



## Analytic cognitive style predicts religious and paranormal belief

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### ABSTRACT

An analytic cognitive style denotes a propensity to set aside highly salient intuitions when engaging in problem solving. We assess the hypothesis that an analytic cognitive style is associated with a history of questioning, altering, and rejecting (i.e., unbelieving) supernatural claims, both religious and paranormal. In two studies, we examined associations of God beliefs, religious engagement (attendance at religious services, praying, etc.), conventional religious beliefs (heaven, miracles, etc.) and paranormal beliefs (extrasensory perception, levitation, etc.) with performance measures of cognitive ability and analytic cognitive style. An analytic cognitive style negatively predicted both religious and paranormal beliefs when controlling for cognitive ability as well as religious engagement, sex, age, political ideology, and education. Participants more willing to engage in analytic reasoning were less likely to endorse supernatural beliefs. Further, an association between analytic cognitive style and religious engagement was mediated by religious beliefs, suggesting that an analytic cognitive style negatively affects religious engagement via lower acceptance of conventional religious beliefs. Results for types of God belief indicate that the association between an analytic cognitive style and God beliefs is more nuanced than mere acceptance and rejection, but also includes adopting less conventional God beliefs, such as Pantheism or Deism. Our data are consistent with the idea that two people who share the same cognitive ability, education, political ideology, sex, age and level of religious engagement can acquire very different sets of beliefs about the world if they differ in their propensity to think analytically.

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“It is the heart which perceives God and not the reason. That is what faith is: God perceived by the heart, not by the reason.”

Blaise Pascal (1623–1662)

### 1. Introduction

Belief in beings, forces, or powers that are non-material, or otherwise with features outside the daily experience of most people, is found in all human cultures. Zuckerman

(2007), for example, has estimated that roughly 90% of the world's population believes in some form of deity. Theistic beliefs are universally accompanied by a variety of additional specific supernatural beliefs as well as various religious rituals and practices. Other kinds of supernatural belief, commonly referred to as “paranormal”, are also common. For example, more than 40% of Americans believe in ghosts, spiritual healing, and extra sensory perception (National Science Foundation, 2002; Rice, 2003). Recent accounts of the origins of religiosity and religion have emphasized the intuitive and sometimes “minimally counterintuitive” nature of religious beliefs, generally making the case that such beliefs are a natural by-product of normal human cognition (Atran, 2002; Barrett, 2000; Boyer, 1994; Frey, 2009; Guthrie, 1993; Lawson, 2000; Pyysiäinen, 2001). On the other hand, increasing numbers of individuals in modern societies find religious and para-

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normal beliefs not only counterintuitive, but quite incredible (Beit-Hallahmi, 2006; Zuckerman, 2007). Why do some people hold very strong religious beliefs while others are quite dubious of them? Answers to this question will almost certainly involve many factors at many levels including affective, experiential, family, institutional, developmental, and cultural variables, among others. The rather ambiguous connection between intuition and the supernatural does, however, link cognitive theories of religiosity with decades of decision-making literature that suggests intuition plays a fundamental role in reasoning processes.

### 1.1. Intuitive and analytic cognitive styles

Considerable research in recent decades has focused on two contrasting styles of problem-solving and decision-making, often formalized as distinct reasoning types or systems (e.g., Epstein, 1994; Evans, 2008; Kahneman, 2003; Sloman, 1996; Stanovich, 2009). The first, sometimes referred to as Type 1 processing, is characterized as intuitive, fast, unconscious, associative, and heuristic. Alternatively, problem solving and decision-making sometimes proceeds in a more analytic manner, sometimes called Type 2 processing, which tends to be more time-consuming, deliberative, and effortful. An analytic cognitive style will typically involve a broader assessment of problem elements as well as an examination and critical evaluation of intuitions. Initial intuitions arising in the context of problem-solving tend to be readily accessible conventional beliefs (Morewedge & Kahneman, 2010) that are associated with a metacognitive feeling of rightness (Thompson, Prowse Turner, & Pennycook, 2011) and appear to require few cognitive resources (De Neys, 2006). Given the foregoing properties, initial intuitions during problem solving often pre-empt further analysis (Evans, 2008). Researchers have constructed a number of tasks that present problematic scenarios in which putatively objective information conflicts with highly salient intuitions. Important for present purposes, there appear to be substantial individual differences in cognitive style (sometimes referred to as thinking disposition), that is, the tendency to critically evaluate initial misleading intuitions and persist in analytic processing (Stanovich, 2004). Focusing on individual differences, we integrate theories of reasoning and decision-making with cognitive theories of religiosity and the formation of belief and unbelief. We then test the hypothesis that individual differences in religiosity can be predicted by individual differences in the propensity and ability to question intuitions while solving reasoning problems.

### 1.2. Cognitive styles and religiosity

The relation between analytic rationality and the rejection of religious beliefs has, of course, not gone unnoticed. Atheists have generally been found to be, both stereotypically and empirically; intellectual, rational, and sceptical (Beit-Hallahmi, 2006; Caldwell-Harris, Wilson, LoTempio, & Beit-Hallahmi, 2010; Hunsberger & Brown, 2001). Intellectualism has been found to be an important predictor of

religious apostasy among college students (Caplovitz & Sherrow, 1977). Consistent with these attributes, atheists most frequently give intellectual, rational, and scientific reasons for their rejection of religious beliefs (Hunsberger & Altemeyer, 2006). It is therefore hypothesized that when intuitions conflict with reasoning, less religious people will display a more analytic cognitive style than more religious people. Moreover, in light of findings that skill in logical inference is an important component of intelligence testing (Stanovich & West, 2008), and the numerous studies reporting a negative correlation between intelligence and religiosity (e.g., Bertsch & Pesta, 2009; Larson & Witham, 1998; Lewis, Ritchie, & Bates, 2011; Lynn, Harvey, & Nyborg, 2009; Reeve, 2009), it appears that highly religious people may also be less skilled at basic logical inference than less religious people. Therefore, based on the forgoing evidence and reasoning, we hypothesize that more religious people, compared to less religious people, may be both less skilled at logical inference (cognitive ability) as well as more prone to be misled by immediate intuitions (cognitive style) that essentially foreclose on the logical processes that might draw inferences that would weaken them.

Shenhav, Rand, and Greene (2011), working from a dual-process framework, recently reported evidence consistent with this hypothesis. In a series of studies run independently of the current work, Shenhav and colleagues demonstrated that performance on a reasoning task associated with analytic processing (i.e., the cognitive reflection test or CRT; Frederick, 2005) was negatively correlated with belief in God. CRT problems are structured to suggest obvious but misleading answers to otherwise elementary arithmetic questions and hence require further processing to reject the incorrect answer that comes immediately to mind. Shenhav and colleagues report that subjects failing to reject the incorrect answer were more likely to believe in God. Crucially, the correlation remained significant even when cognitive ability (as measured by the Shipley Vocabulary Test and the Wechsler Adult Intelligence Scale Matrix Reasoning test) was controlled. Shenhav and colleagues theorized that belief in God is predicted by reasoning style because it is a particularly fundamental intuitive belief (Atran, 2002; Barrett, 2004; Boyer, 1994; Guthrie, 1993) and therefore hard to override via analytic processing. There are, however, problems with this argument. First, the authors cited by Shenhav and colleagues also frequently describe religious beliefs as attractive and memorable because they are “minimally” counterintuitive (Barrett, 2000; Boyer, 2001; Norenzayan, Atran, Faulkner, & Schaller, 2006; Pyysiäinen & Anttonen, 2002). Moreover, as noted above, research on nonbelievers reveals that increasing numbers of people find many if not all religious concepts strongly counterintuitive (Hunsberger & Altemeyer, 2006). Finally, the interfering intuitions of the cognitive tasks employed in dual process research, including the CRT task used by Shenhav and colleagues, are not fundamental intuitions but merely plausible solutions to specific problems. Thus, while religious intuitions may or may not be unique, we suggest a possibly more fundamental basis for a negative association of analytic cognitive style and religious beliefs: the asymmetry of belief and unbelief.

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