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The Effects of Cognitive Style and Degree of Familiarity on Belief in Supernatural Events in Religious Stories

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THE EFFECTS OF COGNITIVE STYLE AND DEGREE OF FAMILIARITY ON
BELIEF IN SUPERNATURAL EVENTS IN RELIGIOUS STORIES

by
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ABSTRACT

BRANDI ELIZABETH SOPER: The Effects of Cognitive Style and Degree of
Familiarity on Belief in Supernatural Events in Religious Stories
(Under the direction of Dr. Elizabeth Boerger)

Two studies assessed whether individual differences in cognitive style, familiarity with

religious content, or the inclusion of supernatural details in religious stories had any

effect on individual religious beliefs. Two scales intended to indentify individual

differences in the need for cognition and the need for cognitive closure were used to

measure cognitive style. Three different types of religious beliefs were measured by

Hunt's (1972) Literal, Anti-literal, Metaphorical religious belief scale and also by a

similar scale that measured participants' belief in actual Biblical stories. The Bible stories

were manipulated to include either familiar or unfamiliar details as well as supernatural

or natural details. Participants revealed higher metaphorical religious beliefs in unfamiliar

Bible stories and higher literal religious beliefs in familiar Bible stories.

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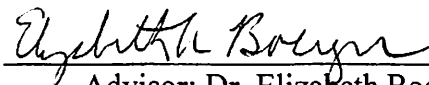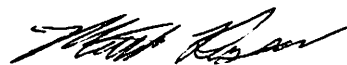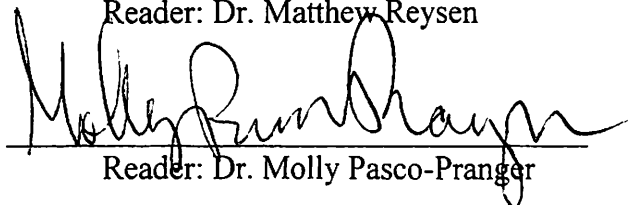
The Effects of Cognitive Style and Degree of Familiarity on Supernatural Events in Religious

Stories

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The effects of cognitive style and degree of familiarity on religious beliefs

A survey by the Pew Research Center's Forum on Religion & Public Life and the Pew Research Center for the People & the Press (2006) found that 79% of American Christians said Jesus Christ will return to Earth some day. These results, regarding public opinion and a specific religious canon, provide a specific example of a personal belief held by some of the American public. In essence, personal beliefs are values, ideas, and doctrines that individuals choose to accept as true. We are all subject to a system of interpreting the world through our own personal beliefs. Although it is not always apparent, we guide our lives around a set of personal beliefs that we hold concerning others, ourselves, and the events surrounding us. We all have these beliefs in varying forms and they work to shape the individual we are and also affect the way that we interpret information. Personal beliefs may be distinguished from the concept of knowledge, with the latter being a premise that is accepted as true on the basis of justified and provable evidence. A person's knowledge of one subject may produce a personal belief on this subject through the use of our perspective, understanding, emotions, and memory (Lilienfeld, Lynn, Namy & Woolf, 2008). Beliefs, then, are perceptions that may not be accurate or tangible but are blindly adhered to, sometimes despite compelling alternative evidence. Personal beliefs can be applied to social and cultural topics such as political ideology and racism. They can also be applied to unconventional entities such as the existence of ghosts, aliens, or "big foot." One form of a personal belief that is influential in shaping our personal development and decision-making is religious faith and the convictions this faith entails.

In evaluating how different individuals approach and process information pertaining to their belief systems, the domain of religious beliefs seems a highly appropriate realm. Religious beliefs are a unique area to consider because unlike one's personal beliefs concerning world

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functions like politics, they often involve supernatural features like the unorthodox topics mentioned above. Religious beliefs, including those of Christianity, have a defining feature of belief in the existence of a supernatural character or characters that are capable of performing divine actions (Atran & Norenzayan, 2005). Atran and Norenzayan (2005, p. 716) classify religious supernatural beings as being "imperceptible in principle" and their governing actions in the world "materially and logically inscrutable in principle." They insist that supernatural religious agents and their actions go against the theoretical causal framework that is used to guide our understanding of the world. In other words, the belief in a supernatural being defies the standards of analytical processing paths, such as those used in scientific evaluation, that an individual normally applies to natural phenomena or entities in real life. This belief in religious supernatural agents is seemingly "counterfactual and counterintuitive" to the cognitive principles that normally guide a person's understanding of the everyday world, as they violate the physical concepts that an individual has learned to apply (Atran & Norenzayan , 2005, p. 716).

Previous research has revealed that both younger (3- and 4- year old) and older (5-, 6-, and 7- year old) children understand the reality status of familiar figures, correctly judging historical figures to be real and fictional figures to be pretend. Furthermore, when presented with information about novel figures embedded in either a realistic narrative or a narrative with obvious fantasy elements, older children used the narrative to make an appropriate assessment of the reality status of the character (Corriveau, Kim, Schwalen, & Harris, 2009). Individuals as young as five years old are aware of and adhere to a set of causal principles that govern everyday experiences and they are able to use this set to evaluate the reality status of fantastical and non-fictional characters and events.

These causal principles include knowledge about scientific limitations and possibilities,

allowing us to distinguish what could or could not occur in everyday experiences. For example, we are aware of the impossibility that popular supernatural figures such as Santa Claus or Harry Potter actually exist. Their supernatural actions, involving a flying sleigh or flying broomstick, violate our scientific understanding of gravity in how we apply it to everyday living and this knowledge prompts our disbelief in the figures and their actions. Therefore, most people cannot accept the reality of such popular figures and their supernatural abilities, as they challenge factual scientific knowledge and thereby intuitively seem impossible. Some individuals with religious supernatural beliefs, however, do not apply this same analytical scrutiny to supernatural religious characters or events. Instead, they set aside established notions of real-world feasibility, and allow these religious agents to constitute a supernatural class of their own, distinct and independent from the everyday scientific properties that restrict their belief of supernatural agents presented in popular culture. A religious individual might not, for example, believe that a man could survive in the stomach of a whale for three days, if this feat were told in a context outside of the Biblical story of "Jonah and the whale". Because this supernatural event is relayed through a Biblical perspective, however, it may be held as true by a Christian believer.

In turn, it has been found that Christian individuals hold various forms of belief in the principles and doctrines of Christianity. For example, not all people believe in the supernatural or miraculous aspects of the Bible in a literal sense. Instead, some individuals choose to hold a metaphorical or symbolic belief in these miraculous feats (Hunt, 1972). Furthermore, some individuals choose to reject all supernatural events and figures in the Bible, yet may still believe in the non-supernatural aspects. It is the intention of this study to learn more about the factors that may influence different types of religious beliefs. Previous research has indicated that lower levels of intelligence are strongly associated with high religious fundamentalism, thereby suggesting intelligence as one possible determinant of individual religiosity (Bates, Lewis, &

Ritchie, 2009). This view, however, remains controversial so I instead intend to look at the function of an individual's cognitive framework, or cognitive style, in determining individual religious belief differences. Cognitive style refers to an individual's tendency or preferred way of acquiring and processing information. It involves a person's typical way of thinking, remembering, or problem solving as well as the mental processes that they habitually apply to obtaining, sorting, and utilizing information (Lilienfeld et, al, 2008). Although different forms of cognitive style have been shown to correlate with different levels of general intelligence, cognitive style is both a different and broader area of cognitive activity (Cacioppo & Petty, 1982). The foundations of an individual's cognitive structure and style, which reveals how a person generally approaches religious as well as non-religious information, may also provide insight into the different ways that individuals think about religion and supernatural religious feats.

It is often noted by cognitive and social psychologists that individuals vary in how they approach information that is relevant to their personal beliefs. For example, when approached with information pertaining to their personal beliefs, some people attempt to strengthen or defend their belief through self-serving judgments while other people analytically consider its content, independent of personal convictions (Klaczynski, 2000). These two different approaches have been classified by cognitive psychologists as heuristic and analytical processing. The first, heuristic processing, is a cognitive processing path that relies on past observations and memories, generalizations, stereotypes, and intuitions when making a decision or judgment (Lilienfeld et al., 2008). Heuristics are timesaving mental shortcuts that reduce complex judgments to simple rules. The heuristic process is rapid, preconscious, and seemingly effortless as it relies on subjectively appealing and intuitively correct information that supports self-serving, belief-based judgments (Klaczynski, 2000).

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In contrast, a second cognitive processing path, known as analytical processing, involves complex, rational, and objective reasoning. Analytic reasoning competence is marked by an individual's ability to disassociate prior knowledge and personal beliefs when evaluating relevant information (Klaczynski, 2000). These two cognitive processing paths work both separately and interdependently in a person's information processing system; yet contextual variables, along with a person's cognitive style, determine which path will be used more often. Contextual variables refer to specific situations that would facilitate the use of one cognitive processing system over the other. For example, time constraints to make a quick decision may motivate the heuristic process, while the analytic process may be preferred when making an important decision that is not time-sensitive (Klem, Kruglanski, & Webster, 1993). Furthermore, heuristic reasoning often dominates when a person is processing evidence that relates to their beliefs, as personal theories may interfere with the processing of contradictory information. On the other hand, analytical processing may dominate when a person is evaluating information they do not associate with personal beliefs (Klazcynski, 2000). In addition, each person is said to have a personal cognitive style that is used when interpreting information. As noted previously, cognitive style may be referred to as an individual's tendency or preferred way to evaluate and process information, using either a predominant heuristic or analytical path.

Psychologists have developed two cognitive style measures to identify differences in how individuals process information. One scale, The Need for Cognitive Closure (NFCL), denotes an individual's desire for a definite answer on some topic so as to avoid confusion and ambiguity, and may therefore by associated with a heuristic processing style. Individuals marked by a high need for closure have a strong desire for a clear-cut opinion on a topic. An individual with a low need for cognitive closure, however, is not strongly unsettled by the idea of uncertainty concerning their opinions (Klem et al., 2008).On the other hand, some individuals have a strong

disposition to engage in and enjoy thinking. This aspect can be measured on the Need for

Cognition scale (NFCOG). Similarly, this cognitive style may be associated with a dominant

analytical processing system. When individuals with a high need for cognition are approached

with information that may deviate from their own understanding or belief on a topic, they seek to

cognitively dissect the information and are thus marked perhaps by a "need to understand" as

opposed to a "need to conclude." In addition, a low need for cognition is representative of

individuals who have a disposition to become frustrated and discouraged when they approach

unknown or deviating information, as they prefer to have a quick understanding and opinion on a

topic. These individuals are motivated to quickly arrive at a conclusion about the topic by using

heuristic based shortcuts that do not require extensive cognitive effort (Cacioppo & Petty, 1982).

The processing of religious belief information may be approached differently by

different individuals, guided by one's cognitive style, just as one's cognitive style guides the

general processing of other "every day" topics. It is my hypothesis that cognitive style may affect

how a person approaches religious supernatural beliefs by evoking different processing methods

and interpretations for different people. Furthermore, the different processing approaches, or

cognitive styles, will be manifested in the type of religious belief that an individual forms. For

example, a person who generally enjoys thinking, classified by a high need for cognition and

subsequent low need for closure may be apt to interpret supernatural religious information in a

more metaphorical/ symbolic or anti-literal sense, because of their desire to analytically reflect

on the information and to reflect on causal principles. On the other hand, people who like to have

a definite sense of conclusion and understanding, characterized by a high need for closure and

low need for cognition, may be more likely to hold a literal sense to religious supernatural

information, because it allows them to have a simple conclusion without deeply sifting through

the information. A literal belief in supernatural religious incidents enables these individuals to

arrive at an easily accessible explanation that makes sense of otherwise mysterious and inexplicable events because they can reference the causal power of God or another miraculous character (Shenhav, Rand, & Greene, 2011)

Another ordinary psychological process that may also influence an individual's cognitive approach to interpreting religious statements is the cognitive ease with which an idea can be remembered. Bartlett's (1932) study showed that a group of British university students were better able to recall familiar items of a Native American folk tale. The students were less likely to remember and recall the story items that were unfamiliar or inconsistent with their cultural expectations. This suggests, in relation to the present study, that one's familiarity with the material that is being evaluated may influence one's values, attitudes, and beliefs concerning the information being processed (Lilienfeld, et al. 2008). Furthermore, Vaden and Woolley (2011) showed that children, as they got older, tended to use religious language cues such as a reference to God or another familiar Bible character in a story to evaluate the story's reality status. In other words, when familiar religious characters were included in the stories presented to children, they were more likely to believe events that they would normally conclude were impossible than when stories were rewritten to refer to unfamiliar characters. The researchers included eight stories with events and characters based on the Old Testament of the Bible, and they manipulated the details of four of the stories. For example, the first group of four stories was Bible stories involving familiar characters from the Bible (e.g., Jonah does not do what God asks of him and so is thrown into the ocean and swallowed by a whale). The second group of four stories was created exactly from the text of the first group but the researchers changed the proper names and references to God. (e.g., Jonah, renamed James, does not do something he was supposed to do and so also is thrown into the ocean and swallowed by a whale) (Vaden and Woolley, 2011, p. 1122).

Although it is unknown whether these findings may generalize to young adults, it is relevant to note that people may be more likely to believe information that has familiar characters or events. Familiarity with a set of religious content might invoke heuristic processes that lead to acceptance and belief of the content based on past experiences and prior information. If a religious individual has heard details of a particular Bible story before, then they may accept the details of the story at face-value without analytically considering the possibility of its events. If however, an individual is less familiar with or has never heard of a particular Bible story, they may evaluate the story's content based on analytical concepts and everyday scientific guidelines because they do not validate its truth based on prior exposure and knowledge of its source. I hypothesize that varying degrees of familiarity with a religious story will provoke various forms of religious beliefs; specifically, familiar religious stories may be considered more literally true by a religious person while unfamiliar stories may be considered untrue or metaphorically true. In addition, an individual's cognitive style may interact with varying degrees of familiarity when a person is interpreting a religious story and evaluating their own belief of its content. Individuals with a high need for cognition style and/or low need for closure style may approach all religious story information in an analytical context, even if they are familiar with it. Individuals low in the need for cognition style and/or high in the need for closure style may instead approach only unfamiliar religious story information in an analytical context because they have no prior heuristic base to use except for their understanding of causal principles in everyday life.

Although the exact meaning of "religion" is sure to vary among scholars and public alike, the term used for the purpose and execution of this study will focus on a widespread belief in supernatural agents. Setting aside the ritualistic and social distinctions of the term, the present study will focus on cognitive functions involved in interpreting supernatural or non-supernatural religious stories. It has also been claimed that the cultural context of a religion has different

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implications for how its followers approach the dimensions listed above (Atran & Norenzayan, 2005). For this reason, this study will focus on the Christian religion, as it is relevant for the geographic area of the study. Focusing the study on one religion allows a unified written doctrine and set of shared fundamental beliefs that should be familiar and similar for most Christian participants.

The foregoing notions were examined in two studies. The first was a pilot study to establish rates of familiarity on Bible stories that would be used in Study 2. Study 1 included seventeen Bible stories and undergraduate students rated their familiarity with each story. Twelve of the original seventeen Bible stories were chosen for Study 2, based on high and moderate familiarity ratings. In this study, the participants rated their type of belief (literal, anti-literal, or metaphorical) in each of the twelve Bible stories and they rated their familiarity with each story. Participants also completed two measures of cognitive style, the Need for Closure and Need for Cognition scale, and the Literal, Anti-Literal, Metaphorical religious belief scale. It was expected that individuals scoring high on the Need for Cognition scale and low on the Need for Closure scale would display less literal religious beliefs and more metaphorical and anti-literal religious beliefs, especially on the supernatural stories. In turn, it was expected that individuals scoring low on the Need for Cognition scale and high on the Need for Closure scale would display more literal or metaphorical religious beliefs, and less anti-literal religious beliefs. Additionally, it was expected that high familiarity with a Bible story would prompt more literal beliefs, while low familiarity with a Bible story would instead prompt more metaphorical or anti-literal religious beliefs.

Study 1

Method

Participants

Thirty-five (10 male, 25 female) undergraduate students were recruited from the

University of Mississippi Psychology Study Participant Manager (PSPM) system. The students were enrolled in a general psychology course and participated in exchange for research credit hours for the course. Participants were of standard undergraduate student age ($M = 18.6$, range = 18 to 21). The majority of students (88.6 %) identified themselves as Christians, while 11.4% reported that they did not practice a specific religion. Two participants were excluded from the final data analysis because they did not complete all of the materials and four participants were excluded because they reported that they did not belong to a religion, and would therefore be disadvantaged in rating the familiarity of Christian Bible stories. These exclusions left a final sample of twenty-nine (8 male, 21 female) undergraduate students. The average age of participants did not change ($M = 18.6$, range = 18 to 21). Of the final sample of twenty-nine participants, all of the students identified themselves as Christians and 27.6% ($n = 8$) were non-denominational, 27.6% ($n = 8$) were of the Baptist denomination, 13.8% ($n = 4$) were Catholic, 10.3% ($n = 3$) were Methodist, 13.8% ($n = 4$) were Presbyterian, and 6.9% ($n = 2$) belonged to the Church of Christ.

Procedure

Participants were tested in small groups of 8-10 students in a classroom setting inside the Psychology building at the University of Mississippi. The students were given an information letter describing the study when they walked in. After reading the letter, they signaled their readiness and consent by looking up, and they were then given a packet containing a short demographic questionnaire, and seventeen Bible Stories with familiarity rating scales. Students were reminded not to put their name on any of the materials, and they placed the materials face down by the instructor once they were completed. The study took the students about thirty minutes to complete, and they were given a half-hour research credit for their class.

Materials

Participants completed a demographic questionnaire that reported age, gender, religious involvement, and religious identification. Religious involvement was reported by two questions, asking how often the student attended religious functions (church, worship, etc.) and how often they studied or practiced religion on their own time. Of the participants, 51.7% ($n = 15$) reported that they attended religious functions 1 or more times per week, 41.4% ($n = 12$) reported that they attend 1-3 times per month, and 6.9% ($n = 2$) reported that they attend 1-11 times per year. In addition, 69% of participants ($n = 20$) reported that they study or practice religion on their own time 1 or more times per week, 20.7% ($n = 6$) reported that they practice on their own time 1-3 times per month, and 10.3% ($n = 3$) reported 1-11 times per year. Religious identification was provided through an open ended question asking if the participant identified themselves as belonging to a certain religion/religious denomination.

The participants also read seventeen short summaries of Bible stories and were instructed to rate how familiar they were with each story on a 4-point Likert-type scale (1 = "very unfamiliar" to 4 = "very familiar"). I researched many Bible stories, using my own Christian background and experience as a guide. The stories were chosen based on my perception of how familiar/unfamiliar each story would be to young adults with a Christian background. Of the seventeen stories, eleven of them involved supernatural details, such as Jesus healing a blind man with his hands, while six of the stories did not involve supernatural aspects (See *Appendix* A). Furthermore, three of the eleven supernatural stories were anticipated to be generally familiar Bible stories, such as the story of Noah's Ark, while three of the six natural Bible stories were anticipated to be generally familiar, such as the story of David vs. Goliath. The remaining supernatural stories as well as the remaining natural stories were anticipated to be generally unfamiliar to the participants. The seventeen Bible stories were chosen to represent four groups based on my initial impression of them: familiar-natural, familiar-supernatural, unfamiliar-

natural, and unfamiliar-supernatural.

Results & Discussion

Familiarity ratings for each of the seventeen stories were compared to assess which stories were the most and least familiar to the participants (See *Table 1*). A paired samples t-test was used to determine whether the supernatural Bible stories or natural Bible stories were rated more familiar overall. While the natural stories ($M = 19.0$, $SD = 3.27$) were rated more familiar than the supernatural stories ($M = 17.9$, $SD = 2.81$), the difference was not significant, $t (28) = -2.04$, $p = .051$. Another paired-samples t-test also revealed that the high familiarity-natural stories ($M = 11.09$, $SD = 1.47$) were ranked slightly more familiar than the high-familiarity-supernatural stories ($M = 10.94$, $SD = 1.06$), though the difference was not significant, $t (32) = .550$, $p = .586$. There was a significant difference, $t (32) = 2.55$, $p = .016$, between the moderately familiar-natural stories ($M = 8.00$, $SD = 2.22$) and the moderately familiar –supernatural stories ($M = 7.06$, $SD = 2.18$).

The original plan for the study was to identify the highest familiar and lowest familiar ranked stories, but the range of familiarity scores for the supernatural stories was broader than the range of scores for the natural stories. Because there were not comparable degrees of familiarity across the two types (natural/supernatural) of stories, three supernatural stories with the highest familiarity ratings ($M = 10.9$, $SD = 1.05$), three supernatural stories with moderate familiarity ratings ($M = 7.05$, $SD = 2.18$) three natural stories with the highest familiarity ratings ($M = 11.05$, $SD = 1.43$), and three natural stories with moderate familiarity ratings ($M = 8$, $SD = 2.22$) were chosen for Study 2.

Table 1. *Mean Familiarity Ratings for Study 1 Bible Stories*

Supernatural		Natural	
Story	*M (SD)*	Story	*M (SD)*
Noah*	4.00 (.000)	Moses*	3.80 (.473)
Blind Man*	3.52 (.712)	David*	3.77 (.731)
Daniel*	3.46 (.886)	Joseph*	3.49 (.919)
Babel*	2.89 (1.157)	Zaccheus*	3.09 (1.12)
Mantle	2.34 (.938)	Samson*	2.69 (1.16)
Simon*	2.23 (.973)	Stephen*	2.18 (1.13)
Fig	2.00 (1.138)		
Balaam	2.00 (1.029)		
Eutychus*	1.94 (1.136)		
Elisha	1.80 (.933)		
Bear	1.48 (.919)		

Note. M= Mean; *SD=* Standard Deviation; *=* Bible Stories used in Study 2.

Study 2

Method

Participants

Eighty five (24 male, 56 female) undergraduate students were recruited from the

University of Mississippi Psychology Study Participant Manager (PSPM) system. The students

were enrolled in a general psychology course and participated in exchange for research credit

hours for the course. The majority of participants (94.1%) were of standard undergraduate

student age but the overall sample had a range of ages 18-48 (M = 20.1) Of the participants, 30%

were non-denominational Christians (n = 24), 25% reported being Baptist (n = 20), 15% were

Catholic (n = 12), 8.8% were Methodist (n = 7), 3.8% were Presbyterian (n = 3), 2.5% were

Episcopalian (n = 2), 1.3% belonged to the Church of Christ (n =1), 1.3% practiced Hinduism (n

= 1), and 12.5% (n = 10) reported that they do not belong to any certain religion.

Procedure

Participants were tested in small groups of 8-10 students in a classroom setting inside the Psychology building at the University of Mississippi. The students were given an information letter describing the study when they walked in. After reading the letter, they signaled their readiness and consent by looking up, and they were then given a packet containing the same short demographic questionnaire used in Study 1, two scales used to measure cognitive style, and a religious belief questionnaire. Participants also read the twelve Bible Stories chosen from Study 1 and rated their familiarity and belief in each story. Students were reminded not to put their name on any of the materials, and they placed the materials face down by the instructor once they were completed. The study took the students about forty-five minutes to complete, and they were given an hour research credit for their class.

Materials

Study 2 contained the demographic questionnaire used in Study 1, intended to assess the participant's age, gender, religious involvement, and religious identification. Of the students, 27.5% ($n = 22$) reported that they attend religious functions 1 or more times per week, 35% ($n = 28$) reported that they attend 1-3 times per month, 25% ($n = 20$) reported that they attend 1-11 times per year, and 12.5% ($n = 10$) reported that they do not attend. Furthermore, 60% of participants ($n = 48$) reported that they study or practice religion on their own time 1 or more times per week, 13.8% ($n = 11$) reported that they practice on their own time 1-3 times per month, 12.5% ($n = 10$) reported 1-11 times per year, and 13.8% ($n = 11$) reported that they do not attend.

Participants also completed two scales used to measure individual cognitive style: the Need for Cognition Scale (NFCOG) (Cacioppo & Petty, 1982) and the Need for Closure Scale

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(NFCL) (Klem, et al., 1993). The NFCL scale is a self-report measure that is designed to identify an individual's high or low need for cognitive closure. The NFCL measure consists of 42 items that were rated by the participants on a 5 point (1= "Strongly Disagree" to 5= "Strongly Agree") Likert-type scale. The NFCL scale requires the participants to rate the extent to which they agree that each statement reflects their personal preference for cognitive closure (e.g., "I dislike questions which could be answered in many different ways") as well as their preference to avoid cognitive closure (e.g., "I would describe myself as indecisive"). Previous studies indicate that the NFCL scale significantly discriminated between student groups who were predicted to differ in their need for cognitive closure. In particular, students who were accounting majors and thereby anticipated to prefer structured, explicit tasks scored notably higher on each NFCL item compared with art majors, who are characterized by a preference for ambiguous, unstructured activities (Klem, et al., 1993).

The NFCOG scale is a 45-item self-report measure intended to assess individual differences in the need for cognition. The need for cognition is marked by an individual's dispositional tendency to enjoy effortful cognitive activities. The NFCOG scale requires respondents to rate the extent to which each of the 45 items reflects their personal preference for engaging in cognitive activity on a 5 point (1= "Strongly Disagree" to 5= "Strongly Agree") Likert-type scale. The scale includes items reflecting a preference for tasks requiring cognitive effort (e.g., "I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought") and items reflecting a preference to avoid high-effort cognitive activity (e.g., "When something I read confuses me, I just put it down and forget about it.")

Next, the participants indicated their religious belief tendencies on the Literal, Anti-

literal, Metaphorical (LAM) religious belief scale (Hunt 1972). This scale assesses three different types of religious beliefs and commitment: a literal and definite belief in religious information, no belief, or a belief marked by a metaphorical/symbolic association of the information. The literal religious belief is marked by unyielding belief in a religious concept at face-value and without question. An anti-literal religious belief is represented by the rejection of belief statements on the basis that they are unscientific and archaic. Finally, a metaphorical religious belief is marked by belief in a religious concept, yet restructuring it in a symbolic or metaphorical interpretation (Hunt 1972).

The LAM scale consists of 17 items involving Christian statements and participants choose their belief on each subject from three answer choices reflecting a literal, anti-literal, or mythological religious belief or interpretation. An example item from this scale states, "Jesus was born of the Virgin in a manner different from human beings." The literal belief answer choice to this statement says, "Agree, since God conceived Jesus in Mary's womb before she had a sexual relationship with Joseph, her husband;" the anti-literal belief stated, "Disagree, although most religions claim a virgin birth for their founder, we know that such an event is physically impossible." The mythological-symbolic belief choice stated, "Agree, but only in the sense that this is an ancient mythological way of talking about the Ultimate Reality as manifested in Jesus."

After completing the three scales, participants read the twelve Bible stories selected from Study 1. After reading the stories, the students indicated the degree of their familiarity with each story on the same four point scale (1= "very unfamiliar" to 4 = "very familiar") used in Study 1. Participants then rated the extent to which they believe each story actually occurred using a scale similar to the one used in the LAM measure (Hunt 1972). . The responses were: a.) The events in this story are true, exactly as they are represented in the Bible, b.) The events of this story

cannot be true because scientific developments and observations would prove otherwise, c.) The events in this story probably did not actually happen, but they could still be relevant in providing religious guidance.

Results

Familiarity Ratings

Familiarity ratings were summed across each of the four story types (natural-familiar, supernatural-familiar, natural-unfamiliar, and supernatural-unfamiliar). Descriptive statistics for the Bible story familiarity ratings can be found by story type in Table 2. These scores were submitted to a 2 (familiarity: familiar,unfamiliar) × 2 (type of story: natural,supernatural) repeated measures analysis of variance (ANOVA) to see if there were significant difference between the story types on familiarity ratings. The results yielded a significant main effect of familiarity, $F(1,72) = 158.58$, $p < .001$, partial $\eta^2 = .688$, as well as a significant interaction of familiarity and type of story, $F(1,72) = 11.160$, $p = .001$, partial $\eta^2 = .134$. The test did not reveal a significant main effect for type of story, $F(1,72) = .363$, $p = .549$, partial $\eta^2 = .005$.

As expected, the familiar story types, both familiar-natural ($M = 10.05$, $SD = 2.28$) and familiar-supernatural ($M = 10.39$, $SD = 1.88$), were rated as more familiar than the unfamiliar-natural ($M = 7.89$, $SD = 2.44$) and unfamiliar-supernatural ($M = 7.17$, $SD = 2.31$) story types. Follow up t-tests revealed that the unfamiliar-natural stories ($M = 7.83$, $SD = 2.45$) were seen as more familiar than the unfamiliar-supernatural stories ($M = 7.22$, $SD = 2.27$); $t(73) = 2.36$, $p = .021$. There was no significant difference in the familiarity ratings of familiar-natural ($M = 10.02$, $SD = 2.29$) and the familiar-supernatural stories ($M = 10.39$, $SD = 1.88$); $t(73) = -.365$, $p = .063$.

Table 2. *Mean Familiarity Ratings for Study 2 Bible Story Types*

Story type	M (SD)
Familiar-natural	10.05 (2.28)
Familiar-supernatural	10.39 (1.87)
Unfamiliar-natural	7.89 (2.45)
Unfamiliar-supernatural	7.17 (2.31)

Note. *M*= Mean; *SD*= Standard Deviation.

Bible Story Belief Ratings

Literal belief ratings from the LAM adaptation scale were tallied across each of the four Bible story types and subjected to a 2 (familiar, unfamiliar) × 2 (natural, supernatural) ANOVA to determine if literal belief ratings varied across the four story types. The results yielded a significant main effect of familiarity, $F(1,84) = 30.31$, $p = .000$, partial $\eta^2 = .265$ and a marginally significant interaction of familiarity and type of story, $F(1,84) = 3.75$, $p = .056$, partial $\eta^2 = .039$. Literal belief ratings were higher overall for the familiar than for the non-familiar story types as shown in Table 3. The familiar -natural stories ($M = 2.06$, $SD = 1.23$) and the familiar-supernatural stories ($M = 2.06$, $SD = 1.24$) showed approximately equal literal belief ratings, while the unfamiliar-natural stories ($M = 1.75$, $SD = 1.32$) had slightly higher ratings than the unfamiliar-supernatural stories ($M = 1.52$, $SD = 1.25$).

Metaphorical belief ratings from the LAM adaptation scale were tallied across each of the four Bible story types and subjected to a 2 (familiar, unfamiliar) × 2 (natural, supernatural) ANOVA to determine if metaphorical belief ratings varied across the four story types. The results yielded a significant main effect of familiarity, $F(1,84) = 21.23$, $p = .000$, partial $\eta^2 = .202$, but not for type of story, $F(1,84) = .274$, $p > .05$, partial $\eta^2 = .003$. Metaphorical belief ratings were

higher overall for the unfamiliar than for the familiar story types as shown in Table 3.

Table 3. *Mean Belief Ratings for Study 2 Bible Story Types*

Story type	Literal *M (SD)*	Metaphorical *M (SD)*
Familiar-natural	2.06(1.23)	.565(1.05)
Familiar-supernatural	2.06(1.24)	.471(.881)
Unfamiliar-natural	1.75(1.32)	.847(1.17)
Unfamiliar-supernatural	1.52(1.25)	.859(1.00)

Note. M= Mean; *SD=* Standard Deviation.

Cognitive Style, LAM, and Literal Belief Ratings

Scores on the Literal, Anti-Literal, Metaphorical religious belief scale items were computed by counting the number of scores for each of the three categories. A median split was then used to establish high and low score categories. Scores on the LAM items were analyzed through correlation analysis, which revealed a negative correlation between literal beliefs and anti-literal beliefs, $(r = -5.95, n = 85, p = .000)$ as well as literal beliefs and metaphorical beliefs, $(r = -4.54, n = 85, p = .000)$. There was no correlation between anti-literal and metaphorical beliefs. Furthermore, anti-literal beliefs and metaphorical beliefs showed no correlation, $(r = .212, n = 85, p = .052)$. A categorical literal belief score was computed by a median score split, with scores of 1-34 being the low literal score category and scores 34-51 being the high category. A categorical metaphorical belief score was computed similarly, with scores of 1-4 comprising the low metaphorical belief category and scores of 5-15 being the high metaphorical belief category. There were not enough anti-literal responses to use in further analysis.

After reverse scoring the items that reflect a preference to avoid effortful cognition, a composite need for cognition score was established by summing across responses to each of the items on the NFCOG scale. Scores on the Need for Cognition items, which had a potential range of 45-225, ranged from 100 to 192 with a median score of 149. Participants scoring 149 and

below on the Need for Cognition scale were considered low in the need for cognition ($n = 38$), while participants scoring 150-192 were considered high in the need for cognition style ($n = 40$). These low/high categories were determined by using a median split in the summed NFCOG scores.

Similarly, a composite need for cognitive closure score was found by summing across responses to each of the NFCL items after reverse scoring the items reflecting a desire to avoid closure. Scores on the Need for Closure items, which had a potential range of 42-210, ranged from 107 to 167 with a median score of 138. Participants scoring 137 and below on the Need for Cognitive Closure scale are labeled as low in their need for cognitive closure ($n = 38$), while participants scoring 138-167 are considered high in the need for cognitive closure ($n = 39$). A median split in the range of scores was again used to determine the low/high categories. In addition, zero order correlations were calculated between the summed scores from the NFCOG scale and NFCL scale. These tests did not reveal significant correlations between the NFCOG and NFCL summed scores($r = -.094$, $n = 75$, $p = .423$), so the two may be used as separate variables in further analysis.

To determine if cognitive style, LAM responses, or story type had any effect on the number of literal belief ratings in the twelve Bible stories, these scores were submitted to a 2 (high NFCL, low NFCL) × 2 (high NFCOG, low NFCOG) × 2 (high literal LAM, low Literal LAM) × 2 (familiar, unfamiliar) × 2 (natural, supernatural) ANOVA. This analysis revealed significant main effects of familiarity, $F(1,75) = 27.54$, $p = .000$, partial $\eta^2 = .269$. The between subjects test revealed a significant main effect of LAM literal belief category scores, $F(1,83) = 39.87$, $p < .01$, partial $\eta^2 = .325$. Participants scoring high in the literal LAM category belief score also provided higher literal belief scores across all of the story types. The tests of between-

subjects effects revealed a marginally significant effect of need for closure, $F(1,75) = 5.18$, $p = .026$, partial $\eta^2 = .065$.Participants ranking high in the need for cognitive closure rated more literal beliefs in the Bible stories across each of the four story types (familiar- natural stories: $M = 2.44$, $SD = .995$, familiar-supernatural stories: $M = 2.49$, $SD = .914$, unfamiliar- natural stories: $M = 2.18$, $SD = 1.12$, unfamiliar- supernatural stories: $M = 1.82$, $SD = 1.44$) than those ranking low in the need for cognitive closure (familiar,-natural stories: $M = 1.92$, $SD = 1.28$, familiar-supernatural stories: $M = 1.84$, $SD = 1.35$, unfamiliar- natural stories: $M = 1.55$, $SD = 1.41$, unfamiliar-supernatural stories: $M = 1.39$, $SD = 1.33$). Overall, participants, both high and low in the need for closure, rated higher literal belief ratings for the familiar story types, both familiar-natural ($M = 2.18$, $SD = 1.17$) and supernatural-familiar ($M = 2.17$, $SD = 1.18$) than for the unfamiliar-natural ($M = 1.87$, $SD = 1.30$) and unfamiliar-supernatural ($M = 1.61$, $SD = 1.25$) story types.

Table 4. *Mean Literal Belief Ratings for Study 2 Bible Stories Across low/high Literal LAM category*

Story type	LAM literal belief category	M (SD)
Familiar-natural	Low	1.35 (1.29)
	High	2.73 (.659)
Familiar-supernatural	Low	1.34(1.33)
	High	2.73 (.659)
Unfamiliar-natural	Low	1.09 (1.30)
	High	2.36 (1.04)
Unfamiliar-supernatural	Low	.927(1.15)
	High	2.07 (1.09)

Note. M= Mean; *SD=* Standard Deviation; LAM= Literal, Anti-literal, Metaphorical Religious Belief scale

Cognitive Style, LAM, and Metaphorical Belief Ratings

To determine if cognitive style, LAM responses, or story type had any effect on the number of metaphorical belief ratings in the twelve Bible stories, these scores were submitted to a 2 (high NFCL, low NFCL) × 2 (high NFCOG, low NFCOG) × 2 (high metaphorical LAM, low metaphorical LAM) × 2 (familiar, unfamiliar) × 2 (natural, supernatural) ANOVA. This analysis revealed a significant main effect of familiarity, $F(1) = 21.12, p =.000$, partial $\eta^2 = .203$ and LAM metaphorical belief score category, $F(1) = 20.19, p =.000$, partial $\eta^2 = .196$. Participants scoring high in the Metaphorical LAM belief category rated a higher number of metaphorical Bible story beliefs across all story types than those ranking low in the category, as shown in Table 5. The unfamiliar story types had a higher number of metaphorical belief ratings for the high and low LAM metaphorical belief categories than the familiar story types.

Table 5. *Mean Metaphorical Belief Ratings for Study 2 Bible Stories Across low/high Metaphorical LAM category*

Story type	LAM metaphorical belief category	*M (SD)*
Familiar-natural	Low	.146 (.573)
	High	.955 (1.24)
Familiar-supernatural	Low	.073 (.264)
	High	.841 (1.07)
Unfamiliar-natural	Low	.366 (.886)
	High	1.29 (1.23)
Unfamiliar-supernatural	Low	.585 (.865)
	High	1.11 (1.06)

Note. M= Mean; *SD=* Standard Deviation; LAM= Literal, Anti-literal, Metaphorical Religious Belief scale

Discussion

This study intended to identify some of the factors that determine individual differences in religious beliefs. As anticipated, the results show that an individual's level of familiarity with

the religious information they are evaluating will affect the type of belief they have. The significant effect of familiarity on belief ratings in the Bible stories suggests that familiarity may perhaps play a large role in the way individuals determine their personal religious beliefs. These results are consistent with the previous findings of Vaden and Woolley (2011), who found that older children (5- and 6-year olds) had higher beliefs in familiar religious characters and events than unfamiliar religious characters and events. The authors suggested that familiarity was related to affirmations of reality status in two ways. Firstly, familiarity may automatically confer reality status. This concept is related to my earlier hypothesis: individuals who are evaluating familiar religious material may be likely to use a familiarity-based heuristic, judging the material based on the ease with which they recall prior information and experiences relating to the current situation. Vaden and Woolley's second explanation involves the multiple environments where children are exposed to religious information.

Literal Bible story belief ratings were higher overall for the familiar than for the unfamiliar story types; this is the opposite of the metaphorical Bible story belief ratings, which showed higher metaphorical beliefs for the unfamiliar Bible stories than for the familiar stories. These results suggest that the participants were more likely to wholly accept Biblical information that they have encountered before and is associated with the second theory that Vaden and Woolley (2011) provided to explain the interaction of familiarity and beliefs. Because the majority of participants were Christians (94%), it is likely that they have encountered these familiar Bible stories in multiple settings throughout their life. The characters and events in these stories have perhaps been presented by many people in different places-including their parents at home in ordinary conversation and their church leaders at church services or study classes. Multiple types of testimony relaying these stories may have facilitated an unyielding literal belief that the participants did not even have to consciously think about because it was so easily

recalled. In addition, the participants were more likely to reflect on the information in the unfamiliar Bible stories, leading to higher metaphorical beliefs for these stories. Because the participants were less familiar with these stories, they did not automatically consider them to be true. Instead, they perhaps further evaluated the story's details and ruled out the possibility of its literal truth in favor of a metaphorical interpretation. The lack of previous exposure to the Bible stories may have prompted the participants to use their own means of evaluation instead of looking to former experience and recall.

The LAM belief ratings also showed significant main effects, so that participants who rated more literal beliefs on the LAM items also rated more literal beliefs on the Bible stories, whether the story was familiar or unfamiliar. Also, participants who rated more metaphorical beliefs on the LAM items also rated more metaphorical beliefs on the Bible stories, again whether they were familiar or unfamiliar stories. These results suggest that religious individuals adhere to a consistent "religious belief style," where they are unlikely to vary in the type of beliefs (literal/metaphorical) they have.

The lack of a relationship between individual belief ratings and the natural/supernatural story element were surprising. It was predicted that individuals would have more literal beliefs in the natural stories and more metaphorical beliefs in the supernatural story. Instead, participants approached both story types the same. Vaden and Woolley (2011) showed that older children (5- and 6- year olds) used God's involvement in a story to shift their reality, non-reality boundary judgments. In other words, these children used God's involvement in a story to make reality-status decisions; when God was referenced in a story, children believed in events that they would normally discount as impossible. The authors suggested, as one explanation, that reference to God or other religious characters or events create a specific context or setting within which these entities are viewed. This particular context may automatically confer reality status and is

applicable to the stories used in this study. Many of the stories included reference to God or Jesus and thus could have prompted this same cognitive process of reality-evaluation. The Bible stories presented in this study may have introduced a similar form of specific context cues that the participants used to determine their belief status, as the belief scale accompanying the Bible stories indicated that all of the stories were indeed from the Bible.

Bible story familiarity was manipulated in this study in order to encourage participants to use their everyday knowledge of causal properties to evaluate supernatural information that they may not realize came from the Bible. If the participants were unsure of the story's source and unable to determine that it was a Bible story, it was hypothesized that they would analyze the supernatural information like they would evaluate fantastical information in the real world. The first belief option, reading "The events in this story are true, exactly as they are represented in the Bible," may have affected the participant's belief evaluations because they were able to determine that all of the stories were actual Bible stories, whether they had heard them before or not. Participants with high literal belief ratings may be especially likely to accept all information that they know comes from the Bible as true. Therefore, even if the participants were unfamiliar with a specific Bible story and initially unsure of its source, they were able to eventually conclude that it came from the Bible after reading the belief choice answers. After concluding that the story they read was indeed a Bible story, they may have been unlikely to evaluate the supernatural content outside of a religious context.

The need for cognition had no effect on the participant's religious beliefs. Therefore, individuals who both enjoy cognitive effort and dislike extensive cognitive effort approach religious information the same. The need for cognitive closure had a marginal effect, revealing that individuals high in the need for cognitive closure rated more story events as literally true. These findings may suggest that individuals who enjoy a definite conclusion to a topic are more

likely to have a literal religious belief that requires less in-depth thought on the information. These individuals are perhaps more comfortable with a literal religious interpretation because it is what they have previously learned whereas a metaphorical interpretation would require independent reflection on the information.

Although cognitive style did not produce the hypothesized effect on different religious beliefs, other aspects of cognitive functioning remain important in evaluating this domain. Previous research has found that individual differences in cognitive style predict belief in God. Specifically, researchers suggest that an individual with an intuitive cognitive style is more likely to believe in God than an individual with a reflective cognitive style. To determine this, participants completed the Cognitive Reflection Test (CRT; Frederick, 2005). This test employs easily solvable math problems that have intuitively compelling incorrect answers. Participants who gave more intuitive answers on the CRT reported stronger belief in God (Shenhav et al., 2011).

Perhaps the two scales used in the current study to measure individual differences in cognitive style did not tap into the appropriate cognitive style processes. Future research should address other aspects of cognitive functioning that may differentiate religious beliefs, including different measures and types of cognitive processing styles. Other cognitive approaches could include the comparison of intelligence measure scores and different types of religious beliefs. Previous research has investigated the effect of intelligence on different levels of individual religiosity, finding that lower levels of intelligence are associated with high religious fundamentalism (Lewis et al., 2011). It may be the case that different levels of intelligence also predict different levels of religious beliefs.

Furthermore, the processes used to differentiate individual differences in supernatural versus natural religious beliefs also deserve further exploration. Because all of the stories used to

evaluate different types of religious beliefs in this study were all from the Bible, participants may have used this as a heuristic context cue when evaluating their own belief-status, as mentioned earlier. The present study could have instead included supernatural and natural Bible stories mixed with novel supernatural and natural stories that did not come from the Bible yet included similar details like the stories used in Vaden and Woolley's (2011) study in order to better compare different types of beliefs in supernatural religious information.

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Synopsis of Study 1 Bible Stories (* indicate stories that were chosen for Study 2)

Supernatural, Familiar Bible stories

*Daniel- A man named Daniel was thrown into a lion's den after breaking the law by praying to God. An angel was sent by God to close the lion's mouth and Daniel was unharmed.

*Noah- A man named Noah was instructed by God to build an ark that would withstand the flood that God would send. Noah collected two of every animal to put on the ark.

*Blind Man- Jesus healed a blind man by rubbing clay on his eyes and instructing him to wash the clay off in the pool of Siloam.

Supernatural, Unfamiliar Bible stories

Balaam- A man named Balaam was riding his donkey to fight a nomadic tribe from Israel and God sent an angel of the Lord to stop him, and allowed Balaam's donkey to speak.

**Simon-*A sorcerer named Simon could perform magical feats and developed a group of followers in Samaria who thought that he was divine.

**Eutychus-*The apostle Paul was preaching to a crowd one evening when a man named Eutychus fell from the second story window. Paul revived the man and woke him from the dead.

*Fig-*Jesus was traveling to Jerusalem and became hungry and fatigued. He checked a nearby fig tree for fruit but cursed the tree upon finding that it had no ripe figs.

Mantle- A great prophet of God, Elijiah was preparing another prophet, Elisha to take his place. As Elijiah was leaving to meet God, he used his mantle to part the Jordan River and bring a chariot of horses and fire.

Bear- Elijiah was traveling to the town of Bethel when he encountered a group of children who began teasing his bald head. He cursed them and sent two bears out of the woods to maul the children.

Elisha- The Israelites were burying one of their fallen soldiers quickly in order to avoid the oncoming Moabite army. They dropped the soldier in the tomb of Elisha, and the soldier came to life after touching Elisha's bones.

*Babel- God came down to Earth to confuse the language and scatter the people of Shinar because they tried to build a tower to reach Heaven.

Natural, Familiar Bible Stories

David- A young boy named David volunteered to fight the ferocious Philistine warrior, Goliath. David defeated Goliath with his slingshot and a stone.

Moses –After the Egyptian Pharaoh passed an order to kill all Hebrew newborn sons, a Hebrew baby named Moses was placed in basket and floated down the river. Moses was discovered by the Pharaoh's daughter and was raised by him.

*Joseph-*Joseph was given a special coat of many colors by his father. This made his many brothers jealous and they decided to sell Joseph to some traders and fake his death. Many years later, Joseph became a ruler in Egypt.

Natural, Unfamiliar Bible Stories

Samson- A group of Philistine's conspired to capture Samson, a judge from Israel. They used Delilah, the woman Samson loved to trick him into capture and cut off his hair.

*Stephen-*Stephen was a Godly man who stood up for his faith in Jesus. Men eventually became jealous of Stephen's wisdom and it caused his death.

Zaccheus- Zaccheus, a tax collector in Jericho, wasn't very well liked by the people because they considered him dishonorable. He becomes a man of God after Jesus visits Jericho and stays with him.