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Epistemic rationality: Skepticism toward unfounded beliefs requires sufficient cognitive ability and motivation to be rational

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ABSTRACT

Why does belief in the paranormal, conspiracy theories, and various other phenomena that are not backed up by evidence remain widespread in modern society? In the present research we adopt an individual difference approach, as we seek to identify psychological precursors of skepticism toward unfounded beliefs. We propose that part of the reason why unfounded beliefs are so widespread is because skepticism requires both sufficient analytic skills, and the motivation to form beliefs on rational grounds. In Study 1 we show that analytic thinking is associated with a lower inclination to believe various conspiracy theories, and paranormal phenomena, but only among individuals who strongly value epistemic rationality. We replicate this effect on paranormal belief, but not conspiracy beliefs, in Study 2. We also provide evidence suggesting that general cognitive ability, rather than analytic cognitive style, is the underlying facet of analytic thinking that is responsible for these effects.

1. Introduction

People often believe strange things. According to a 2013 poll, 37% of Americans believe that global warming is a hoax, 21% believe that a UFO crashed in Roswell, 20% think that there is a relationship between vaccines and autism, and 15% believe that the medical and pharmaceutical industry create new diseases to sell the cure (Van der Linden, 2015). Conspiracy theories of this kind are by no means the only domain with well-subscribed unfounded beliefs. According to a 2015 poll, 71% of Americans believe in miracles, 42% believe in ghosts, 41% believe in extrasensory perception, and 29% believe in astrology (Van der Linden, 2015). These figures are in line with scientific studies that assessed nationally representative samples (Oliver & Wood, 2014), and underscore that unfounded beliefs are not pathological, but are common among regular citizens. Furthermore, unfounded beliefs predict a range of maladaptive perceptions and behaviors, including poor health choices (e.g., vaccine refusal; preference for alternative instead of regular medical approaches), climate change denial, decreased civic virtue, aggression, and ideological radicalization (Abalakina-Paap, Stephan, Craig, & Gregory, 1999; Asser & Swan, 1998; Goertzel, 1994; Grebe and Nattrass, 2012; Jolley & Douglas, 2014; Nahin, Barnes, Stussman, and Bloom, 2009; Shermer, 2011; Van Prooijen, Krouwel, & Pollet, 2015).

What makes people believe in conspiracy theories and paranormal phenomena that are not backed up by any evidence? One pertinent insight in this research domain is that one unfounded belief predicts other unfounded beliefs. For instance, an excellent predictor of belief in one conspiracy theory is belief in different, conceptually unrelated conspiracy theories (Goertzel, 1994; Lewandowsky, Oberauer, & Gignac, 2013; Swami et al., 2011; Swami, Chamorro-Premuzic, & Furnham, 2010; Van Prooijen et al., 2015; Wood, Douglas, & Sutton, 2012). Furthermore, belief in conspiracy theories strongly predicts other types of unfounded beliefs, including belief in magic, superstition, and the supernatural (Darwin, Neave, & Holmes, 2011; Lobato, Mendoza, Sims, & Chin, 2014; Newheiser, Farias, & Tausch, 2011). People hence differ in their general susceptibility to beliefs for which there is little to no evidence. This suggests that although unfounded beliefs can differ widely in content, the general tendency to endorse such beliefs may be grounded in identifiable and relatively stable psychological processes. Indeed, numerous factors contribute to irrational beliefs, including need for control (Kay, Gaucher, McGregor, & Nash, 2010; Van Prooijen & Acker, 2015; Whitson & Galinsky, 2008), uncertainty (Hogg, Adelman, & Blagg, 2010; Van Prooijen & Jostmann, 2013), and illusory pattern perception (Blackmore & Trościanko, 1985; Van Prooijen, Douglas, and Inocencio, in press).

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One individual difference factor that has received considerable attention in attempts to explain various unfounded beliefs is analytic thinking – the tendency to reflect on problems that appear to have an intuitive correct answer (e.g., Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Stanovich & West, 2008). There are several reasons to suspect that impoverished analytic thinking contributes to unfounded beliefs. First, widespread irrational beliefs often have strong intuitive appeal (e.g., Barrett, 2000; Norenzayan & Gervais, 2013). To the extent that people rely on intuitive rather than analytic thinking, they should therefore be more susceptible to ideas that seem intuitively plausible yet do not hold after careful scrutiny. Second, individuals with limited analytic thinking skills may be less able to discriminate between strong and weak evidence, and therefore be less skeptical toward ideas that are supported by anecdotal evidence and innuendo. Research has demonstrated that individuals who rely less on analytic thinking are indeed more inclined to believe in the paranormal (Hergovich & Arendasy, 2005; Musch & Ehrenberg, 2002), the supernatural (Gervais & Norenzayan, 2012; Pennycook et al., 2012), as well as various conspiracy theories (Swami & Furnham, 2012; Swami, Voracek, Stieger, Tran, & Furnham, 2014). Complementary findings indicate that lower education levels predict paranormal beliefs (Aarnio & Lindeman, 2005) and belief in conspiracy theories (Douglas, Sutton, Callan, Dawtry, & Harvey, 2016). The link between education and decreased belief in conspiracy theories is partly mediated by analytic thinking (Van Prooijen, 2017).

The present research expands on these insights by showing that analytic reasoning skills alone are not sufficient to promote skepticism toward unfounded beliefs; one also needs to value forming personal beliefs based on logic and evidence. We demonstrate this point in two studies, and in the context of two related but different types of unfounded beliefs: belief in the paranormal and conspiracy beliefs.

1.1. The limits of analytic thinking

The literature discussed above suggests that analytic reasoning skills play an important role in preventing the spread of irrational beliefs. At the same time, there are good reasons to suspect that having the required reasoning skills is frequently not enough. First, a vast literature on attitude change suggests that having the necessary analytic skills does not ensure that people will scrutinize persuasive messages in a thorough manner (e.g., Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986). In the absence of strong motivation to scrutinize the persuasive message, people instead tend to rely on heuristic processing (Chaiken et al., 1989; cf., Petty & Cacioppo, 1986). Second, irrational beliefs are promoted by various epistemic and existential motives, such as the need for control (Van Prooijen & Acker, 2015; Whitson & Galinsky, 2008), uncertainty management (Van Prooijen & Jostmann, 2013), terror management (Newheiser et al., 2011), and ideology protection (Van Prooijen et al., 2015). This is important, as research on motivated reasoning (e.g., Kunda, 1990; Nickerson, 1998) has demonstrated that people are generally biased in their reasoning when they favor a certain conclusion. In fact, evidence suggests that high cognitive ability can enhance motivated reasoning (Kahan, Peters, Dawson, & Slovic, 2017). Kahan and colleagues found that individuals who scored high on cognitive ability (numeracy) were particularly inclined to misinterpret scientific evidence that was inconsistent with their political views. This effect presumably emerged because participants with a high (vs. low) cognitive ability were better able to generate alternative (ideology-consistent) interpretations of the data.[1] Thus, it seems reasonable to suspect that strong analytic thinking skills are not sufficient to inoculate people against unfounded beliefs. They also need the motivation to use their reasoning skills in pursuit of the truth, rather than to use them in pursuit of belief confirmation, or to not use them at all. We propose that valuing epistemic rationality can serve this function.[2]

1.2. The role of valuing epistemic rationality

We suggest that valuing epistemic rationality can serve as a buffer against various unfounded beliefs, by increasing the likelihood that one's analytic thinking skills are recruited to objectively analyze the validity of ideas. Among individuals who do not strongly value epistemic rationality, by contrast, analytic thinking skills should have little effect on the rationality of their beliefs, because these skills are likely to either remain disengaged, or employed in pursuit of preferred conclusions rather than the truth (e.g., Kahan et al., 2017). Thus, we propose that a key difference between people who do versus do not strongly value epistemic rationality is that the former are more likely to respond to epistemic uncertainty by actively searching for truth, whereas the latter are more inclined to remain cognitively disengaged, or search for validation of their existing beliefs.

There are meaningful differences in the extent to which people value epistemic rationality. In fact, some people view it as a moral virtue to form and evaluate beliefs based on logic and evidence, and as a vice to rely on less rational processes (Ståhl, Zaal, & Skitka, 2016). Ståhl and his colleagues (2016) developed and validated two measures of individual differences in epistemic values: the Importance of Rationality Scale (IRS), and the Moralized Rationality Scale (MRS). The IRS centers on how important people think it is that *their own* beliefs are based on logic and evidence. Thus, the IRS measures the strength of one's preference to be epistemically rational. The MRS, on the other hand, measures to what extent people view it as a moral issue to be epistemically rational, and therefore the belief that *everyone should* rely on logic and evidence when forming and evaluating their beliefs. As should be expected, the IRS and MRS are positively related, yet clearly conceptually distinct ($0.22 < rs < 0.43$; Ståhl et al., 2016). Furthermore, the IRS and MRS are both negatively associated with beliefs that are not based on evidence, such as beliefs in the supernatural, and various paranormal phenomena (Ståhl et al., 2016). What is not clear, however, is whether valuing or moralizing epistemic rationality moderates the relationship between analytic reasoning skills and unfounded beliefs. Testing that idea empirically is the purpose of the present research.

We conducted two studies to examine whether analytic reasoning skills are more negatively associated with unfounded beliefs among those who strongly (vs. weakly) value or moralize rationality. In both studies we examined two domains of unfounded beliefs: the paranormal, and conspiracy theories. In Study 1 we examined whether analytic thinking–which we operationalized through general and validated measures of analytic cognitive style (i.e., the Cognitive Reflection Test)–and the extent to which one values/moralizes epistemic rationality, interactively predict belief in the paranormal and conspiracy theories. Study 2 served as an extended replication of Study 1, with the goal to determine whether the effects of analytic thinking obtained are attributable specifically to differences in analytic cognitive style, cognitive ability, or both.

2. Study 1

2.1. Method

2.1.1. Sample, procedure, and materials

We requested 300 participants from Crowdflower, a crowdsourcing

[1] Ballarini and Sloman (2017) recently failed to replicate this effect. Since then, however, Kahan and Peters (2017) reported a successful replication, and also argued that Ballarini and Sloman's replication attempt suffered from insufficient statistical power.

[2] Epistemic rationality concerns whether or not one's beliefs accurately describe the world. It should not be confused with instrumental rationality, which concerns the extent to which one's beliefs and actions increase the likelihood of achieving one's goals (e.g., Stanovich, 1999). Put differently, epistemic rationality can be viewed as a *particular case* of instrumental rationality, where the focal goal is to have accurate beliefs about the world. To illustrate, believing that Santa Claus exists can be instrumentally rational, to the extent that it increases the likelihood of reaching one's focal goal (e.g., life satisfaction). However, believing in Santa Claus is not epistemically rational, because there is no evidence to suggest that he actually exists.