

M&D cite Randolph-Seng and Nielsen (2008), who critiqued Shariff and Norenzayan (2007), questioning the plausibility of the supernatural watcher hypothesis because the data could not conclusively distinguish between the ideomotor and supernatural watcher explanations. These two mechanisms gain plausibility given two distinct but well-supported empirical literatures. There is considerable evidence showing that prosocial behavior can be facilitated both by activating nonconscious altruistic thoughts (e.g., Bargh et al. 2001), and by heightened reputational concerns (e.g., Fehr & Fischbacher 2003). These two mechanisms are not mutually exclusive, however, and may even reinforce each other in everyday life.

The interesting question therefore is: What kind of laboratory evidence can provide support for the supernatural watcher account above and beyond behavioral-priming processes? First, if the priming effects of God concepts are weaker or nonexistent for non-believers, then the effect could not be solely due to ideomotor processes, which are typically impervious to prior explicit beliefs or attitudes. Second, if God primes make religious participants attribute actions to an external source of agency, these effects could not be explained by ideomotor processes, as such manipulations disambiguate the felt presence of supernatural watchers from their alleged prosocial consequences. Finally, if the supernatural watcher explanation is at play, religious primes should arouse social evaluation of the self. Moreover, such reputational awareness should moderate the magnitude of the prime's effect on prosocial behavior.

As M&D note, evidence on the first point is currently mixed. However, close examination of the findings betrays a revealing pattern. All but one of these priming studies recruited student samples, which can be problematic since beliefs, attitudes, and social identity among students can be unstable, raising questions about the reliability of chronic individual difference measures of religious belief and identity measures for students who are still in transition to adulthood (Sears 1986; Henrich et al., in press). Thus, student atheists might be at best "soft atheists." In the only religious priming experiment we are aware of that recruited a non-student adult sample (Shariff & Norenzayan 2007, Study 2), the effect of the prime emerged again for theists, but disappeared for these "hard" atheists (see Fig. 1). In addition, Henrich et al. (2009) found that across 14 small-scale societies of varying group size, where there is variability in whether supernatural agents are morally concerned, belief in the moralizing Abrahamic God (along with degree of market integration) predicted larger offers in the dictator and ultimatum games. These initial findings speak against an exclusively ideomotor account of the results, and

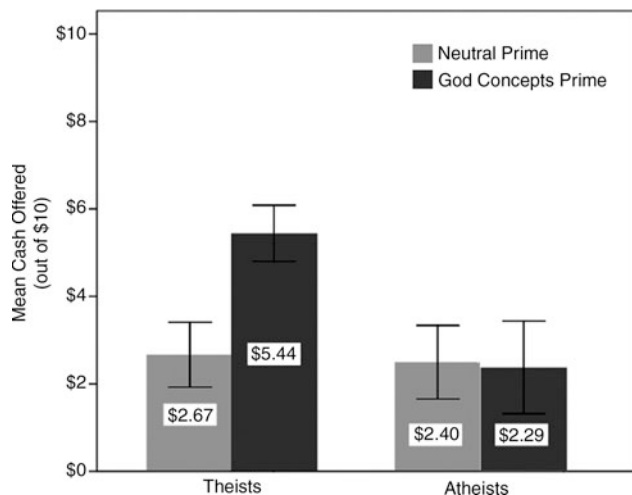


Figure 1 (Norenzayan et al.). Results from the dictator game in Shariff and Norenzayan (2007, Study 2) indicate that priming God concepts increased generosity for religious believers but not for atheists. Error bars represent standard error of the mean.

suggest that belief – not just alief – is involved in religious prosociality.

Regarding the second question, one experiment clearly separates the felt presence of a supernatural agent from prosocial outcomes. Dijksterhuis et al. (2008) found that after being subliminally primed with the word "God," believers (but not atheists) were more likely to ascribe an outcome to an external source of agency, rather than their own actions. In addition, religious belief positively correlates with greater concern with social evaluation of the self (Trimble 1997), and recent experimental evidence points to this being a causal relationship. Gervais and Norenzayan (2009) found that priming God concepts (using the same sentence unscrambling task of Shariff and Norenzayan [2007]) increased public self-awareness (Govern & Marsch 2001) – a measure that taps into feelings of being the target of social evaluation. In contrast, and as predicted, the prime had no effect on private self-awareness. Ongoing research is examining whether prosocial effects of religious primes are moderated by measures of evaluative concern, a key prediction of the supernatural watcher hypothesis, which would be incompatible with a purely ideomotor account. Thus, although M&D are right that more research is needed to reach firm conclusions, the evidence regarding the supernatural watcher hypothesis is more compelling than M&D's cautious approach suggests. But does that mean that belief in supernatural agents is an example of adaptive misbelief?

M&D briefly mention both by-product theories of religion and cultural evolutionary explanations for cooperation. We have argued elsewhere (Norenzayan & Shariff 2008; Norenzayan, in press; Shariff et al. 2010) that integrating these two frameworks yields a more cogent explanation for the rise and persistence of religious beliefs than theories which invoke a more direct genetic evolutionary argument (e.g., Bering et al. 2005; Johnson & Bering 2006). Once belief in supernatural agency emerged as a by-product of mundane cognitive processes, cultural evolution favored the spread of a special type of supernatural agent – moralizing high Gods. Growing evidence is converging on the conclusion that sincere belief in these omniscient supernatural watchers facilitated cooperation and trust among strangers (Norenzayan & Shariff 2008). Not surprisingly, this cultural spread coincided with the expansion of human cooperation into ever larger groups over the last 15 millennia (Cauvin 2000). This evolutionary scenario has the virtue of explaining an otherwise puzzling feature of religious prosociality – namely, the systematic cultural variability in the prevalence of moralizing Gods across societies that correlates with group size (e.g., Roes & Raymond 2003). Contrary to a genetic adaptation account, the deities of most small-scale societies, which more closely approximate ancestral conditions, are neither fully omniscient nor morally concerned. It is the evolutionarily recent anonymous social groups, facing the breakdown of reputational and kin selection mechanisms for cooperation, which most strongly espouse belief in such Gods. Thus, beliefs in moralizing supernatural agents may not qualify as genetically evolved misbeliefs. But they could instead be seen as examples of culturally evolved ones that played a key historical (although not irreplaceable) role in the rise and stability of large cooperative communities.

### The (mis)management of agency: Conscious belief and nonconscious self-control

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**Abstract:** McKay & Dennett (M&D) identify positive illusions as fulfilling the criteria for an adaptive misbelief, but could there be other

types of beliefs that may qualify as adaptive misbeliefs? My commentary addresses this and other questions through identifying belief in free will as a potential candidate as an adaptive misbelief.

To say that beliefs are untrue, or are “misbeliefs,” is to say that the belief in question can be objectively verified; however, beliefs are by definition subjective. Despite the subjective nature of human beliefs, researchers have learned to use the refining process of the scientific method in order to partly uncover “reality.” Such is the plight of the social scientist and the beauty of scientific method. At what point, however, do the systematic replications and validations go beyond an understanding of the underlying factors giving rise to beliefs? If science, for example, reliably demonstrates that the sun does not in reality move across the sky, does this change one’s belief in how the sun is moving throughout the day? It may do so (based on a faith in science), but such change in belief does nothing to change perception. One’s subjective perception of the sun’s movement is what is real and is the only view that matters to normal functioning. Therefore, there are times when it may be more adaptive and functional to misperceive than correctly believe.

McKay & Dennet (M&D) suggest that in order to identify a systematically adaptive misbelief, such belief may result from processing “biases” in the sensory system itself. Such an assertion assumes that perception gives rise to (mis)belief. Although this assertion may at times be true, at other times perception and belief may be disconnected (e.g., see above), or (mis)belief may actually give rise to perception (e.g., New Look: Balcetis & Dunning 2006; Bruner 1957). In fairness, disconnects between perception and belief are discussed in M&D’s discussion of “alief” and error management theory; nevertheless, their proposed connection between perception and misbelief remains unclear.

A similar point of confusion is found in the distinction M&D make between psychological and biological adaptation. It has long been recognized that social psychological factors and biological factors are closely related (for a review see Cacioppo et al. 2000). Because of the complementary nature of social psychological and biological factors in human behavior, making distinctions between the two becomes meaningless without specifying how the two may be connected for a given outcome (e.g., Gailliot et al. 2007).

The lack of clarity in distinguishing between perception and belief, and psychological and biological adaptation, becomes apparent as M&D investigate whether religious belief might be a good candidate for adaptive misbelief. If inferring the presence of agents is adaptive, for example, is such adaptability psychological or biological? If such agents cannot be seen and are not real, then what role does perception play? In fact, most of the empirical research in the area cited by M&D (i.e., Pichon et al. 2007; Randolph-Seng & Nielsen 2007; Shariff & Norenzayan 2007) suggest that *alief*, rather than belief, is involved, and that perceptual priming of agency rather than religion per se may be at the root of the behavioral effects found. M&D do acknowledge these possibilities, but fail to extend these possibilities to the search for adaptive misbelief (a point I return to later).

Where M&D’s search does take them is to conscious self-deception. Considering their previously implied condition of adaptive misbelief arising from nonconscious perceptual biases, it is unclear why conscious self-deception is even considered, but it does provide a nice segue into positive illusions (i.e., the unrealistic optimism-type), fulfilling the stated requirements for adaptive misbelief. But why stop there? Are there other types of beliefs that could be considered adaptive misbeliefs (e.g., antecedent misbeliefs giving rise to the positive illusions described by M&D)?

One potential candidate may be gleaned from M&D’s discussion of religious beliefs, namely a belief in personal agency. Recent social psychological research suggests that one’s belief in free will is (or can be) an illusion (for reviews, see Bargh 2008; Wegner 2005); however, other research suggests that the more one believes

in personal agency, the more prosocial and hardworking one tends to be (Baumeister et al. 2009; Stillman et al., in press; Vohs & Schooler 2008). Insofar as a belief in free will is a positive illusion (see Bargh & Earp 2009), it may be considered a pre-existing belief for the types of positive illusions discussed by M&D. For example, if one did not believe that control over one’s actions was real, then there may be less reason to believe that one has what it takes to survive a life-threatening disease.

Proposing a belief in free will as a candidate for adaptive misbelief does bring to the forefront the previously discussed question of the connection between perception and belief. Insofar as the choices one makes are the result of nonconscious thinking instigated by the environment and resulting from our evolutionary past (Bargh 2008), belief in free will and nonconscious perception do not line up. Nevertheless, rational choice and conscious self-regulation are also thought to be intricately linked to the evolution of human cognition (Baumeister 2008), in which case belief may be able to feed back into perception. Such a possibility would help explain how humans, despite being mostly unaware of the various messages presented to them from the environment, can successfully navigate through their environment in order to accomplish their personally activated goals. In fact, recent research has found that people can go beyond nonconsciously regulating their responses to *consciously* perceived stimuli, to preconsciously controlling the impact of *nonconsciously* perceived stimuli on their responses (i.e., being differently influenced by subliminal primes depending on current nonconscious motivations; Randolph-Seng 2009). In this way, an adaptive misbelief, such as a belief in free will, may actually become true as human cognition evolves.

## You can’t always get what you want: Evolution and true beliefs

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**Abstract:** McKay & Dennett (M&D) convincingly argue against many proposals for adaptively functioning misbelief, but the conclusion that true beliefs are generally adaptive does not follow. Adaptive misbeliefs may be few in kind but many in number; maladaptive misbeliefs may routinely elude selective pruning; reproductively neutral misbeliefs may abound; and adaptively grounded beliefs may reliably covary with but not truthfully represent reality.

In critiquing proposed examples of adaptive misbelief, McKay & Dennett (M&D) aim to confirm the assumption that, via evolution, humans “have been biologically engineered to form true beliefs” (sect. 1, para. 2), and conclude that the exchange rate between fitness and truth “is likely to be fair in most circumstances” (sect. 15, last para). We agree with their critiques (Murray & Moore 2009; Schloss 2007), but the conclusion does not follow.

First, even if many proposals for adaptive misbelief fail, this does not tell us whether adaptive misbeliefs spawned in situations M&D acknowledge as credible are common or, as they claim, limited to “certain rarefied contexts” (sect. 15, last para). For instance, the promiscuous attribution of agency and teleology, or the manifold positive illusions that may be accounted for within error management theory (Johnson 2009) are extraordinarily plentiful, persistent, and influential. Other kinds of positive illusions, from the placebo effect to magnifying the virtues of beloved people, places, nations, and traditions – consistent with proposals