelihood will mediate the relationship between OC tendencies and ghost belief.

3b: TAF-Moral will mediate the relationship between OC tendencies and religious belief.

3c: Scrupulosity will mediate the relationship between OC tendencies and religious belief.

3d: Scrupulosity will mediate the relationship between OC tendencies and frequency of private religious practices.

*Hypothesis 4:* Experience and belief each will predict identity, and this relationship will be content-specific (e.g., ghost belief will predict ghost identity). This will be tested by computing correlations for these variables.

## CHAPTER II: METHOD

### Participants and Procedure

#### *Sample 1*

Undergraduate students enrolled in introductory psychology courses at Middle Tennessee State University (MTSU) were recruited from the university's research pool to participate in the study. They received course credit for their participation. In order to have adequate statistical power (even after attrition) and to allow for equitable use of the research pool by other researchers, the research team set a target minimum sample size of 200 participants. A total of 252 individuals participated in the study. Data from participants who completed less than 90% of the survey ( $n = 21$ ) and/or who reported that they did not exercise their best effort in completing the survey ( $n = 20$ ) were omitted from analysis. Of the participants who provided usable data ( $N = 211$ ), 74.4% identified as women. Ethnically, the sample was 54.3% Caucasian, 21.0% African American, 6.2% Asian, 6.2% Hispanic, 0.5% Alaskan Native/Pacific Islander, 5.2% mixed ethnicity, and 6.7% other ethnicity. The average age of the sample was 19.85 years ( $SD = 4.91$ , range = 18 to 59). All participants provided active informed consent (Appendix H) before beginning the survey. The study was reviewed and approved by MTSU's Institutional Review Board (see Appendix A).

Participants enrolled in the study using the university research pool's online signup system (Sona Systems). A hyperlink within Sona redirected participants to the Qualtrics survey platform on which they completed the survey. Upon providing informed consent, participants completed the 307-item battery of questionnaires described in the Materials section. The order of the questionnaires was randomized across participants.

However, the attitude towards science items, identity items, and demographic items were always presented at the end of the survey so that (1) undue suspicion toward the researchers was not aroused and (2) participants' identity concerns were not primed. The average completion time for the survey was approximately 75 minutes. Upon completion of the survey, participants were debriefed and thanked for their participation. Data collection for Sample 1 terminated approximately midway through the Fall 2019 semester after the desired sample size had been reached.

### *Sample 2*

Data from a community sample also were collected with the goal of validating findings in the student sample. Each year during the final three weekends of October, a paranormal investigation group called the Shadow Chasers of Middle Tennessee hosts "haunted tours" on the town square in Murfreesboro, Tennessee. Tours depart from the same location every 30 minutes during a three-hour window each night. Attendees are advised to be present at the meeting point at least several minutes before their tour is scheduled to begin. It was during this waiting period that participants completed the survey.

A total of 86 individuals participated in the study. Two hundred forty-two people attended the October 2019 tours, meaning that there was a 35.5% rate of participation. Data from those who attempted to complete the survey after the tour had concluded ( $n = 4$ ) and from those who reported having taken the survey during the previous year ( $n = 1$ ) were omitted from analysis. Of the participants who provided usable data ( $N = 81$ ), 58.0% identified as women. The average age of the sample was 37.51 years ( $SD = 14.86$ , range = 18 to 77). All participants provided informed consent before beginning the

survey. The study was reviewed and approved by MTSU's Institutional Review Board (see Appendix A).

Researchers approached tour attendees while they were waiting for their tour to begin and asked them whether they would be interested in completing a survey for psychology research at MTSU. If they agreed to participate, researchers handed them a paper survey and a writing utensil. Participants checked a box at the top of the first page of the survey indicating that they were at least 18 years old and that they consented to participate. Upon completion, researchers collected the survey materials, provided participants with a debriefing sheet (Appendix I), answered any questions they had about the study, and thanked them for their time. Incomplete surveys were accepted in the event that participants ran out of time before their tour began. No further data were collected from participants after their tour had begun.

### **Materials**

The full list of measures used in Sample 1 is described next. Due to the time constraints imposed on Sample 2, the full survey used in Sample 1 was abbreviated substantially for Sample 2. The following measures from Sample 1 were retained in full for Sample 2: PBC, OCI-R, ghost identity, and religious identity. The R-PBS and the BMMRS were abbreviated and appeared with select other belief items. The sets of items measuring ghost behavior, ghost experience, religious behavior, and religious experience were abbreviated, as well. Except for those just listed, all other measures described next for Sample 1 were omitted from Sample 2 entirely. The Sample 2 questionnaires were counterbalanced, yielding a total of eight unique versions of the survey form.

### ***Revised Paranormal Belief Scale***

The Revised Paranormal Belief Scale (R-PBS; Tobacyk, 2004) was used to measure paranormal beliefs. The scale comprises 26 items assessing various types of paranormal beliefs, including traditional religious belief (4 items), psi (4 items), witchcraft (4 items), superstition (3 items), spiritualism (4 items), extraordinary life forms (3 items), and precognition (4 items). Items are rated on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Examples of items included on the R-PBS are: “The soul continues to exist though the body may die” (traditional religious belief); “Some individuals are able to levitate (lift) objects through mental forces” (psi); “Black magic really exists” (witchcraft); “Black cats can bring bad luck” (superstition); “Your mind or soul can leave your body and travel (astral projection)” (spiritualism); “The abominable snowman of Tibet exists” (extraordinary life forms); and “Astrology is a way to accurately predict the future” (precognition). Higher scores indicate higher levels of paranormal belief. The author reported test-retest reliability as .92 for the full scale.

To maintain continuity with previous research (Langston, Fehrman, et al., 2018; Langston, Frosh, et al., 2018; Langston & Hubbard, 2014), several alterations were made to the R-PBS. Namely, four items that had appeared on the original Paranormal Belief Scale (PBS; Tobacyk & Milford, 1983), but subsequently were eliminated from the R-PBS, were retained in this study (e.g., “Dreams can provide information about the future”). Additionally, two paranormal belief items were added by the research team based on suggestions of previous research and such items not being represented on the R-PBS: “I believe in the existence of ghosts” (Wiseman et al., 2002) and “It is possible for

places to be haunted” (Laythe & Owen, 2012). This resulted in a paranormal belief scale with 32 total items and an additional subscale (ghost belief). Furthermore, the rating scale was modified from the 7-point scale described above to a 5-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Reliability information from the present study for the subscales of the modified R-PBS is presented in Table 1.

### ***Brief Multidimensional Measure of Religiousness and Spirituality***

The Brief Multidimensional Measure of Religiousness and Spirituality (BMMRS; Fetzer Institute, 1999) was used to assess many aspects of religiosity, including beliefs and experiences. The BMMRS consists of 38 items encompassing 11 distinct dimensions of religiosity, with each dimension measured on its own scale: daily spiritual experiences (6 items), values/beliefs (2 items), forgiveness (3 items), private religious practices (5 items), religious and spiritual coping (7 items), religious support (4 items), religious/spiritual history (3 items), commitment (3 items), organizational religiousness (2 items), religious preference (1 item), and overall self-ranking (2 items). In the interest of brevity, the full list of items and the scales on which they are measured will not be reproduced here (for more information, see Fetzer Institute, 1999). Sample items include the following: “I feel God’s presence” (daily spiritual experiences); “I believe in a God who watches over me” (values/beliefs); “(Because of my religious or spiritual beliefs) I have forgiven myself for things that I have done wrong” (forgiveness); “How often do you pray privately in places other than places of worship?” (private religious practices); “I look to God for strength, support, and guidance” (religious and spiritual coping); “If you had a problem or were faced with a difficult situation, how much comfort would the people in your congregation be willing to give you?” (religious support); “Did you ever

have a religious or spiritual experience that changed your life?” (religious/spiritual history); “I try hard to carry my religious beliefs over into all my other dealings in life” (commitment); “How often do you go to religious services?” (organizational religiousness); “What is your current religious preference?” (religious preference); and “To what extent do you consider yourself a religious person?” (overall self-ranking). For all of the Likert-scaled subscales and independent items, higher scores represented higher levels of that particular dimension of religiosity, after we recoded them as such. Additionally, some of the subscales were divided into positive and negative components in the analysis (e.g., religious coping was divided into positive religious coping and negative religious coping). The authors have reported reliability estimates for select subscales ranging from  $\alpha = .54$  to  $\alpha = .91$ .

The research team made several alterations to the BMMRS. In the religious/spiritual history section, the response format was changed from yes/no to a 5-point scale ranging from 1 (“definitely not”) to 5 (“definitely yes”). The question “How many of these religious experiences have you had?” was appended to the item (which was shown to all those who had responded with anything but “definitely not”), and the wording of the age follow-up question was altered to reflect the possibility that a participant had had multiple experiences. Additionally, drawing on the work of Hood (1975), participants were instructed to check all boxes that accurately described the quality of their most compelling religious/spiritual experience (e.g., “something greater than myself seemed to absorb me”). In the commitment and religious preference sections, there were slight wording changes to facilitate ease of interpretation (e.g., “What is your current religious preference or affiliation?”). Also, the overall self-ranking items were

reworded and converted to a 5-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Finally, the research team added the item “My religious belief is intense” to the overall self-ranking section in order to maintain continuity with previous research (Langston, Fehrman, et al., 2018; Langston, Frosh, et al., 2018; Langston & Hubbard, 2014). Reliability information for each subscale of the modified BMMRS is presented in Table 1.

**Table 1**

*Reliability for the Study Scales across Samples*

	Sample 1	Sample 2	Full Sample
Variable	$\alpha$	$\alpha$	$\alpha$
<i>Experience</i>			
AEI Fear	.80	—	—
AEI Quality	.85	—	—
<i>Belief</i>			
BMMRS OSR	.89	.90	.90
R-PBS TradRel	.84	—	—
R-PBS Ghosts	.77	.85	.79
R-PBS Psi	.77	—	—
R-PBS Witchcraft	.89	—	—
R-PBS Superstition	.79	—	—
R-PBS Spiritualism	.79	—	—
R-PBS ELF	.77	—	—
R-PBS Precognition	.84	—	—
<i>Religiosity</i>			
BMMRS DSE	.94	—	—
BMMRS ValBel	.48	—	—
BMMRS Forgiveness	.74	—	—
BMMRS Private	.81	—	—
BMMRS PosCope	.85	—	—
BMMRS NegCope	.60	—	—

**Table 1 (continued)**

	Sample 1	Sample 2	Full Sample
Variable	$\alpha$	$\alpha$	$\alpha$
BMMRS Support	.94	—	—
BMMRS Opp	.81	—	—
BMMRS Org	.85	.78	.83
<i>Identity</i>			
Ghost identity	.79	.87	.84
Paranormal social identity	—	—	—
Religious identity	.97	.97	.97
Religious social identity	.88	—	—
<i>Personality</i>			
BSSS-4	.81	—	—
OCI-R Total	.91	.91	.91
OCI-R Washing	.78	.74	.78
OCI-R Obsessing	.74	.87	.78
OCI-R Hoarding	.70	.70	.72
OCI-R Ordering	.84	.83	.84
OCI-R Checking	.66	.80	.70
OCI-R Neutralizing	.68	.70	.68
TAF-R Total	.94	—	—
TAF-R Moral	.95	—	—
TAF-R Likelihood	.95	—	—
PIOS Total	.94	—	—
PIOS Sin	.91	—	—
PIOS God	.91	—	—
Private body consciousness	.71	.76	.72
SPQ-B Total	.84	—	—
SPQ-B CPF	.61	—	—
SPQ-B IF	.74	—	—
SPQ-B DF	.78	—	—
Transliminality	.83	—	—
Tolerance for ambiguity	.54	—	—
Paranoia	.95	—	—
CTDA Total	.92	—	—
CTDA S&A	.84	—	—
CTDA I&C	.79	—	—
CTDA M&S	.84	—	—

**Table 1 (continued)**

	Sample 1	Sample 2	Full Sample
Variable	$\alpha$	$\alpha$	$\alpha$
Absorption	.90	—	—
Attitude towards science	.91	—	—

*Note.* AEI = Anomalous Experiences Inventory, BMMRS = Brief Multidimensional Measure of Religiousness and Spirituality; OSR = overall self-ranking; R-PBS = Revised Paranormal Belief Scale; TradRel = traditional religious belief; ELF = extraordinary life forms; DSE = daily spiritual experiences; ValBel = values and beliefs; Private = private religious practice; PosCope = positive religious coping; NegCope = negative religious coping; Opp = religious opposition (negative items of support subscale); Org = organizational religiousness; BSSS-4 = Brief Sensation Seeking Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF-R = Revised Thought-Action Fusion scale; PIOS = Penn Inventory of Scrupulosity; SPQ-B = Schizotypal Personality Questionnaire-Brief; CPF = cognitive perceptual factor; IF = interpersonal factor; DF = disorganized factor; CTDA = Critical Thinking Disposition Assessment; S&A = systematicity and analyticity; I&C = inquisitiveness and conversance; M&S = maturity and skepticism.

### ***Ghost and Paranormal Experience Items***

Ghost experience was measured by a series of items created by the research team, some of which were original and others of which were loosely based on scales from past research. First, participants answered the item “Have you ever experienced an encounter with a ghost?” on a 5-point scale ranging from 1 (“definitely not”) to 5 (“definitely yes”). For any response but “definitely not,” participants were asked follow-up questions about the experience(s) (e.g., “How many ghosts have you encountered?”). The next follow-up items were based on the work of Wiseman et al. (2002) and Haraldsson (2009) and instructed participants to check all boxes that accurately described their most compelling experience (e.g., “sense of presence”; “sense of being touched”). Then, participants were presented with a list of fear items (e.g., “I do not want an encounter like this to happen again”) rated on a 5-point scale from 1 (“strongly disagree”) to 5 (“strongly agree”), which were based on the fear subscale of the Anomalous Experiences Inventory (AEI;

Gallagher et al., 1994) and adapted for ghost encounters specifically. Lastly, there was a series of items pertaining to the quality of the experience (e.g., “I can form a clear mental image of this encounter”), which were created by the research team. Higher scores on the fear and quality scales indicate higher levels of fear and intensity associated with the ghost experience.

Participants also were asked whether they had experienced anything else besides a ghost that could be considered paranormal (rated on the same 5-point scale as described above). Those who responded with anything but “definitely not” were asked to provide the approximate number of such events they had experienced as well as to check the box(es) that accurately described the type of experience(s) (e.g., “out of body experience/astral projection,” “psychic experience,” etc.; Sparks & Miller, 2001). Reliability information for the ghost and paranormal experience items is presented in Table 1. The full list of these items is presented in Appendix B.

### ***Ghost Behavior Items***

The research team created four items to assess participants’ engagement in “ghost-seeking” behaviors. These were presented as a series of yes/no questions with intermittent follow-up questions if participants responded affirmatively (e.g., “Have you gone somewhere on purpose hoping to see a ghost? [How many times?]”). A fifth ghost behavior item (“Have you been on this ghost tour before? [How many times?]”) was presented to participants in Sample 2 but was omitted from Sample 1. The full list of ghost behavior items is presented in Appendix C.

### ***Obsessive-Compulsive Inventory, Revised***

The Obsessive-Compulsive Inventory, Revised (OCI-R; Foa et al., 2002) is an 18-item measure of OCD symptoms that was used to assess participants' degree of OC tendencies in the present study. Each item describes an OC experience, and participants were instructed to rate "how much that experience distressed or bothered [them] in the past month" on a 5-point scale ranging from 0 ("not at all") to 4 ("extremely"). The OCI-R comprises six subscales with three items each: washing (e.g., "I find it difficult to touch an object when I know it has been touched by strangers or certain people"); obsessing (e.g., "I find it difficult to control my own thoughts"); hoarding (e.g., "I collect things I don't need"); ordering (e.g., "I get upset if others change the way I have arranged things"); checking (e.g., "I check things more often than necessary"); and neutralizing (e.g., "I feel I have to repeat certain numbers"). Higher scores indicate higher OC symptoms. The OCI-R has demonstrated good internal consistency in past research. Foa et al. (2002) reported a coefficient alpha of .90. They also reported test-retest reliability estimates in the acceptable range (.57 to .91). Abramowitz and Deacon (2006) reported good internal consistency ( $\alpha = .89$ ) for the full OCI-R, as well, in their clinical sample. Reliability information from the present study for the OCI-R is presented in Table 1.

### ***Revised Thought-Action Fusion Scale***

The Revised Thought-Action Fusion Scale (TAF-R; Shafran, et al., 1996) was used to measure the propensity for thought-action fusion, a construct related to but distinct from obsessive-compulsiveness. The authors state (pp. 379-380) that the construct has two components, each of which comprises a subscale of the 19-item TAF-R: (1) "the belief that thinking about an unacceptable or disturbing event makes that

event more probable, more likely to happen in reality” (likelihood, or TAF-L; 7 items) and (2) “the interpretation of obsessional thoughts and forbidden actions as morally equivalent” (morality, or TAF-M; 12 items). Participants rated items on a 5-point scale ranging from 0 (“disagree strongly”) to 4 (“agree strongly”). Sample items include “If I think of myself being in a car accident, this increases the risk that I will have a car accident” (TAF-L) and “If I wish harm on someone, it is almost as bad as doing harm” (TAF-M). Higher scores indicate a higher propensity for thought-action fusion. The authors reported high internal consistency for the TAF-R subscales in their samples, with estimates ranging from  $\alpha = .85$  to  $\alpha = .96$ . Reliability information from the present study for the TAF-R is presented in Table 1.

### ***Penn Inventory of Scrupulosity***

Scrupulosity was assessed using the Penn Inventory of Scrupulosity (PIOS; Abramowitz et al., 2002), a 19-item measure of religiously-themed OC experiences. Participants were instructed to rate the frequency of such experiences on a 5-point scale ranging from 0 (“never”) to 4 (“constantly”). Higher scores indicate higher levels of scrupulosity. The PIOS consists of two subscales: fear of sin (12 items; e.g., “I worry I must act morally at all times or I will be punished”) and fear of God (7 items; e.g., “I worry that God is upset with me”). The authors reported high internal consistency for the full PIOS and its subscales in their samples of undergraduate students, with estimates ranging from  $\alpha = .88$  to  $\alpha = .93$ . Pirutinsky and Rosmarin (2018) also reported high internal consistency for the PIOS and its subscales (estimates ranging from  $\alpha = .87$  to  $\alpha = .96$ ) in their samples of clinical Orthodox Jews and nonclinical non-Orthodox Jews. Reliability information from the present study for the PIOS is presented in Table 1.

### ***Private Body Consciousness Scale***

Private body consciousness (PBC) was assessed using the items from the PBC subscale of the Body Consciousness Questionnaire (Miller et al., 1981). These five items (e.g., “I can often feel my heart beating”) are rated on a 5-point scale ranging from 0 (“extremely uncharacteristic”) to 4 (“extremely characteristic”). In order to preserve continuity with the team’s past research, the rating scale was modified to contain the anchor points 1 (“strongly disagree”) and 5 (“strongly agree”) in the present study. Higher scores indicate higher levels of private body consciousness. The authors reported an acceptable test-retest reliability of .69 for the PBC subscale. Reliability information from the present study for the PBC is presented in Table 1.

### ***Brief Sensation Seeking Scale***

Participants’ propensity for sensation seeking was assessed using the Brief Sensation Seeking Scale (BSSS-4; Stephenson et al., 2003). The scale consists of four items (e.g., “I like to do frightening things”) rated on a 5-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Higher scores indicate a greater propensity for sensation seeking. The longer form of the scale from which this scale’s items were taken demonstrated acceptable internal consistency ( $\alpha = .66$ ). Reliability information from the present study for the BSSS-4 is presented in Table 1.

### ***Schizotypal Personality Questionnaire-Brief***

The Schizotypal Personality Questionnaire-Brief (SPQ-B; Raine & Benishay, 1995) is a 22-item measure that was used to assess schizotypy. The SPQ-B comprises three subscales, each measuring an aspect of schizotypal personality: cognitive-perceptual deficits (8 items; e.g., “Have you ever had the sense that some person or force

is around you, even though you cannot see anyone?"); interpersonal deficits (8 items; e.g., "People sometimes find me aloof and distant"); and disorganization (6 items; e.g., "Some people find me a bit vague and elusive during a conversation"). Participants responded true or false to each of the items. Higher totals of true responses indicate higher levels of schizotypy. The authors reported acceptable to good reliability for the scale and its subscales, with alpha coefficients ranging from .72 to .80 and test-retest reliability estimates ranging from .86 to .95. Reliability information from the present study for the SPQ-B is presented in Table 1.

### ***Revised Transliminality Scale***

The Revised Transliminality Scale (RTS; Lange et al., 2000) was used to assess transliminality, the "hypothesized tendency for psychological material to cross thresholds into or out of consciousness" (Lange et al., 2000, p. 594). The scale contains 17 items to which participants responded with true or false. Higher totals of true responses indicate higher levels of transliminality. Sample items include "I have experienced an altered state of consciousness in which I felt that I became cosmically enlightened" and "I have gone through times when smells seemed stronger and more overwhelming than usual." The authors reported a Rasch reliability of .82 for the scale. Reliability information from the present study for the RTS is presented in Table 1.

### ***Critical Thinking Disposition Assessment***

The Critical Thinking Disposition Assessment (CTDA; Yuan et al., 2014) is an 18-item measure that was used to measure participants' propensity for critical thinking. The CTDA comprises three subscales: systematicity and analyticity (7 items; e.g., "Before making a judgment, I am used to analyzing all the available information and the

current situation”); inquisitiveness and conversance (6 items; e.g., “I always learn as much as possible, even if I don’t know when I’ll put to use the things I learned”); and maturity and skepticism (5 items; e.g., “I never hesitate to question any prejudice, assumption, or belief of mine and thoroughly examine everything I have said and done”). Each item was rated on a 7-point scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Higher scores indicate a greater propensity for critical thinking. The authors reported high internal consistency for the scale and its subscales, with alpha coefficients ranging from .86 to .94. Reliability information from the present study for the CTDA is presented in Table 1.

### ***Paranoia Checklist***

The Paranoia Checklist (PC; Freeman et al., 2005) is an 18-item measure that was used to assess participants’ degree of paranoid ideation. In the original scale, the items were rated on the three dimensions of frequency, degree of conviction, and distress. In the present study, however, only the second dimension (i.e., belief) was measured, and participants rated the items on a 5-point scale ranging from 1 (“do not believe it”) to 5 (“absolutely believe it”). Higher scores indicate higher levels of paranoid belief. Sample items include “I need to be on my guard against others” and “I might be being observed or followed.” The authors reported high internal consistency for the PC, with alpha coefficients for all dimensions equaling or exceeding .90. Reliability information from the present study for the PC is presented in Table 1.

### ***Revised Rydell-Rosen Ambiguity Tolerance Scale***

The Revised Rydell-Rosen Ambiguity Tolerance Scale (AT-20; Mac Donald, Jr., 1970) is a 20-item measure that was used to assess participants’ tolerance for ambiguous

information and situations. Participants responded true or false to each item. Accounting for reverse-scored items, higher scores on the measure indicate a greater tolerance for ambiguity. Sample items include “A problem has little attraction for me if I don’t think it has a solution” and “I get pretty anxious when I’m in a social situation over which I have no control.” The authors reported test-retest reliability for the scale as .63. Reliability information from the present study for the AT-20 is presented in Table 1.

### ***Modified Tellegen Absorption Scale***

The Modified Tellegen Absorption Scale (MODTAS) is a 34-item measure of absorption, the capacity for fully attending to an image or any other object of consciousness (Jamieson, 2005). Absorption has been shown by past research to predict susceptibility to hypnosis (Jamieson, 2005; Tellegen & Atkinson, 1974). In the modified format (Jamieson, 2005), items (e.g., “If I wish I can imagine some things so vividly that it’s like watching a good movie or hearing a good story”) are rated on a 5-point scale ranging from 0 (“never”) to 4 (“very often”). However, to maintain continuity with previous research (Langston, Fehrman, et al., 2018; Langston, Frosh, et al., 2018; Langston & Hubbard, 2014) the original scale’s (Tellegen & Atkinson, 1974) true/false response format was retained for this study. Higher totals of true responses indicate higher levels of absorption. The original scale demonstrated excellent internal consistency ( $\alpha = .92$ ). Reliability information from the present study for the MODTAS is presented in Table 1.

### ***Credibility of Science Scale***

The Credibility of Science Scale (CoSS; Hartman et al., 2017) was used to assess participants’ attitudes toward science. The brief measure consists of six items (e.g.,

“People trust scientists a lot more than they should”) rated on a 7-point scale ranging from 1 (“disagree very strongly”) to 7 (“agree very strongly”). Higher scores represent *less favorable* attitudes toward science. The scale demonstrated excellent internal consistency ( $\alpha = .95$  and  $\alpha = .94$ ) in the original authors’ two samples. Reliability information from the present study for the CoSS is presented in Table 1.

### ***Ghost Identity***

The research team developed a measure of ghost identity based on the Geek Identity Scale (GIS; McCain et al., 2015), a 10-item questionnaire measuring “the extent to which one identifies as a geek and as part of geek culture” (p. 19). Each item (e.g., “I consider myself to be a ‘geek’”) is rated on a 5-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The authors of the GIS reported high internal consistency for their scale ( $\alpha = .97$ ).

The ghost identity scale utilized the four items from the GIS deemed by the research team to have the most face validity, and these items were reworded to reflect identification with belief in ghosts (e.g., “I consider myself to be a ghost believer”). The measurement scale from the GIS was retained in the ghost identity scale (GID). Higher scores represent higher incorporation of belief in ghosts into one’s personal identity. Reliability information for the GID scale is presented in Table 1. The full GID scale is presented in Appendix D.

### ***Paranormal Social Identity***

The researcher created a measure assessing the extent to which individuals identify with a paranormal group, which was loosely based on the Social Identity Theory elucidated by Tajfel and Turner (1979) as well as on Allport and Ross’s (1967) research

addressing social aspects of religious belief. The scale consists of six total items. Participants responded yes or no to the first three items (e.g., “My family members belong to a paranormal/ghost hunting group”). If the participant responded yes to the item “I am a member of a paranormal/ghost hunting group,” then the next set of three items (e.g., “Belonging to a paranormal/ghost hunting group is important to me”) was displayed. These three items were rated on a 5-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). These three items were the only ones used in the calculation of a score (i.e., the average of the items) for the scale. Higher scores on the scale represent higher levels of incorporation of a paranormal group into one’s identity. Reliability information for the paranormal social identity scale (PSI) is presented in Table 1. The full PSI scale is presented in Appendix E.

### ***Religious Identity***

Religious identity was assessed in the same manner as was ghost identity. The researcher created a religious identity scale by modifying the four items of the GID scale to reflect religious or spiritual belief rather than ghost belief (e.g., “I consider myself to be a religious or spiritual believer”). The measurement scale was retained. Higher scores represent higher incorporation of religious or spiritual belief into one’s personal identity. Reliability information for the religious identity scale (RID) is presented in Table 1. The full RID scale is presented in Appendix F.

### ***Religious Social Identity***

Religious social identity was assessed in the same manner as was paranormal social identity. The wording of the six items was modified to reflect identification with a religious organization rather than with a paranormal group (e.g., “My family members

belong to a religious community or organization”). As in the PSI scale, participants were shown the second set of items (e.g., “Belonging to a religious community or organization is important to me”) only if they had responded yes to the item “I am a member of a religious community or organization” in the first set. The scale of measurement was retained. Higher scores on the scale represent higher levels of incorporation of a religious group into one’s identity. Reliability information for the religious social identity scale (RSI) is presented in Table 1. The full RSI scale is presented in Appendix G.

### ***Demographic Items***

The following demographic information was collected from participants in both samples: age, gender, and level of education. Ethnicity information was collected in Sample 1 only.

### **Data Analysis**

The responses for the following variables were recoded such that 0 was the lower bound of the scale: ghost experience, paranormal experience, all continuously-scaled BMMRS subscales (except overall self-ranking), religious experience, and paranoia. All other scales were scored in accordance with the information presented earlier.

Ghost belief was selected as the primary metric for paranormal belief, especially for the purposes of the mediation analyses. This was done because (1) ghost *experience* also was measured specifically, and a direct correlation between experience and belief could be computed, and (2) ghost belief and experience were measured in *both* samples. Ghost belief was measured by averaging the responses on four items from the modified R-PBS—two items from the original scale (“The soul continues to exist though the body may die” and “It is possible to communicate with the dead”) and the two items added by

the research team (“I believe in the existence of ghosts” and “It is possible for places to be haunted”). The item “Have you ever experienced an encounter with a ghost?” was used as the metric for ghost experience in both samples due to its continuous scale. A Pearson correlation was computed to quantify the relationship between ghost experience and ghost belief. This was done in both samples.

Two subscales from the religiosity measures were selected as the metrics for religious belief on account of their good reliability and face validity. The traditional religious belief subscale of the R-PBS was used as a metric for the *content* of religious belief. This was used in Sample 1 only, as these items were omitted from the Sample 2 survey. To index the *strength* of religious belief, the sum of the three overall self-ranking items from the modified BMMRS was computed. This metric was used in both samples. The item “Did you ever have a religious or spiritual experience that changed your life?” was used as the metric for religious experience in both samples due to its continuous scale. Pearson correlations were computed between the religious experience and belief metrics.

To test for an indirect effect of personality on belief through experience, a series of mediation analyses based on 5000 bootstrap samples were conducted using personality (e.g., OC tendencies, schizotypy, etc.) as the predictor variable, experience (ghost/religious) as the mediator variable, and belief (ghost/religious) as the outcome variable. If the 95% bootstrap confidence interval of the indirect effect did not include zero, then we concluded that there was significant mediation. This was the conclusion regardless of whether there was a statistically significant correlation between the predictor and the outcome prior to running the mediation analysis (Hayes, 2018). Similar

mediation analyses were conducted to test for the mechanism (e.g., TAF) responsible for the relationship between OC tendencies and belief. The only mediation analyses conducted in Sample 2 were (1) for the OC tendency relationship to belief through experience and (2) for the private body consciousness relationship to belief through experience. Pearson correlations also were computed to determine the relationship between OC tendencies and the other variables mentioned in the Hypotheses section.

Finally, to test for relationships among identity, experience, and belief, Pearson correlations were computed. This was done in both samples, but not for social identity in Sample 2, as it was not measured.

All analyses were performed in the IBM SPSS (version 26) software. The mediation analyses were performed using the PROCESS macro for SPSS (Hayes, 2018).

### CHAPTER III: RESULTS

Descriptive statistics for both samples are presented in Table 2. Sample 2 scored statistically significantly higher than did Sample 1 on ghost experience,  $t(288) = 2.49, p = .013$ ; religious experience,  $t(288) = 2.18, p = .030$ ; ghost belief,  $t(288) = 2.34, p = .020$ ; ghost identity,  $t(281) = 6.67, p < .001$ ; and strength of religious belief,  $t(286) = 3.81, p < .001$ . In contrast, Sample 1 scored significantly higher than did Sample 2 on total OC tendencies,  $t(286) = 3.20, p = .002$ . The samples did *not* differ significantly on religious identity.

There were also several gender differences in the full sample on the main variables of interest. Women scored significantly higher than did men on ghost experience,  $t(150.53) = 2.06, p = .041$ ; religious experience,  $t(276) = 2.49, p = .013$ ; ghost belief,  $t(277) = 2.75, p = .006$ ; religious identity,  $t(115.60) = 3.53, p = .001$ ; and strength of religious belief,  $t(117.65) = 2.17, p = .032$ . There were *not* significant differences by gender on total OC tendencies or on ghost identity. The remainder of the data analyses were separated by sample but combined across gender.

#### Sample 1

Correlations among the experience and belief variables for Sample 1 are displayed in the lower triangle of Table 3. Hypothesis 1 stated that experience will predict belief, and this relationship will be content-specific. Religious experience exhibited strong, significant, positive relationships with both the strength and content of religious belief. The same was true for ghost experience and ghost belief. As predicted in Hypothesis 1, the experience-belief relationship was content-specific: Neither the relationship between ghost experience and religious belief nor the relationship between

religious experience and ghost belief was significant. Furthermore, there were no significant correlations between other paranormal experience and religious belief or between religious experience and other paranormal beliefs. Thus, Hypothesis 1 was supported.

Hypothesis 2 stated that, in general, personality (including OC tendencies) will be related to experience and belief; furthermore, it stated that the relationship between personality and belief will be mediated by experience. Total OC tendencies were not significantly correlated with experience (ghost, paranormal, or religious). There was a significant relationship with ghost belief,  $r(210) = .179, p = .009$ , as well as with all but one type (psi) of the other paranormal beliefs measured: witchcraft,  $r(209) = .179, p = .010$ ; superstition,  $r(209) = .255, p < .001$ ; spiritualism,  $r(209) = .281, p < .001$ ; extraordinary life forms,  $r(210) = .177, p = .010$ ; and precognition,  $r(209) = .202, p = .003$ . Neither the strength nor the content of religious belief was significantly correlated with total OC tendencies, however.

When analyzed by subscale, no significant correlations emerged between the types of OC tendencies and experience (ghost, paranormal, or religious). Three of the six types of OC tendencies exhibited significant relationships with ghost belief: washing,  $r(210) = .142, p = .039$ ; obsessing,  $r(210) = .167, p = .016$ ; and hoarding  $r(210) = .209, p = .002$ . No type of OC tendencies was significantly related to the strength of religious belief. However, two types of OC tendencies were significantly related to the content of religious belief: obsessing,  $r(209) = .139, p = .044$ ; and neutralizing  $r(208) = .160, p = .021$ .

**Table 2***Descriptive Statistics for Study Variables across Samples*

Variable	Sample 1			Sample 2		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
<i>Experience</i>						
Religious experience	210	2.30	1.52	80	2.74	1.51
Num religious experiences	164	3.99	9.56	38	2.63	4.06
Age religious experience	159	11.56	5.92	42	18.21	10.90
Comp religious experience	168	2.58	1.65	67	2.06	1.95
Ghost experience	211	1.48	1.40	79	1.94	1.38
Num ghost experiences	133	2.73	9.43	40	1.83	3.40
Age ghost experience	122	10.02	6.12	29	19.93	12.22
Comp ghost experience	136	2.10	1.67	60	2.42	1.89
AEI Fear	133	14.35	5.36	—	—	—
AEI Quality	133	15.29	5.29	—	—	—
Para experience	211	1.48	1.43	—	—	—
Types para experience	211	1.10	1.40	—	—	—
<i>Behavior</i>						
Num ghost tours	52	1.73	1.48	44	3.18	2.70
Num ghost investigations	16	4.31	7.40	9	1.11	0.33
<i>Belief</i>						
BMMRS OSR	209	9.43	3.62	79	11.22	3.37
R-PBS TradRel	209	3.95	1.06	—	—	—
R-PBS Ghosts	210	3.48	0.94	80	3.78	0.97
R-PBS Psi	210	1.99	0.83	—	—	—
R-PBS Witchcraft	209	2.64	1.09	—	—	—
R-PBS Superstition	210	1.95	0.87	—	—	—
R-PBS Spiritualism	209	2.83	0.97	—	—	—
R-PBS ELF	210	2.31	0.86	—	—	—
R-PBS Precognition	209	2.71	0.82	—	—	—
<i>Religiosity</i>						
BMMRS DSE	209	17.87	9.58	—	—	—
BMMRS ValBel	210	4.33	1.53	—	—	—
BMMRS Forgiveness	210	6.12	2.38	—	—	—
BMMRS Grace	211	1.94	1.48	—	—	—
BMMRS Private	211	8.88	7.03	—	—	—
BMMRS PosCope	208	4.83	3.06	—	—	—

**Table 2 (continued)**

Variable	Sample 1			Sample 2		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
BMMRS NegCope	209	2.38	2.18	—	—	—
BMMRS Involvement	211	1.82	1.15	—	—	—
BMMRS Support	209	3.93	2.26	—	—	—
BMMRS Opp	209	1.57	1.75	—	—	—
BMMRS Gain	210	2.53	1.42	—	—	—
BMMRS Gain Age	172	14.11	6.37	—	—	—
BMMRS Loss	211	2.15	1.45	—	—	—
BMMRS Loss Age	159	14.48	5.29	—	—	—
BMMRS Commitment	209	1.72	1.04	—	—	—
BMMRS Contribution	194	152.18	595.15	—	—	—
BMMRS Hours	204	3.33	6.51	—	—	—
BMMRS Org	210	4.25	3.21	75	4.00	2.99
<i>Identity</i>						
Ghost identity	210	1.96	0.88	73	2.78	1.00
Paranormal social identity	4	3.50	0.58	—	—	—
Religious identity	210	3.53	1.41	75	3.82	1.27
Religious social identity	130	3.89	0.90	—	—	—
<i>Personality</i>						
BSSS-4	211	3.34	0.93	—	—	—
OCI-R Total	210	22.46	13.82	78	16.68	13.06
OCI-R Washing	210	3.52	3.20	76	2.00	2.49
OCI-R Obsessing	210	3.76	3.06	77	2.66	3.37
OCI-R Hoarding	210	4.10	2.92	75	3.52	2.97
OCI-R Ordering	210	4.82	3.15	74	3.88	2.94
OCI-R Checking	209	4.00	2.79	76	3.29	2.97
OCI-R Neutralizing	209	2.30	2.66	74	1.93	2.51
TAF-R Total	211	28.10	17.88	—	—	—
TAF-R Moral	208	21.36	13.13	—	—	—
TAF-R Likelihood	208	7.15	7.88	—	—	—
PIOS Total	210	24.34	15.84	—	—	—
PIOS Sin	209	15.55	9.62	—	—	—
PIOS God	208	8.95	7.05	—	—	—
Private body consciousness	210	17.91	3.41	76	17.30	3.89
SPQ-B Total	205	10.33	5.13	—	—	—
SPQ-B CPF	208	3.68	2.03	—	—	—

**Table 2 (continued)**

Variable	Sample 1			Sample 2		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
SPQ-B IF	205	4.28	2.31	—	—	—
SPQ-B DF	208	2.34	2.01	—	—	—
Transliminality	206	6.84	4.13	—	—	—
Tolerance for ambiguity	206	8.00	3.05	—	—	—
Paranoia	207	16.98	14.71	—	—	—
CT Total	206	92.12	15.62	—	—	—
CT S&A	207	35.31	6.87	—	—	—
CT I&C	208	29.95	5.50	—	—	—
CT M&S	210	26.75	5.16	—	—	—
Absorption	204	18.10	7.89	—	—	—
Attitude towards science	210	23.10	7.60	—	—	—

*Note.* Comp = total number of experience components; AEI = Anomalous Experiences Inventory; para = paranormal; BMMRS = Brief Multidimensional Measure of Religiousness and Spirituality; OSR = overall self-ranking; R-PBS = Revised Paranormal Belief Scale; TradRel = traditional religious belief; ELF = extraordinary life forms; DSE = daily spiritual experiences; ValBel = values and beliefs; Private = private religious practice; PosCope = positive religious coping; NegCope = negative religious coping; Opp = religious opposition (negative items of support subscale); Org = organizational religiousness; BSSS-4 = Brief Sensation Seeking Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF-R = Revised Thought-Action Fusion scale; PIOS = Penn Inventory of Scrupulosity; SPQ-B = Schizotypal Personality Questionnaire-Brief; CPF = cognitive perceptual factor; IF = interpersonal factor; DF = disorganized factor; CTDA = Critical Thinking Disposition Assessment; S&A = systematicity and analyticity; I&C = inquisitiveness and conversance; M&S = maturity and skepticism.

With respect to other forms of religiosity aside from belief, total OC tendencies were not significantly correlated with private religious practices or the frequency of saying grace, contrary to Hypothesis 2a. There was a significant positive relationship between OC tendencies and negative religious coping,  $r(209) = .249$ ,  $p < .001$ ; but, there was also a significant positive relationship with positive religious coping,  $r(208) = .162$ ,  $p = .019$ , so Hypothesis 2b could not be supported. No other relationships between total OC tendencies and religiosity were significant except for the religious values/beliefs

subscale,  $r(209) = .165, p = .017$ , and religious commitment,  $r(208) = .160, p = .021$ .

Because of this, Hypothesis 2c could not be supported.

**Table 3**

*Correlations among Experience and Belief Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
(1) RelExp	—	<b>.158</b>	—	<b>.562**</b>	—	<b>.226*</b>	—	—	—	—	—	—
(2) GExp	.071	—	—	<b>.167</b>	—	<b>.490**</b>	—	—	—	—	—	—
(3) PExp	.067	.401**	—	—	—	—	—	—	—	—	—	—
(4) OSR	.480**	.037	-.019	—	—	<b>.473**</b>	—	—	—	—	—	—
(5) TradRel	.554**	.052	-.000	.648**	—	—	—	—	—	—	—	—
(6) Ghosts	.116	.465**	.251**	.107	.354**	—	—	—	—	—	—	—
(7) Psi	.102	.082	-.021	.039	.107	.313**	—	—	—	—	—	—
(8) Witch	.116	.197**	.126	.062	.128	.484**	.493**	—	—	—	—	—
(9) Super	.075	.043	-.082	.135	.173*	.161*	.378**	.202**	—	—	—	—
(10) Spirit	.038	.294**	.140*	.035	.151*	.622**	.587**	.636**	.412**	—	—	—
(11) ELF	-.047	.130	.177*	-.029	-.068	.351**	.492**	.444**	.328**	.503**	—	—
(12) Precog	.034	.348**	.233**	.095	.149*	.559**	.544**	.422**	.365**	.681**	.440**	—

*Note.* Values in the lower triangle are from Sample 1 and in the upper triangle (bold) from Sample 2.

RelExp = religious experience; GExp = ghost experience; PExp = paranormal experience; OSR = overall self-ranking subscale of BMMRS; TradRel = traditional religious belief subscale of R-PBS; Ghosts = ghost belief; Psi = psi subscale of R-PBS; Witch = witchcraft subscale of R-PBS; Super = superstition subscale of R-PBS; Spirit = spiritualism subscale of R-PBS; ELF = extraordinary life forms subscale of R-PBS; Precog = precognition subscale of R-PBS.

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

Table 4 displays the results of the mediation analyses for the relationship between personality and ghost belief mediated by ghost experience. Of the 28 analyses conducted, significant mediation was found for six predictor variables: sensation seeking, total TAF, private body consciousness, schizotypy (cognitive-perceptual factor only), transliminality, and absorption.

**Table 4***Mediation Analyses for Personality, Ghost Experience, and Ghost Belief*

Predictor	Sample 1			Sample 2		
	Bootstrap estimate	95% CI LL	95% CI UL	Bootstrap estimate	95% CI LL	95% CI UL
BSSS-4	0.092	<b>0.027</b>	<b>0.168</b>	—	—	—
OCI-R Total	-0.001	-0.006	0.004	0.008	-0.000	0.018
OCI-R Washing	-0.006	-0.026	0.014	0.032	-0.014	0.079
OCI-R Obsessing	-0.001	-0.024	0.020	0.026	-0.002	0.056
OCI-R Hoarding	0.000	-0.022	0.021	0.010	-0.024	0.043
OCI-R Ordering	-0.006	-0.026	0.015	0.030	-0.001	0.065
OCI-R Checking	0.001	-0.021	0.024	0.026	-0.005	0.061
OCI-R Neutralizing	-0.008	-0.032	0.017	0.029	-0.014	0.083
TAF-R Total	-0.004	<b>-0.007</b>	<b>-0.001</b>	—	—	—
TAF-R Moral	-0.005	-0.010	0.000	—	—	—
TAF-R Likelihood	-0.007	-0.014	0.000	—	—	—
PIOS Total	-0.000	-0.004	0.004	—	—	—
PIOS Sin	-0.008	-0.007	0.006	—	—	—
PIOS God	0.001	-0.008	0.010	—	—	—
PBC	0.026	<b>0.010</b>	<b>0.045</b>	0.031	<b>0.008</b>	<b>0.059</b>
SPQ-B Total	0.011	-0.001	0.023	—	—	—
SPQ-B CPF	0.049	<b>0.022</b>	<b>0.080</b>	—	—	—
SPQ-B IF	-0.003	-0.028	0.023	—	—	—
SPQ-B DF	0.019	-0.012	0.052	—	—	—
Transliminality	0.028	<b>0.014</b>	<b>0.044</b>	—	—	—
Tolerance for ambiguity	0.012	-0.007	0.032	—	—	—
Paranoia	0.004	-0.001	0.008	—	—	—
CT Total	0.001	-0.003	0.005	—	—	—
CT S&A	0.002	-0.007	0.011	—	—	—
CT I&C	0.002	-0.009	0.014	—	—	—
CT M&S	0.001	-0.011	0.013	—	—	—
Absorption	0.015	<b>0.007</b>	<b>0.024</b>	—	—	—
Attitude towards science	-0.003	-0.011	0.005	—	—	—

*Note.* Bootstrap estimate refers to indirect effect. Significant mediation is denoted by the bolded CI limits (i.e., CIs that do not cross zero). BSSS-4 = Brief Sensation Seeking Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF-R = Revised Thought-Action Fusion scale; PIOS = Penn Inventory of Scrupulosity; PBC = Private Body Consciousness; SPQ-B = Schizotypal Personality Questionnaire-Brief; CPF = cognitive perceptual factor; IF = interpersonal factor; DF = disorganized factor; CTDA = Critical Thinking Disposition Assessment; S&A = systematicity and analyticity; I&C = inquisitiveness and conversance; M&S = maturity and skepticism.

Table 5 displays the mediation analysis results for the relationship between personality and the strength of religious belief mediated by religious experience. Of the 28 analyses conducted, significant mediation was found for six predictor variables: TAF (total and moral), scrupulosity (total and both subscales), and attitude towards science. The same six predictors yielded significant results when the content of religious belief was the outcome variable in the analysis instead of the strength of religious belief (see Table 6).

Hypothesis 3 stated that other constructs directly relevant to OC tendencies (i.e., TAF and scrupulosity) will explain the relationship between OC tendencies and belief. TAF-Likelihood did not significantly mediate the relationship between total OC tendencies and ghost belief. The same was the case when each subscale of the OCI-R was substituted for the OCI-R total score as the predictor variable. Thus, Hypothesis 3a was not supported. Furthermore, there was no significant mediation when other paranormal beliefs were substituted as the outcome variable.

Similarly, TAF-Moral did not significantly mediate the relationship between total OC tendencies and religious belief (strength or content). Hypothesis 3b likewise was not supported.

In support of Hypothesis 3c, there was a significant indirect effect of total OC tendencies on religious belief through scrupulosity: strength,  $b = 0.031$ , BCa [0.012, 0.052]; content,  $b = 0.013$ , BCa [0.007, 0.020]. There were indirect effects, as well, for the outcome variables private religious practices and frequency of saying grace, respectively  $b = 0.089$ , BCa [0.052, 0.130] and  $b = 0.013$ , BCa [0.005, 0.023]. This supported Hypothesis 3d.

**Table 5***Mediation Analyses for Personality, Religious Experience, & Religious Belief (Strength)*

Predictor	Sample 1			Sample 2		
	Bootstrap estimate	95% CI LL	95% CI UL	Bootstrap estimate	95% CI LL	95% CI UL
BSSS-4	-0.070	-0.341	0.216	—	—	—
OCI-R Total	0.001	-0.016	0.018	0.016	-0.018	0.049
OCI-R Washing	0.019	-0.056	0.098	0.119	-0.038	0.283
OCI-R Obsessing	0.008	-0.064	0.081	0.084	-0.033	0.238
OCI-R Hoarding	-0.033	-0.120	0.056	0.033	-0.101	0.170
OCI-R Ordering	0.012	-0.066	0.091	0.068	-0.095	0.220
OCI-R Checking	-0.034	-0.125	0.056	0.084	-0.068	0.237
OCI-R Neutralizing	0.041	-0.046	0.133	0.015	-0.156	0.170
TAF-R Total	0.021	<b>0.008</b>	<b>0.038</b>	—	—	—
TAF-R Moral	0.032	<b>0.015</b>	<b>0.054</b>	—	—	—
TAF-R Likelihood	0.016	-0.014	0.050	—	—	—
PIOS Total	0.024	<b>0.010</b>	<b>0.043</b>	—	—	—
PIOS Sin	0.035	<b>0.012</b>	<b>0.064</b>	—	—	—
PIOS God	0.060	<b>0.026</b>	<b>0.104</b>	—	—	—
PBC	0.011	-0.063	0.093	0.001	-0.117	0.127
SPQ-B Total	-0.010	-0.057	0.035	—	—	—
SPQ-B CPF	0.056	-0.058	0.177	—	—	—
SPQ-B IF	-0.048	-0.153	0.054	—	—	—
SPQ-B DF	-0.072	-0.200	0.043	—	—	—
Transliminality	0.036	-0.018	0.098	—	—	—
Tolerance for ambiguity	0.006	-0.072	0.085	—	—	—
Paranoia	-0.011	-0.030	0.006	—	—	—
CT Total	-0.007	-0.023	0.009	—	—	—
CT S&A	-0.020	-0.057	0.015	—	—	—
CT I&C	-0.014	-0.057	0.038	—	—	—
CT M&S	-0.016	-0.059	0.032	—	—	—
Absorption	0.016	-0.014	0.049	—	—	—
Attitude towards science	0.061	<b>0.031</b>	<b>0.100</b>	—	—	—

*Note.* Bootstrap estimate refers to indirect effect. Significant mediation is denoted by the bolded CI limits (i.e., CIs that do not cross zero). BSSS-4 = Brief Sensation Seeking Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF-R = Revised Thought-Action Fusion scale; PIOS = Penn Inventory of Scrupulosity; PBC = Private Body Consciousness; SPQ-B = Schizotypal Personality Questionnaire-Brief; CPF = cognitive perceptual factor; IF = interpersonal factor; DF = disorganized factor; CTDA = Critical Thinking Disposition Assessment; S&A = systematicity and analyticity; I&C = inquisitiveness and conversance; M&S = maturity and skepticism.

Hypothesis 4 stated that experience and belief each will predict identity, and this relationship will be content-specific. There were too few observations ( $n = 4$ ) to compute correlations for paranormal social identity. Ghost identity was significantly positively correlated with ghost belief,  $r(210) = .512, p < .001$ , and with ghost experience,  $r(210) = .441, p < .001$ . The same was the case for the relationship between religious identity and religious belief and experience: strength,  $r(209) = .673, p < .001$ ; content,  $r(209) = .788, p < .001$ ; experience,  $r(210) = .634, p < .001$ . Religious social identity was also significantly correlated with religious belief and experience, although to a lesser magnitude than was personal identity: strength,  $r(130) = .273, p = .002$ ; content,  $r(130) = .296, p = .001$ ; experience,  $r(130) = .249, p = .004$ . The relationships were content-specific: There were no significant correlations across belief systems (e.g., ghost belief with religious identity, religious experience with ghost identity, etc.). Thus, Hypothesis 4 was supported.

**Table 6**

*Mediation Analyses for Personality, Religious Experience, & Religious Belief (Content)*

Predictor	Sample 1		
	Bootstrap estimate	95% CI LL	95% CI UL
BSSS-4	-0.023	-0.115	0.071
OCI-R Total	0.000	-0.006	0.006
OCI-R Washing	0.006	-0.020	0.032
OCI-R Obsessing	0.003	-0.022	0.028
OCI-R Hoarding	-0.011	-0.040	0.017
OCI-R Ordering	0.004	-0.022	0.029
OCI-R Checking	-0.011	-0.041	0.019
OCI-R Neutralizing	0.014	-0.015	0.044
TAF-R Total	0.007	<b>0.003</b>	<b>0.012</b>

**Table 6 (continued)**

Predictor	Sample 1		
	Bootstrap estimate	95% CI LL	95% CI UL
TAF-R Moral	0.011	<b>0.005</b>	<b>0.018</b>
TAF-R Likelihood	0.005	-0.005	0.016
PIOS Total	0.008	<b>0.003</b>	<b>0.014</b>
PIOS Sin	0.012	<b>0.004</b>	<b>0.021</b>
PIOS God	0.020	<b>0.008</b>	<b>0.033</b>
PBC	0.004	-0.021	0.031
SPQ-B Total	-0.003	-0.019	0.012
SPQ-B CPF	0.020	-0.020	0.061
SPQ-B IF	-0.017	-0.052	0.019
SPQ-B DF	-0.025	-0.066	0.014
Transliminality	0.012	-0.006	0.033
Tolerance for ambiguity	0.002	-0.025	0.029
Paranoia	-0.004	-0.010	0.002
CT Total	-0.002	-0.007	0.003
CT S&A	-0.007	-0.019	0.006
CT I&C	-0.005	-0.019	0.013
CT M&S	-0.005	-0.020	0.011
Absorption	0.005	-0.005	0.016
Attitude towards science	0.020	<b>0.010</b>	<b>0.031</b>

*Note.* Bootstrap estimate refers to indirect effect. Significant mediation is denoted by the bolded CI limits (i.e., CIs that do not cross zero). BSSS-4 = Brief Sensation Seeking Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; TAF-R = Revised Thought-Action Fusion scale; PIOS = Penn Inventory of Scrupulosity; PBC = Private Body Consciousness; SPQ-B = Schizotypal Personality Questionnaire-Brief; CPF = cognitive perceptual factor; IF = interpersonal factor; DF = disorganized factor; CTDA = Critical Thinking Disposition Assessment; S&A = systematicity and analyticity; I&C = inquisitiveness and conversance; M&S = maturity and skepticism.

## Sample 2

Correlations among the experience and belief variables for Sample 2 are displayed in the upper triangle of Table 3 in boldface type. Religious experience and the strength of religious belief again were significantly positively correlated as were ghost experience and ghost belief. However, contrary to Hypothesis 1, the experience-belief

relationship was not content-specific in Sample 2: The relationship between religious experience and ghost belief was positive and significant.

As in Sample 1, total OC tendencies were not significantly correlated with experience (ghost or religious). There was not a significant relationship with the strength of religious belief. Additionally, total OC tendencies and organizational religiousness were not significantly related. In contrast with Sample 1, there was not a significant relationship between total OC tendencies and ghost belief.

When analyzed by subscale, no significant correlations emerged between the types of OC tendencies and experience (ghost or religious), as was the case in Sample 1. No type of OC tendencies was significantly related to ghost belief. Likewise, no type of OC tendencies was significantly related to the strength of religious belief.

Table 4 displays the results of the mediation analyses for the relationship between personality and ghost belief mediated by ghost experience. Private body consciousness was the only predictor for which ghost experience significantly mediated the relationship with ghost belief.

Table 5 displays the mediation analysis results for the relationship between personality and the strength of religious belief mediated by religious experience. There was no predictor for which the relationship was significantly mediated.

As in Sample 1, ghost identity was significantly positively correlated with ghost belief,  $r(73) = .748, p < .001$ , and ghost experience,  $r(72) = .520, p < .001$ . Religious identity was significantly correlated with strength of religious belief,  $r(74) = .895, p < .001$ , and with religious experience,  $r(74) = .713, p < .001$ . However, the relationships were *not* content-specific as they were in Sample 1. Ghost identity correlated with

strength of religious belief,  $r(72) = .239, p = .043$ . Also, religious identity correlated with ghost belief,  $r(75) = .450, p < .001$ , and with ghost experience,  $r(74) = .240, p = .040$ .

Hypothesis 4 could not be supported.

## CHAPTER IV: DISCUSSION

The purpose of this research was to clarify the personality variables related to paranormal and religious belief systems to determine whether there are meaningful differences between the belief systems and their adherents. This objective was pursued in the service of the more general goal of refining a cognitive model for the formation and change of beliefs. Specifically, this study examined how experience affects the relationship between personality traits, including OC tendencies, and belief. Furthermore, the study intended to replicate past research findings demonstrating the personality trait mechanism by which OC tendencies and paranormal and religious beliefs are related. Finally, the study attempted to validate the constructs of personal and social identity so that their relationship with belief can be quantified, especially later when evaluating the change stage of the cognitive model of belief.

Results from both samples supported our prediction (Hypothesis 1) that experience would be related to belief. This replicated the findings of past research that experience is highly predictive of belief (e.g., Aarnio & Lindeman, 2007; Clarke, 1995). However, the second part of this prediction—that the relationship between experience and belief would be content-specific—was supported in Sample 1, but not in Sample 2. The lack of significant correlations across belief systems in Sample 1 replicated the results of past research (Langston, Fehrman, et al., 2018; Langston, Frosh, et al., 2018). Religious experience and ghost belief were correlated in Sample 2, but not ghost experience and religious belief. This may be an artifact of the composition of the samples—namely, that Sample 2 was composed of stronger believers and experiencers than was Sample 1. Keeping in mind that the experience-belief relationship may not be

completely unidirectional, the latter finding also could be partially attributable to the more organized nature of religious belief (Aarnio & Lindeman, 2007) insofar as someone raised in a religious environment may have a more well-defined traditional framework for interpreting anomalous experience, leading them to have religious experiences rather than ghost experiences.

While there was not much precedent to explain our finding a non-relationship between OC tendencies and experience, the results pertaining to the relationship of OC tendencies with paranormal and religious beliefs were mixed, a reality which has been alluded to by other researchers (Inozu et al., 2012; Mauzay et al., 2016). The relationship between OC tendencies and ghost belief was significant in Sample 1 but not in Sample 2. The reason for this is unclear, as preexisting group differences favored Sample 1 on OC tendencies but Sample 2 on ghost belief. On the other hand, there was not a relationship between OC tendencies and religious belief in either sample. In Sample 1, although the unexpected correlations between OC tendencies and religious values/beliefs, positive religious coping, and religious commitment made unconditional support of Hypotheses 2b and 2c impossible, the lack of significant correlations with all other religiosity metrics accorded with the research of Agorastos et al. (2012). Plus, two of these three relationships may be statistical artifacts. The values/beliefs subscale had very low reliability, and the psychometric soundness of the religious commitment item was not able to be assessed.

There were not specific hypotheses made for the series of mediation analyses. That being said, overall, the mediation findings provide support for the claim that paranormal and religious believers tend to have a few different personality traits but that

experience is a variable that holds across belief systems in the cognitive model of belief. In the cases of significant indirect effects, this means that experience is the mechanism through which a personality trait is converted into a belief. In the absence of an experience—and one directly relevant to the type of belief, as the tests of Hypothesis 1 generally indicated—it appears less likely that an individual with a certain personality trait will develop the belief in question. Sensation seeking was one of the personality traits for which experience had a significant indirect effect on its relationship with belief (in ghosts, specifically), and it provides a good example of the foregoing reasoning. Although there may be a correlation between the trait and the belief from the outset (as there was in this study), a disposition toward being a thrill-seeker does not guarantee that someone will believe in ghosts. It is reasonable to surmise that those who have their sensation-seeking behaviors suppressed in one way or another will have less opportunities for a ghost encounter and therefore less reason to believe in ghosts.

The personality traits found to have an indirect effect on belief through experience would reasonably be expected to open up people to having such experiences that form and reinforce their beliefs. For instance, Langston, Fehrman, et al. (2018) found that absorption and transliminality were more associated with ghost belief than with religious belief. This was borne out by comparing the ghost mediation analyses with the religious mediation analyses (there was significant mediation for these two variables in the first set of analyses but not in the latter). The moral subtype of TAF also showed some discriminatory power with respect to paranormal and religious beliefs in the mediation analyses with experience, as there was significant mediation when religious belief was the outcome variable but not when ghost belief was the outcome variable. This

relationship of TAF-Moral to religious beliefs has been found in past research (Marino et al., 2008; Williams et al., 2013). Despite the significant relationship between OC tendencies and ghost belief in Sample 1, the mediation analyses with experience suggest that obsessive-compulsiveness proper is not helpful in predicting the type of believer, and it may affect ghost and other paranormal beliefs directly without being susceptible to experience.

The results of the mediation analyses with TAF as the mediator of the relationship between OC tendencies and belief contradicted most of past work on the matter (e.g., Mauzay et al., 2016; Yorulmaz et al., 2011). In the case of religious belief, this lack of mediation may make sense insofar as the magnitude of the relationship between OC tendencies and religious belief was low to begin with. That being said, the reason for the lack of significant mediation for ghost and other paranormal beliefs is not readily apparent. However, our analyses suggested that scrupulosity still is a useful construct for determining the exact nature of the relationship between OC tendencies and religious beliefs and behavior (Abramowitz et al., 2002; Abramowitz & Jacoby, 2014; Buchholz et al., 2019; Cogle et al., 2013; Mauzay et al., 2016; Pirutinsky & Rosmarin, 2018; Witzig & Pollard, 2013). In our study, there were almost zero significant direct relationships between total OC tendencies and religious beliefs and behavior. Significant mediation by scrupulosity suggests that obsessive personality does not itself cause someone to become religious; rather, this personality disposition leads to viewing sin as more severe and God as more exacting, which then leads to stronger endorsement of religious beliefs and behaviors. A clinical implication of this is that in the treatment of OCD patients whose disorder manifests in religious contexts, it may be strategic for

clinicians to measure and target particular scrupulous beliefs *in addition* to the disordered behaviors.

The differences between Sample 1 and Sample 2 in terms of experience and belief relationships were mirrored when identity was the object of analysis. There was content-specificity of identity's relationships with experience and belief in Sample 1, but this was not the case in Sample 2. Again, this could be at least partially attributable to the preexisting differences between the samples. There is not much precedent in the literature for what constitutes the typical relationship of identity with experience and belief, but the results from Sample 1 suggested that there is indeed a distinction between personal and social identity with respect to religion (Van Camp et al., 2016). Alternatively, the large difference in the magnitudes of the correlations for personal and social religious identity may reflect the fact that the personal identity measure was so similar to the construct of religious belief that they could be treated synonymously, yet the social identity measure was in fact distinct. Further work in this area is needed to ascertain the utility of identity as a construct.

### **Limitations and Future Directions**

This study had several limitations. First, although most of the measures used achieved high reliability, several of the measures did have low reliability (e.g., values/beliefs and negative religious coping subscales of the BMMRS, tolerance for ambiguity). This may have led to unjustified conclusions about the statistical significance of certain relationships. Additionally, we were not able to calculate reliability at all for the newly devised paranormal social identity measure due to an inadequate number of observations. This could be alleviated by modifying the response format so that the

continuously scaled items are answerable regardless of a participant's response to the first yes/no item.

Second, the size of Sample 2 was somewhat small, especially when compared with that of Sample 1. Although we did not focus our analysis on looking for statistically significant differences between the samples (e.g., by conducting ANOVAs), the absolute size of Sample 2 may have been insufficient to detect relationships among variables within the sample. This could have been partially responsible for the differences in statistical significance between the samples on the same measures.

Third, due to the time constraints of the participants in Sample 2, a highly abbreviated version of the Sample 1 survey had to be administered. This led to our not being able to conduct nearly as many statistical analyses (especially mediation analyses) on the Sample 2 data, which may have led to Type II errors, especially considering the preexisting group differences on the common experience and belief measures. A related concern is that some variables that were measured (sometimes in both samples) were not utilized in the analyses. For instance, future work could devise a method of continuously scaling the qualities of experience as well as examine the role of religious affiliation in relationships among personality, experience, and belief.

In addition to making use of measures already administered but not analyzed in this particular study, future studies could evaluate the formation stage of the cognitive model of belief by requesting qualitative data from participants (e.g., religious conversion or de-conversion stories, full accounts of ghost encounters). These data could be content analyzed to determine whether common themes emerge within and across belief systems in the formation stage. The same set of variables examined here should also be examined

in the context of belief change, as some of these variables may have a significant impact in one stage but not the other (e.g., identity may be more important in the change stage since it is typically an outcome of belief). Future work also should draw from diverse populations (e.g., clinical, countries whose primary religion is something other than Christianity, etc.) to determine if there are meaningful differences. Finally, there should be further refining of identity as a construct. There is a need to devise measures of identity for both paranormal and religious beliefs that demonstrate evidence of reliability and validity, and larger samples may be necessary to conduct the analyses (e.g., exploratory factor analysis) to establish such measures.

In sum, this study established further evidence for a complex and oftentimes mediational relationship between personality and belief with regard to the paranormal and religion. The data indicated that there may be different personality variables, including OC tendencies, implicated in paranormal and religious belief systems but that experience holds across belief systems as a consistent mediator—a mechanism by which personality traits may be translated into beliefs relevant to that experience. This represents a promising attempt of narrowing the variables important to the formation and change of beliefs.

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## **APPENDICES**

## Appendix A: IRB Approval Letter

### IRB

#### INSTITUTIONAL REVIEW BOARD

Office of Research  
Compliance, 010A  
Sam Ingram  
Building, 2269  
Middle Tennessee  
Blvd Murfreesboro,  
TN 37129



### IRBN007 – EXEMPTION DETERMINATION NOTICE

Friday, September 13, 2019

Principal Investigator	<b>Alexander Kah</b> (Faculty)
Faculty Advisor	William Langston
Co-Investigators	NONE
Investigator Email(s)	<i>ack3n@mtmail.mtsu.edu; william.langston@mtsu.edu</i>
Department	Psychology
Protocol Title	<b><i>“Seeing is Beleiving”: Do obsessive-compulsive tendencies make a difference in the relationships among paranormal and religious experiences and beliefs?</i></b>
Protocol ID	<b>20-2024</b>

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXEMPT** review mechanism under 45 CFR 46.101(b)(2) within the research category (2) *Educational Tests* A summary of the IRB action and other particulars in regard to this protocol application is tabulated as shown below:

IRB Action	<b>EXEMPT from 75urther IRB review***</b>	Date	<b>9/13/19</b>
Date of Expiration	<b>9/30/2020</b>		

Sample Size	500 (FIVE HUNDRED)
Participant Pool	<b>Adults (18 years or older) – MTSU students and Murfreesboro residents</b>
Exceptions	1. Online informed consent permitted. 2. Approved to use non-standard templates for direct interactions
Mandatory Restrictions	1. Participants must be 18 years or older 2. Informed consent must be obtained from the participants 3. Identifying information must not be collected
Restrictions	<b>1. All restrictions for exemption apply. 2. Analysis of data collected using UMCIRB 15-000964 3. NOT approved for new data collection</b>
Approved IRB Templates	1. IRB Informed Consent and 2. Online Informed Consent. NON-MTSU Templates: Abbreviated informed consent
Funding	NONE
Comments	NONE

\*\*\*Although this exemption determination allows above defined protocol from further IRB review, such as continuing review, MTSU IRB will continue to give regulatory oversight to ensure compliance.

## Appendix B: Ghost and Paranormal Experience Items

The following item is rated using a five-point scale: 1=Definitely not, 2= probably not, 3=might or might not, 4=probably yes, 5=definitely yes

Have you ever experienced an encounter with a ghost?

For anything but definitely not:

How many ghosts have you encountered? \_\_\_\_\_

How old were you when the first of these occurred? \_\_\_\_\_

Thinking of your most compelling ghost encounter, check each of the following that you experienced: Unusual emotional feeling; sense of presence; unusual sound; unusual temperature (e.g., cold); unusual dizzy feeling; unusual smell; unusual sight; unusual taste; sense of being touched

Still thinking of your most compelling ghost encounter: (matrix with the same 5 scale points for all statements below: Strongly disagree; somewhat disagree; neither agree nor disagree; somewhat agree; strongly agree)

I do not want an encounter like this to happen again

Having this encounter was scary

Thinking about encounters like this frightens me

This encounter was very important to me

I would be afraid to have this encounter happen again

This encounter was intense

This encounter is familiar to me (compared to things I have heard from others, TV, movies, etc.)

I can form a clear mental image of this encounter

This encounter was concrete (as opposed to abstract)

The encounter was vivid

The following item is rate on a five-point scale: 1=Definitely not, 2=probably not, 3=might or might not, 4=probably yes, 5=definitely yes

Have you ever experienced anything (besides a ghost) that fell outside the realm of normal experience? For example, some people say they've encountered flying saucers, while others may claim that they've caught a glimpse of the future before it occurred. These events might be called paranormal. Has anything like this ever happened to you?

For anything but definitely not:

How many of these paranormal experiences have you had? \_\_\_\_\_

Please check all of the different types of paranormal experiences that you have experienced: Psychokinesis (moving things with your mind); witchcraft; out of body experience/astral projection; alien(s) encounter (UFO); demon(s) encounter; psychic experience; extra-sensory perception (ESP); precognition (seeing the future); black magic; palm reading; astrology/horoscopes; something else (please describe briefly)

### **Appendix C: Ghost Behavior Items**

Have you ever been on a ghost tour (where you go around to various locations and hear about ghosts that may be in those locations)? (yes/no) (how many times?)

Have you been on this ghost tour before? (yes/no) (how many times?)

Have you gone somewhere on purpose hoping to see a ghost? (yes/no) (how many times?)

Have you ever been on a ghost investigation or ghost hunt (where you spend time in a location trying to communicate with actual ghosts using some sort of equipment)? (yes/no) (how many?)

Are you a “ghost hunter”? (yes/no)

### **Appendix D: Ghost Identity Scale**

Please rate the following items: (matrix with the same 5 scale points for all statements below: Strongly disagree; disagree; neither agree nor disagree; agree; strongly agree)

I consider myself to be a ghost believer.

Being a ghost believer is a major part of who I am.

I would describe myself to others as being a ghost believer.

If I stopped believing in ghosts, I just wouldn't be the same person.

### **Appendix E: Paranormal Social Identity Scale**

Please choose “Yes” or “No” for the following items

I am a member of a paranormal/ghost hunting group.  
My family members belong to a paranormal/ghost hunting group.  
My friends belong to a paranormal/ghost hunting group.

Only if “I am a member” is chosen: Please rate the following items: (matrix with the same 5 scale points for all statements below: Strongly disagree; disagree; neither agree nor disagree; agree; strongly agree)

Belonging to a paranormal/ghost hunting group is important to me.  
Paranormal/ghost hunting group members help me to make sense of my life experiences.  
A paranormal/ghost hunting group shapes what I believe.

### **Appendix F: Religious Identity Scale**

Please rate the following items: (matrix with the same 5 scale points for all statements below: Strongly disagree; disagree; neither agree nor disagree; agree; strongly agree)

I consider myself to be a religious or spiritual believer.

Believing in God or spiritual forces is a major part of who I am.

I would describe myself to others as being a religious or spiritual believer.

If I stopped believing in God or spiritual forces, I just wouldn't be the same person.

### **Appendix G: Religious Social Identity Scale**

Please choose “Yes” or “No” for the following items

I am a member of a religious community or organization.

My family members belong to a religious community or organization.

My friends belong to a religious community or organization.

Only if “I am a member” is chosen: Please rate the following items: (matrix with the same 5 scale points for all statements below: Strongly disagree; disagree; neither agree nor disagree; agree; strongly agree)

Belonging to a religious community or organization is important to me.

Religious community or organization members help me to make sense of my life experiences.

A religious community or organization shapes what I believe.

## Appendix H: Informed Consent

### *Measuring Religious, Paranormal, and Obsessive Experiences and Beliefs* (presented in Qualtrics):

#### Consent

Welcome to the research!

**[This is the survey presented in Qualtrics to the student sample.]**

This study is being conducted to better understand how people's religious, paranormal, and obsessive experiences and beliefs relate to one another. We are going to ask you about some things you might believe in, and some questions about your personality.

There are several parts to this project:

- Report things you might believe in
- Report experiences
- Describe your personality

The whole thing should take less than an hour. There are a lot of questions to answer. Some of them will require a little thinking. Please take your time and try to answer them all carefully.

Here are your rights as a participant:

Project title: **Measuring Religious, Paranormal, and Obsessive Experiences and Beliefs**

- Your participation in this research is voluntary.
- You may skip any item that you don't want to answer, and you may stop the research at any time. Note that if you leave an item blank, you will be warned that you missed one, just in case it was an accident. You can still click that you don't want to answer.
- There are no risks associated with your participation besides possible discomfort with some of the questions.
- There are no real benefits to you from participating besides earning course credit and possibly learning something about the research.
- You will NOT be asked to provide any identifiable personal information.
- All efforts, within reason, will be made to keep the personal information in your research record private but total privacy cannot be promised. Your information may be shared with people at MTSU (such as the Middle Tennessee State University Institutional Review Board) or other agencies (such as the Federal Government Office for Human

Research Protection) if you or someone else is in danger or if we are required to do so by law.

If you have questions about this research, you may contact Alexander Kah (Principal Investigator, 513/544-0741, ack3r@mtsu.edu), Dr. William Langston (Faculty Advisor, 615/898-5489, william.langston@mtsu.edu), or the Middle Tennessee State University Office of Compliance (615/494-8918, compliance@mtsu.edu). This contact information will be presented again at the end of the research.

If you're ready to get started, please enter your age and make your choice below before clicking the arrow button (that button will be used to navigate through the entire survey).

**Note:** If you do not click on the arrow on the final screen (to go past the screen thanking you for participating), you will NOT be granted credit in Sona for your participation. Even if you're stopping early by skipping to the end, you need to click the final arrow to receive credit. You will know that you are successful because you will automatically return to Sona.

Thanks again for volunteering your time to this project!

Please enter your age:

I have read the information above. I am at least 18 years old. I believe I understand the purpose, risks, and benefits of the research, and I know what I will be expected to do. I consent to participate; I decline to participate (under 18 or decline will go to the end of the survey)

## **Appendix I: Debriefing**

**That completes the survey! Thank you for your participation!**

The purpose of this research was to evaluate the relationship between beliefs in paranormal phenomena and religion and your experiences. We were also interested in obsessive-compulsive tendencies and identity, how they are related to paranormal and religious beliefs, and how they affect the relationship between experiences and beliefs. Based on what happens, these results may be useful to understand how people form and update beliefs, including beliefs in things that are outside of normal experience.

If you would like additional information about the project, you may contact:

- The researchers: William Langston (615/898-5489, [william.langston@mtsu.edu](mailto:william.langston@mtsu.edu)), Alexander Kah (513/544-0741, [ack3r@mtmail.mtsu.edu](mailto:ack3r@mtmail.mtsu.edu))
- The Middle Tennessee State University Office of Compliance (615/494-8918, [compliance@mtsu.edu](mailto:compliance@mtsu.edu))

Thanks again for your participation!