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Ours Is Not to Reason Why: Information Seeking Across Domains

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It is incontrovertible that religious individuals differ from nonbelievers in the extent to which they seek factual information when it comes to endorsing values and beliefs, but is this relationship between religiosity and information seeking stable across domains other than belief systems? Is this a stable strategy related to individuals' tendency to engage in intuitive or deliberative decision making? We examined information-seeking behavior in 4 different domains: values, reproduction, finance, and health. Community members ($N = 310$) completed measures of their intuitive and deliberative decision making as well as their information-seeking behavior within each domain. Mediational analyses confirmed that an intuitive decision-making style mediated the observed relationship between religiosity and information seeking in each domain. These results suggest that religious individuals may make decisions without seeking additional information because of a more intuitive, rather than a less deliberative, style of decision making across domains.

Keywords: information seeking, decision making, religious, domains, intuitive

Although recent empirical work has focused on why humans have developed widespread belief systems, known as religions (e.g., Atran & Norenzayan, 2004; Lindeman, Svedholm-Häkkinen, & Lipsanen, 2015; Tratner, Shackelford, Zeigler-Hill, Vonk, & McDonald, 2018; Vonk & Pitzen, 2017; Willard & Norenzayan, 2013), less work has explored why individuals differ in the extent to which they accept religion as a prevailing explanatory system. Research has revealed that religious individuals differ from nonreligious individuals with regard to intellectual ability (Bertsch & Pesta, 2009; Razmyar & Reeve, 2013; Zuckerman, Silberman, & Hall, 2013), supernatural attributions (Vonk & Pitzen, 2016), various personality traits (Saroglou & Muñoz-García, 2008; Silva & Laher, 2011; Taylor & MacDonald, 1999), and cognitive processes compared with nonreligious individuals (see Pennycook, 2014, for a review). Much of this work has emphasized domain-general tendencies but has not focused on how consistently religious individuals adopt particular cognitive styles. Adhering to a particular religious faith likely requires acceptance of knowledge that cannot be verified through objective means, and, as such, embodies a tension between curiosity and the desire to find meaning in things that one cannot understand. Outside of our faith, most aspects of our lives can be subjected to more careful scrutiny. For example, we can investigate the housing market, consider a variety of alternative housing options, and make projections regarding the future values of homes in particular neighborhoods before deciding to buy a house. Adopting religious beliefs based on faith may stem from a basic and ubiquitous cognitive tendency to make decisions based on intuition or it may be a unique strategy within the domain of religious and philosophical beliefs. The current study aimed to explore whether religion predicted information seeking across domains.

The extent to which an individual should seek information in a given situation will depend on how quickly an actor must decide upon a course of action and the costs associated with making a quick decision. Thus, researchers have proposed two systems that underlie human decision making across contexts (e.g., Epstein, Pacini, Denes-Raj, & Heier, 1996; Evans, 2003; Kahneman, 2003; Sloman, 1996; Stanovich & West, 2000): System One (implicit) and System Two (explicit). Together, these two systems form what is referred to as the dual process theory of the modular mind (Evans, 2003). System One encompasses a body of cognitive mechanisms that apply automatic processes that take little to no effort to initiate. These processes are based on instinct, intuition, and beliefs that drive us to react without engaging in information seeking or reflection (Evans, 2011). This system utilizes heuristics instead of formal logic to prevent cognitive overload when gathering complex information (e.g., Newstead, Handley, Harley, Wright, & Farrelly, 2004), thereby helping us create inferences based on probabilities of prior knowledge (also known as *bounded rationality*; see Garcia-Retamero, Takezawa, & Gigerenzer, 2009; Kahneman, 2003). When the cognitive processing system is overtaxed, perhaps by concurrent demands, individuals are inclined to rely on fast and intuitive processes (Kahneman, 2003).

System Two comprises explicit, analytic cognitive processes that utilize the ability to reason and think abstractly. It facilitates critical and hypothetical thinking, higher-order learning, and rational information seeking (Evans & Stanovich, 2013; Glöckner & Witteman, 2010). It is associated with reflective, analytical, and deliberative thinking—terms used interchangeably in related research. System Two operates more slowly because it requires conscious effort (Evans & Stanovich, 2013; Kahneman, 2003, 2011). These two distinct systems compete with each other during

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decision-making tasks to provide inferences about information we acquire (Goel & Dolan, 2003). Neuroanatomical evidence of competition between these processes is confirmed in the belief bias effect on syllogistic reasoning (Goel & Dolan, 2003; Handley, Newstead, & Trippas, 2011; Tsujii, Masuda, Akiyama, & Watanabe, 2010), which is the tendency to accept a conclusion strictly based on prior knowledge or beliefs, regardless of the validity of the premises. This bias can affect motivation for seeking information based on consistency with previously held inferences.

Individuals may display a bias of using one system over the other in real-world scenarios. Some evidence suggests that there are environmental or social factors that affect a person's decision-making and information-seeking tendencies such that their application may differ depending on the scenario (Bear & Rand, 2016; Olds & Link, 2016; Pachur & Spaar, 2015; Simon, 1987; Szászi, 2016; Todd & Gigerenzer, 2012). Psychometrically valid measures have been developed to examine individual differences in decision-making behavior in regards to a dual process theory (Bruine de Bruin, Parker, & Fischhoff, 2007; Epstein et al., 1996; Scott & Bruce, 1995), but here we asked religious and nonreligious participants specifically about information-seeking behavior within particular domains. Few studies have investigated whether strategies for making decisions and seeking information differ consistently between domains.

The domain of religious beliefs is of primary interest because of the considerable amount of research specifying that religiosity derives from the implicit processes of System One of the dual process model (Atran & Norenzayan, 2004; Bloom, 2007; Gervais & Norenzayan, 2012), although most existing work tends to focus on the negative association between religiosity and reflective thinking (Van Leeuwen, 2014). For example, individuals higher in religiosity tend to demonstrate less reflective thinking when endorsing supernatural beliefs (Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012), engaging in reflective writing tasks (Shenhav, Rand, & Greene, 2012), or judging the wrongness of disgusting and immoral acts (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014b). On the other hand, nonbelievers generally rely on explicit cognitive processes such as logic and rationalism to justify their lack of religious belief (Gervais & Norenzayan, 2012). Priming analytic thinking leads to less antiatheist sentiments via an increase in analytic thinking (Franks & Scherr, 2017) and fewer conjunction fallacies compared with priming with religious stimuli (Bakhti, 2018).

There has been less of a focus on the positive association between an intuitive cognitive style and religiosity, although Svedholm and Lindeman (2013) found a positive association between intuitive styles and paranormal beliefs as well as the usual negative association between reflective styles and the same beliefs. They argued that thinking tends to become dominated by intuitive processing when inhibition is impaired, which may lead to the endorsement of paranormal beliefs. Atheists do not consistently outperform religious individuals on general tests of cognition but they do tend to perform better on tasks that place intuition and reasoning in conflict with each other, which may be expected to promote additional information seeking (Daws & Hampshire, 2017). These findings are consistent with Kahneman's (2003, 2011) work showing that situations that overtax individuals lead to them relying on System One to a greater extent. Furthermore, researchers have shown that more intuitive responders on the Cognitive Reflection Test (CRT; Frederick, 2005) show stronger beliefs in God compared with less intuitive responders (Gervais & Norenzayan, 2012; Shenhav et al., 2012). In addition to work revealing an association between intuitive processes and religious belief, Fetterman and colleagues (2019) found that intuitive thinking mediated the positive association between the tendency to identify the self as being located in the *heart* (rather than in the *head*) and religious belief. This is pertinent to the current work in which we predict that intuitive and deliberative cognitive styles will have opposing associations with information seeking.

The contrasting cognitive tendencies of believers and nonbelievers led us to question whether religious individuals are inclined to accept information uniquely regarding religious "facts" on faith, or whether the inclination to accept rather than seek further information is a pervasive cognitive trait irrespective of the context. Pennycook, Cheyne, Koehler, and Fugelsang (2013) found that religious individuals completed reasoning problems more quickly than nonbelievers irrespective of performance on the tasks, even when controlling for cognitive ability and other factors. In another study, Pennycook and colleagues found that religious individuals, compared with nonreligious individuals, showed less of an increase in response time when probabilistic and stereotypical diagnostic information were presented in conflict versus agreement (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014a). Ross and colleagues (2016) demonstrated that an analytic thinking style predicted data gathering in a "beads task" paradigm when controlling for general cognitive ability, religious belief and engagement, and other variables. In this paradigm, individuals have to decide which of two jars a string of beads originated from and can make a decision or request to see more beads before doing so—a behavioral measure of information seeking (Huq, Garety, & Hemsley, 1988; Phillips & Edwards, 1966). These studies suggest a willingness in nonbelievers to engage further when solving problems compared with believers.

These unique strategies may be mediated by analytic and intuitive thinking styles. We aimed to explore whether individuals engaged in particular types of information-seeking behavior consistently across four specific domains that are relevant to evolutionary adaptations and, thus, likely to be important to most people. We focused on whether religious beliefs contribute to individual variance in this behavior. Although we conceptualize our study as examining whether religious belief predicts information seeking behavior across domains, it is also possible that cognitive decision-making styles, including information-seeking strategies, play a causal role in whether individuals adopt religious beliefs. Because our study is correlational, we cannot provide clarity on the possible direction of causality. However, establishing a relationship among variables will provide a foundation for further exploring causal links using developmental and experimental research designs.

We also included sex as a predictor because prior studies have shown sex differences such that women are more religious than men (Rosenkranz & Charlton, 2013). Pachur and Spaar (2015) evaluated decision-making in four key domains and found that decision-making differed according to domain using a novel measure—the Unified Scale to Assess Individual Differences in Intuition and Deliberation (USID)—comprised of previously developed decision-making scales. The USID can be adapted for specific domains and includes an intuitive and deliberative sub-

scale for each domain. Pachur and Spaar's findings led them to suggest domain-specific decision-making strategies. Therefore, we expanded on this work to examine whether these differences in domain-specific decision-making styles may mediate the predicted relationship between religiosity and information seeking in a community sample. We expected religious individuals to exhibit more intuitive thinking and less deliberative thinking processes compared with nonreligious individuals, which in turn would lead to lower levels of information seeking across domains.

Method

Participants and Procedure

Participants were 336 adults from the United States who were recruited using Amazon's Mechanical Turk (MTurk) and were compensated $2 for their time. Participants completed measures of domain-specific intuition and deliberation as well as domain-specific information seeking via a secure website. Data were excluded for 26 participants with either incomplete data ($n = 25$) or who failed one or more of three attention check items ($n = 1$). The final sample of 310 participants (156 women, 154 men) had a mean age of 37.86 years ($SD = 12.36$, range = 19–73 years). Participants were predominantly White (79.4%) with Black (7.4%), Asian (6.8%), Hispanic (5.8%), and Native Indian (0.3%) participants making up the rest of the sample. Participants indicated a range of religious beliefs with 110 indicating atheism or agnosticism and the other 200 indicating some form of religious belief (145 Christian, 33 religious but without formal affiliation, five Jewish, five Buddhist, three Islam, three Hindu, and six Other). We categorized participants as *nonreligious* if they indicated atheism or agnosticism and categorized all others as *religious*. Although individuals identifying as agnostic may sometimes indicate a belief in God, given that we had included the option "I believe in a higher power but do not affiliate with a particular religion," we decided that individuals who selected "agnostic" instead of this option were best categorized as nonreligious. We will refer to this dichotomous categorization as "religiosity"; although we acknowledge that measures of strength of religious beliefs would allow for a more nuanced assessment of religiosity. Participants came from a range of socioeconomic backgrounds but 75.6% of the sample earned less than $51,000/year and only 12.6% of the sample earned more than $70,000/year. There was a range of political attitudes among participants with 31.3% identifying as very or moderately conservative and 45.2% identifying as moderately or very liberal. The remaining 23.2% identified as independent with regard to political affiliation. Ninety-four percent of the samples were raised in the United States, with approximately equal distribution across the regions of the country. However, 19 participants were raised outside of the United States. The study was approved by the Institutional Review Board (IRB) of Oakland University.

Materials

Domain-specific intuitive and deliberative decision making. We captured domain-specific intuitive and deliberative decision making using a modified version of the USID (Pachur & Spaar, 2015). The USID includes items based on the Preference for Intuition and Deliberation Scale (Betsch, 2004), the Rational-Experiential Inventory (Pacini & Epstein, 1999), the General Decision Making Style Inventory (Scott & Bruce, 1995), the Cognitive Style Indicator (Cools & Van den Broeck, 2007), and the Perceived Modes of Processing Inventory (Burns & D'Zurilla, 1999). The USID includes items concerning intuitive decision making (15 items; e.g., "When I make a decision, I trust my inner feeling and reactions") and deliberative decision making (six items; "Developing a clear plan is very important to me"). Participants completed these 21 items for each of the following domains: values ($\alpha_{Intuitive} = .90$, $\alpha_{Deliberative} = .71$), reproduction ($\alpha_{Intuitive} = .90$, $\alpha_{Deliberative} = .67$), financial ($\alpha_{Intuitive} = .93$, $\alpha_{Deliberative} = .85$), and health ($\alpha_{Intuitive} = .92$, $\alpha_{Deliberative} = .80$). Participants were asked to rate their level of agreement with each item using scales that ranged from 1 (*I do not agree*) to 5 (*I agree completely*).

Domain-specific information seeking. We measured domain-specific information-seeking behavior in each of the following domains: values (12 items; e.g., "I think it is important to learn about many religions before deciding which one is right for me" [$\alpha = .70$]), reproduction (10 items; e.g., "I look for clues from my sexual partner about the best ways to sexually please them rather than relying on my own experiences" [$\alpha = .70$]), financial (10 items; e.g., "I seek other financial opportunities, even if my current enterprise is successful" [$\alpha = .70$]), and health (10 items; e.g., "If my doctor informs me that I have a fairly serious medical condition, I would look for second opinions from other medical sources before following the recommended treatment plan" [$\alpha = .68$]).[1] Participants were asked to rate their level of agreement with each item using a scale that ranged from 1 (*highly disagree*) to 5 (*highly agree*).

Results

Descriptive statistics and zero-order correlations for religiosity, domain-specific decision making, and domain-specific information-seeking behavior are presented in Table 1. Religiosity was positively correlated with intuitive decision making in each domain and negatively correlated with information seeking in each domain except the reproductive domain. Religiosity was not correlated with deliberative decision making in any of the domains. Intuitive and deliberative decision making were negatively correlated within each domain except for the reproductive domain. Intuitive decision making was negatively correlated with information seeking in each domain, whereas deliberative decision making was positively correlated with information seeking in each domain.

Mediational Analyses

Our hypotheses were consistent with an indirect effects model such that we were interested in whether religiosity (1 = *reli-*

[1] Two pilot studies were conducted to categorize 77 items concerning information-seeking behavior into the appropriate domains. There were 171 psychology students who indicated which domain they felt each potential item represented. After further refinement, items that fit into a single category with a frequency of 80% of the total ratings were selected for use in the present study. An additional pilot study found that measures of domain-general decision making were associated with these domain-specific information-seeking behaviors.

Table 1
Intercorrelations and Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Religiosity	—												
2. $Values_{Intuitive}$	.33***	—											
3. $Values_{Deliberative}$	.02	−.13*	—										
4. $Values_{Information\ Seeking}$	−.31**	−.42***	.23***	—									
5. $Reproductive_{Intuitive}$	.23**	.80***	−.13*	−.31***	—								
6. $Reproductive_{Deliberative}$	.01	−.13*	.64***	.08	−.10	—							
7. $Reproductive_{Information\ Seeking}$	−.09	−.24***	.25***	.44***	−.19***	.19***	—						
8. $Financial_{Intuitive}$	.25**	.75***	−.11*	−.33***	.71***	−.11	−.38***	—					
9. $Financial_{Deliberative}$	−.04	−.25***	.59***	.24***	−.17*	.60***	.44***	−.35***	—				
10. $Financial_{Information\ Seeking}$	−.24***	−.44***	.31***	.48***	−.41***	.27***	.49***	−.52***	.52***	—			
11. $Health_{Intuitive}$	.22***	.70***	−.14*	−.34***	.71***	−.08	−.35***	.89***	−.34***	−.51***	—		
12. $Health_{Deliberative}$	−.01	−.19***	.57***	.25***	−.10	.57***	.38***	−.22***	.76***	.45***	−.23***	—	
13. $Health_{Information\ Seeking}$	−.14*	−.27***	.36***	.56***	−.22***	.27***	.60***	−.36***	.52***	.65***	−.36***	.50***	—
M	0.65	2.99	3.51	3.34	3.12	3.53	3.78	2.60	3.89	3.57	2.64	3.77	3.73
Standard deviation	0.48	0.72	0.69	0.56	0.73	0.72	0.49	0.81	0.73	0.53	0.82	0.71	0.52

* $p < .05$. ** $p < .01$. *** $p < .001$.

gious, −1 = *nonreligious*) had indirect associations with domain-specific information-seeking behavior through intuitive and deliberative decision-making styles for that particular domain. We used a series of multiple mediation analyses using model four of the PROCESS macro developed by Hayes (2018). PROCESS uses a bootstrap resampling process that was repeated 10,000 times to generate a 95% bias-corrected confidence interval (CI). Indirect effects were considered to be significant if the CIs did not contain zero. Preliminary analyses included sex as a potential moderator of the indirect associations that religiosity had with domain-specific information-seeking behavior. However, sex did not emerge as a significant moderator in those analyses (i.e., there was no evidence of moderated mediation) nor were the reported results significantly changed by the inclusion of sex in those analyses. As a result, sex was not included in the final analyses in the interest of parsimony.

Values Domain

The results of the multiple mediation analysis for the values domain are depicted in Panel A of Figure 1. Religiosity had a positive association with intuitive decision making ($a_1 = 0.68$, $SE = 0.11$, $t = 6.09$, $p < .001$, 95% CI [0.46, 0.91]) but no association with deliberative decision making ($a_2 = 0.04$, $SE = 0.12$, $t = 0.31$, $p = .76$, 95% CI [−0.20, 0.27]). In turn, intuitive decision making had a negative association with information seeking ($b_1 = -0.33$, $SE = 0.05$, $t = -6.16$, $p < .001$, 95% CI [−0.43, −0.22]), whereas deliberative decision making had a positive association with information seeking ($b_2 = 0.19$, $SE = 0.05$, $t = 3.80$, $p < .001$, 95% CI [0.09, 0.29]). Tests of mediation found that religiosity had a negative indirect association with information seeking through intuitive decision making ($a_1b_1 = -0.22$, $SE = 0.05$, $z = -4.30$, $p < .001$, 95% CI [−0.35, −0.13]) but deliberative decision making did not mediate the association between religiosity and information seeking ($a_2b_2 = 0.01$, $SE = 0.02$, $z = 0.30$, $p = .76$, 95% CI [−0.03, 0.06]). It is important to note that religiosity had a negative association with information seeking when the mediators were not included in the model ($c = -0.66$, $SE = 0.11$, $t = -5.80$, $p < .001$, 95% CI [−0.88, −0.43]) and this negative association persisted when the mediators were included in the model ($c' = -0.44$, $SE = 0.11$, $t = -3.99$, $p < .001$, 95% CI [−0.65, −0.22]). As expected, religiosity was associated with a reduced tendency to seek information regarding values.

Reproductive Domain

The results of the multiple mediation analysis for the reproductive domain are depicted in Panel B of Figure 1. Religiosity had a positive association with intuitive decision making ($a_1 = 0.48$, $SE = 0.12$, $t = 4.13$, $p < .001$, 95% CI [0.25, 0.71]) but no association with deliberative decision making ($a_2 = 0.03$, $SE = 0.12$, $t = 0.23$, $p = .82$, 95% CI [−0.21, 0.26]). In turn, intuitive decision making had a negative association with information seeking ($b_1 = -0.16$, $SE = 0.06$, $t = -2.78$, $p = .005$, 95% CI [−0.27, −0.05]), whereas deliberative decision making had a positive association with information seeking ($b_2 = 0.17$, $SE = 0.06$, $t = 3.11$, $p = .002$, 95% CI [0.06, 0.28]). Tests of mediation found that religiosity had a negative indirect association with information seeking through intuitive decision making ($a_1b_1 = -0.08$, $SE = 0.04$, $z = -2.26$, $p = .02$, 95% CI [−0.16, −0.02]) but deliberative decision making did not mediate the association between religiosity and information seeking ($a_2b_2 = 0.00$, $SE = 0.02$, $z = 0.22$, $p = .83$, 95% CI [−0.03, 0.05]). It is important to note that religiosity was not significantly associated with information seeking when the mediators were not included in the model ($c = -0.19$, $SE = 0.12$, $t = -1.58$, $p = .11$, 95% CI [−0.42, 0.05]) or when the mediators were included in the model ($c' = -0.12$, $SE = 0.12$, $t = -0.98$, $p = .49$, 95% CI [−0.35, 0.12]).

Financial Domain

The results of the multiple mediation analysis for the financial domain are depicted in Panel C of Figure 1. Religiosity had a positive association with intuitive decision making ($a_1 = 0.53$, $SE = 0.12$, $t = 4.56$, $p < .001$, 95% CI [0.30, 0.75]) but no association with deliberative decision making ($a_2 = -0.08$, $SE = 0.12$, $t = -0.64$, $p = .52$, 95% CI [−0.31, 0.16]). In turn, intuitive decision making had a negative association with information seeking ($b_1 = -0.35$, $SE = 0.05$, $t = -7.22$, $p < .001$, 95% CI

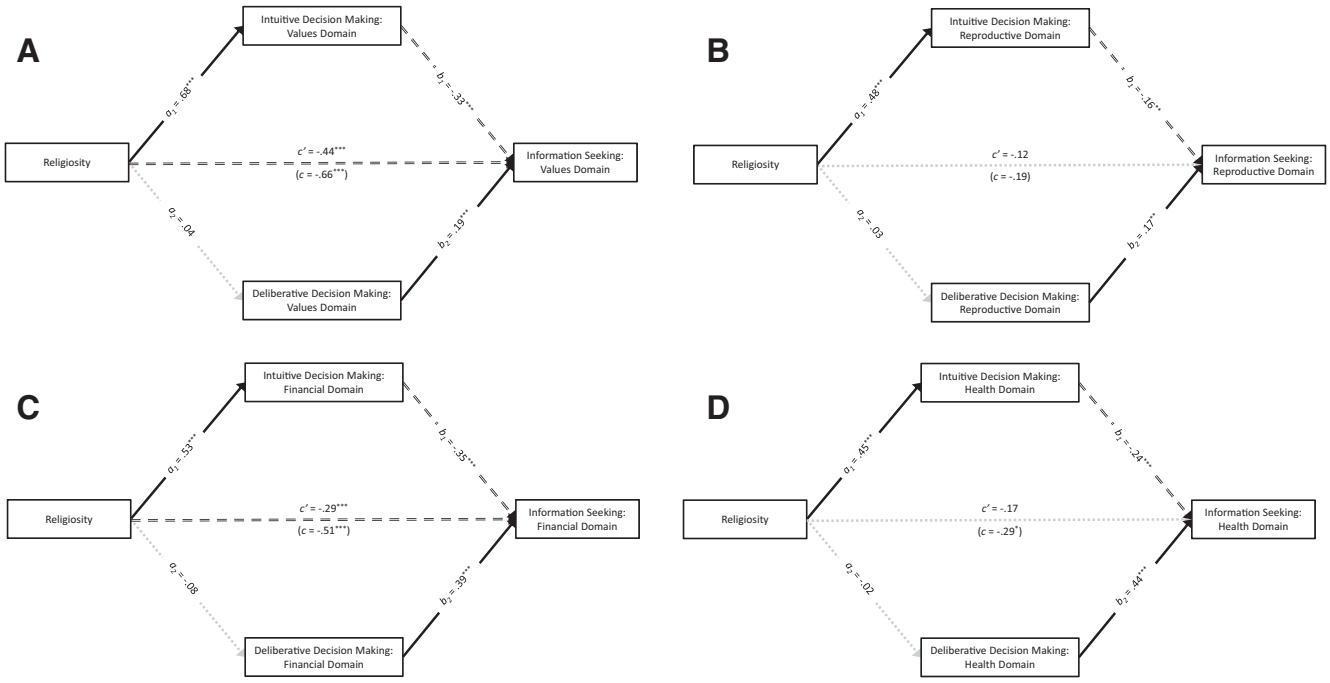

Figure 1. The results of the multiple mediation analyses with intuitive and deliberative decision making mediating the association that religiosity had with information seeking in the values domain (Panel A), the reproductive domain (Panel B), the financial domain (Panel C), and the health domain (Panel D). The significant positive associations are indicated by solid black arrows. The significant negative associations are indicated by dashed black arrows. The dotted gray lines represent nonsignificant associations. ** $p \leq .01$; *** $p \leq .001$.

[−0.44, −0.25]), whereas deliberative decision making had a positive association with information seeking ($b_2 = 0.39$, $SE = 0.05$, $t = 8.42$, $p < .001$, 95% CI [0.30, 0.49]). Tests of mediation found that religiosity had a negative indirect association with information seeking through intuitive decision making ($a_1b_1 = -0.18$, $SE = 0.05$, $z = -3.82$, $p < .001$, 95% CI [−0.30, −0.10]) but deliberative decision making did not mediate the association between religiosity and information seeking ($a_2b_2 = -0.03$, $SE = 0.05$, $z = -0.63$, $p = .53$, 95% CI [−0.13, 0.06]). It is important to note that religiosity had a negative association with information seeking when the mediators were not included in the model ($c = -0.51$, $SE = 0.12$, $t = -4.37$, $p < .001$, 95% CI [−0.73, −0.28]) and this negative association persisted when the mediators were included in the model ($c' = -0.29$, $SE = 0.09$, $t = -3.09$, $p = .002$, 95% CI [−0.48, −0.11]). As expected, religiosity was associated with a reduced tendency to seek information regarding finances.

Health Domain

The results of the multiple mediation analysis for the health domain are depicted in Panel D of Figure 1. Religiosity had a positive association with intuitive decision making ($a_1 = 0.45$, $SE = 0.12$, $t = 3.82$, $p < .001$, 95% CI [0.22, 0.68]) but no association with deliberative decision making ($a_2 = -0.02$, $SE = 0.12$, $t = -0.18$, $p = .86$, 95% CI [−0.26, 0.21]). In turn, intuitive decision making had a negative association with information seeking ($b_1 = -0.24$, $SE = 0.05$, $t = -4.82$, $p < .001$, 95% CI [−0.34, −0.14]), whereas deliberative decision making had a positive association with information seeking ($b_2 = 0.44$, $SE = 0.05$, $t = 8.96$, $p < .001$, 95% CI [0.34, 0.54]). Tests of mediation found that religiosity had a negative indirect association with information seeking through intuitive decision making ($a_1b_1 = -0.11$, $SE = 0.03$, $z = -2.96$, $p = .003$, 95% CI [−0.19, −0.05]) but deliberative decision making did not mediate the association between religiosity and information seeking ($a_2b_2 = -0.01$, $SE = 0.05$, $z = -0.18$, $p = .86$, 95% CI [−0.12, 0.09]). It is important to note that religiosity had a negative association with information seeking when the mediators were not included in the model ($c = -0.29$, $SE = 0.12$, $t = -2.44$, $p = .02$, 95% CI [−0.52, −0.06]) but not when the mediators were included in the model ($c' = -0.17$, $SE = 0.10$, $t = -1.69$, $p = .09$, 95% CI [−0.37, 0.03]).

Alternative Mediational Models

Given that we measured religiosity, domain-specific intuitive and deliberative decision-making styles, and domain-specific information-seeking behavior, it is possible that alternative models may explain the associations that emerged in our analyses. For example, it is possible that religiosity may have had a direct impact on information-seeking behavior that, in turn, may have had implications for decision-making styles. To examine this possibility, we supplemented our parallel multiple mediation analyses with a series of alternative models that switched the positions of the mediators and the outcome (i.e., a procedure that has been described as "reverse mediation"; Baron & Kenny, 1986). That is, domain-specific information-seeking behavior served as the mediator in each of these alternative analyses with domain-specific intuitive and deliberative decision-making styles serving as the

outcomes. The results of these reverse mediation analyses revealed that religiosity had *positive* indirect associations with intuitive decision-making styles through information-seeking behavior for the values domain ($B = 0.23$, $SE = 0.05$, $z = 4.34$, $p < .001$, 95% CI [0.13, 0.36]), the financial domain ($B = 0.25$, $SE = 0.06$, $z = 3.97$, $p < .001$, 95% CI [0.14, 0.38]), and the health domain ($B = 0.10$, $SE = 0.04$, $z = 2.26$, $p = .02$, 95% CI [0.02, 0.19]) but not for the reproductive domain ($B = 0.03$, $SE = 0.02$, $z = 1.35$, $p = .18$, 95% CI [0.00, 0.09]). Similarly, religiosity had *negative* indirect associations with deliberative decision-making styles through information-seeking behavior for the values domain ($B = -0.17$, $SE = 0.05$, $z = -3.51$, $p < .001$, 95% CI [−0.28, −0.08]), the financial domain ($B = -0.27$, $SE = 0.07$, $z = -4.04$, $p < .001$, 95% CI [−0.41, −0.16]), and the health domain ($B = -0.15$, $SE = 0.06$, $z = -2.36$, $p = .02$, 95% CI [−0.28, −0.03]) but not for the reproductive domain ($B = -0.04$, $SE = 0.03$, $z = -1.38$, $p = .17$, 95% CI [−0.10, 0.00]). Although the results of these analyses provided support for reverse mediation for certain domains, it is important to note that there have been important challenges to the utility of reverse mediation in recent years (e.g., Lemmer & Gollwitzer, 2017; Thoemmes, 2015).[2]

Alternative Logistic Regressions

In addition to reverse mediational models, we also conducted two logistic regressions to evaluate the extent to which (a) general intuitive and deliberative decision making and (b) total information seeking predicted religiosity. Intuitive ($B = .68$, $Wald = 12.89$, $p < .001$) but not deliberative thinking predicted religiosity. Total information seeking scores negatively predicted religiosity ($B = -1.32$, $Wald = 15.91$, $p < .001$).

Discussion

We investigated the relationship between religiosity, domain-specific decision-making strategies, and domain-specific information-seeking behavior in a community sample. We confirmed that religious individuals reported less information seeking that is consistent with previous research (Bloom, 2007; Gervais & Norenzayan, 2012; Pennycook et al., 2012; Shenhav et al., 2012). We extended previous findings to show that this pattern was consistent across several domains. In contrast to prior work emphasizing the relationship between deliberative processing and religiosity (reviewed in Pennycook, 2014), we found evidence for associations between religiosity and domain-specific intuitive decision making, but not domain-specific deliberative decision making. The associations between religiosity and domain-specific information seeking were mediated by intuitive decision-making strategies, rather than deliberative strategies. People who reported as religious were more likely to be intuitive decision makers in each domain compared with those who reported as nonreligious. Intuitive decision making was also negatively associated with information seeking in each domain. Deliberative decision making was positively related to information seeking in each domain but it was unrelated to religiosity and did not mediate the association between religiosity and information seeking in any of the domains. Furthermore, reverse logistic regressions indicated significant associations of overall information seeking and intuitive but not deliberative thinking with religiosity. However, alternative reverse mediation models showed that information seeking mediated negative associations between religiosity and deliberative decision making, except for the reproductive domain. Thus, the strength of the association with deliberative thinking was dependent on the directionality of mediation. These patterns were consistent across domains but the relationship between religiosity and information seeking was more tenuous in the domains of reproduction and health relative to the domains of values and finance. These findings are consistent with previous research connecting religiosity to intuitive modes of thinking and extend that research by demonstrating that religious individuals may be less likely to seek additional information when making decisions in domains that are unrelated to their faith.

Our study builds upon the interesting findings of Pachur and Spaar (2015) who found that individuals' use of intuitive and deliberative decision-making styles were inconsistent across domains. Although these authors thereby argued that intuitive and deliberative decision making strategies may be domain-specific, our study examined decision making as a mediator of information seeking—a more specific aspect of decision making. In addition, we introduced the variable of religious belief as a possible predictor of information seeking whereas Pachur and Spaar focused on the role of expertise. Our results suggest that information-seeking strategies may be domain-general when viewed through the lens of religious affiliation. Our finding of consistent negative associations between religiosity and information seeking across domains is most likely because of the strong connection between implicit cognitive processes and the need to find meaning for ambiguous or difficult to understand events. Other authors have suggested that decision makers may flexibly alternate between intuitive and deliberative approaches depending on the nature of the task, availability of information, and their own capacities or expertise in the area (Olds & Link, 2016; Simon, 1987; Szászi, 2016; Todd & Gigerenzer, 2012). Intuitive processes are likely to be used when information is readily accessible (Kahneman, 2003). It is possible that religious individuals are likely to use intuitive styles when reasoning about values because they believe themselves to have expertise on topics such as morality given religious teachings. Our findings are also limited by the somewhat biased nature of our sample, which was predominantly White and of low-mid socioeconomic status. A more diverse sample with different priorities and experiences may have revealed more variable information-seeking strategies across domains.

Pachur and Spaar (2015) found that individuals reported adopting an intuitive style most often when choosing a mate and least often when buying electronics. We found a weaker association between religiosity and information seeking in domains of reproduction and health compared with finance. Decisions about mate choice, conflict resolution within romantic relationships, and personal health may be dominated by biological drives and, thus, less susceptible to deliberative processing. Thus, individuals may behave more similarly in these domains regardless of religious beliefs. Decisions in other domains may have a less direct effect on

[2] Although reverse mediation usually refers to switching the position of the mediator and the outcome variable, we also conducted additional analyses in which we flipped the position of the predictor and the mediator given the possibility that domain-specific decision-making strategies may influence religiosity. However, domain-specific decision-making did not have indirect associations with domain-specific information seeking through religiosity in any of these analyses.

survival and reproductive fitness; thus, being more susceptible to social influences and less under the control of evolved mechanisms. Olds and Link (2016) focused on another key difference between the domains of reproduction and finance. In the former, they assumed a high degree of uncertainty, at least with regard to mate choice, whereas they pointed out that, when purchasing electronics, a great degree of information about alternatives can be highly specified. When a great degree of information is available to process, the situation may lend itself more easily to deliberative processing.

It is important to note that, although intuitive processes are often linked to inflexibility and greater errors (Kahneman, 2011), intuition can also be both fast and accurate (Gigerenzer & Todd, 1999). Bear and Rand (2016) point out that intuitive processes may be adaptive. They argue for the importance of environmental factors such as the availability of resources. Intuitive agents, from their perspective, may make more costly errors in conditions with limited resources whereas deliberative agents may make better use of resources by planning more carefully for future use. They present a fascinating analysis of how intuitive agents may overtake a population until resources become so sparse that deliberative agents are needed to restabilize the environment, perhaps explaining the historical cycles of enlightenment and instability. Future work should continue to examine the extent to which decision makers adjust their decisions in the face of both confirming and conflicting information, and work to elucidate why some individuals are highly resistant to altering their idealistic notions in the face of disconfirming evidence. Some researchers argue that System Two processes reflect an active inhibitory process that works to suppress religious cognitions (Gervais & Norenzayan, 2012; Pennycook et al., 2012; Shenhav et al., 2012). Thus, inhibition and self-regulation may be more critical than cognitive ability in determining an individual's cognitive style.

Our research suffers from several limitations. First is the common limitation of self-report data, which suffers both from the uncertainty over whether individuals accurately report what they actually do or believe, and the fact that individuals may conceptualize variables differently. Individuals may define and experience intuition differently (Amit, Rusou, & Arieli, 2016; Szászi, 2016). For example, experts may feel they are making decisions intuitively when in fact their decisions are informed by a history of analytical processing that has led to processing becoming more automated. It is clear from existing work that expertise in a given area should be considered when assessing decision-making style (Pachur & Spaar, 2015; Szászi, 2016). A high degree of expertise and a preference for an intuitive style may be two different routes to intuitive decision making in practice (Szászi, 2016), and might cloud associations between other factors, such as religiosity, and information seeking.

Of course, given the correlational nature of the study, we cannot draw any conclusions regarding the causal direction of the relationship between religiosity and information seeking (see Maxwell & Cole, 2007, for an extended discussion of the limitations of cross-sectional mediation). That is, we assumed that religiosity would influence the development of decision-making styles that, in turn, would lead to the adoption of particular information-seeking strategies. However, it is possible that other causal patterns may exist between these variables. For example, it is possible that individuals who engage in less information seeking are more apt to seek religious meaning throughout their lives, but it is also possible that individuals who embrace religion become more likely to accept information at face value (i.e., operate on faith) rather than seeking empirical evidence for facts in various domains, not just with regard to religious beliefs. We obtained significant associations when analyzing the data with both directional models.

An additional limitation of the current work is that we did not independently assess cognitive ability, which should be controlled when examining effects of cognitive style (Pennycook, 2014). Pennycook emphasizes that the association between religiosity and cognitive ability may be explained by the fact that people more readily embrace ideological beliefs consistent with their level of cognitive complexity. Although many studies have shown that a rational thinking style is negatively related to religiosity, Razmyar and Reeve (2013) argued that cognitive style did not add significant unique effects beyond cognitive ability. This conclusion has been challenged, however, by Pennycook (2014), who reviews several empirical findings supporting the idea that those with a more analytic cognitive style are less likely to be religious. He also points to findings by Shenhav et al. (2012) and Gervais and Norenzayan (2012) showing that priming participants to engage in analytical processes can reduce reported religiosity, which is inconsistent with the notion that religiosity is primarily explained by cognitive ability. Although it should be noted that results from priming studies have been debated (Molden, 2014), a meta-analysis (Shariff, Willard, Andersen, & Norenzayan, 2016) and subsequent review (Willard, Shariff, & Norenzayan, 2016) support the use of religious priming techniques, the effects of which appear to be robust at least with regard to prosocial behavior. Jack, Friedman, Boyatzis, and Taylor (2016) have suggested that the negative association between analytic thinking and religious belief may be explained by a negative association between analytic thinking and moral concern, which we did not assess or control for in the current study.

In addition to our sample being biased toward lower income participants who were predominantly White, our sample was also predominantly Christian. Studies of the association between religiosity and information seeking would benefit from having a more diverse sample of participants. In addition, researchers might investigate the association that information seeking has with the strength of religious beliefs rather than religious affiliation alone. Individuals may identify as Christian but have relatively weak beliefs; thus, reducing the strength of the observed association between religiosity and information seeking. Furthermore, existing studies suggest that the correlation between cognitive style and religiosity is more complicated than whether one simply believes in God or does not (Pennycook, 2014). For example, Pennycook and colleagues (2012) found that cognitive style predicted both the degree of belief in God but also the particular God that was endorsed. At least one study suggests that the negative association between analytic thinking and religious belief is not restricted to Christian beliefs, as the association was replicated in a Muslim sample (Yilmaz, Karadöller, & Sofuoglu, 2016). Future research in this area should attempt to gain additional insights into the connections that religiosity has with domain-specific decision making and information seeking by assessing both the strength of religious belief and the particular set of religious beliefs that are being endorsed.

In the current study, we treated religious belief as a dichotomous variable and, therefore, truncated the variability that may have led to stronger associations with decision-making styles and information-seeking strategies. Moreover, our classification of individuals identifying as agnostic as nonreligious was not ideal. Although we assumed that individuals that believed in a higher power would have chosen to identify as such rather than as agnostic, we cannot be certain that we did not include in this category some individuals with weak religious beliefs. We conducted a series of independent samples t tests comparing our atheist and agnostic participants on all measures of information seeking and intuitive and deliberative thinking and found that they differed significantly only with regard to deliberative thinking in the values domain with agnostic individuals reporting higher levels of deliberative thinking ($t = -2.61$, $p = .01$, 95% CI [−.56, −.08]). Thus, there is little evidence that these groups should be considered separately.

It may be helpful for future research to investigate information-seeking behavior in laboratory experiments rather than relying on participants' reports of their own behavior. For example, Hoffman, Yoeli, and Nowak (2015) allowed participants to decide whether to open envelopes that informed them how valuable it would be to defect on another player in a game theoretic model. The beads paradigm used by Ross and colleagues (2016) is another experimental option with which to examine information seeking. As Olds and Link (2016) suggested, varying the ambiguity of the information surrounding the decision-making context may provide valuable information about individual differences in decisional strategies. Clearly, much more work is needed to understand the undoubtedly complex relationships between religious beliefs, cognitive styles, and information-seeking behavior. We hope that others will continue to explore whether these processes reflect individual differences in stable traits rather than situational factors across various domains.

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