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Book Review

The Human Brain as an Evolved Rationalization Machine

A review of Michael Shermer, *The Believing Brain: From Ghosts to Gods to Politics and Conspiracies – How We Construct Beliefs and Reinforce Them as Truths*. Times Books: New York, 2011, 400 pp., US\$28.00, ISBN # 978-0-8050-9125-0 (hardcover).

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Introduction

Michael Shermer, one of the world's most renowned skeptical authorities and the founder and editor-in-chief of *Skeptic* magazine, has built his career around debunking irrational and poorly supported beliefs. Despite his notability as a proponent of skepticism and scientific reasoning, Shermer may not be as well known for his vast knowledge of evolutionary psychology and his ability to clearly explain everyday human behaviors and belief systems from an evolutionary perspective. In his latest book, *The Believing Brain: From Ghosts to Gods to Politics and Conspiracies – How We Construct Beliefs and Reinforce Them as Truths*, Shermer seeks to explain the formation of specific beliefs (as the title implies), as well as belief systems in general. In doing so, he brilliantly synthesizes cognitive research and evolutionary theorizing – shedding light on a number of humanity's most cherished beliefs and their underlying mechanisms along the way.

Shermer's book is separated into four parts, all of which are tied together by one unifying hypothesis – that humans form beliefs first and then seek evidence consistent with those beliefs. Shermer terms this process “belief-dependent realism” (p.5). It has long been known among those familiar with social cognitive science that people are more rationalizing than rational. For example, Gilbert (Gilbert, 2002; Gilbert and Gill, 2000) has argued that people initially believe their own subjective experiences as an accurate reflection of reality, and will only discount or question these beliefs through effortful cognitive processing. However, Shermer intends to not only disseminate the information on human rationalization to the lay public, but also seeks to explain the evolutionary reasons for why the human brain is a rationalizing machine.

Biology of Belief: Patternicity, Agenticity, and Neurology

Following on the heels of anecdotal belief accounts presented in the first section of the book (“Journeys into Belief”), Shermer begins his scientific analysis of belief systems in the second section (“The Biology of Belief”). The crux of his argument rests on two different cognitive processes, *patternicity* and *agenticity*. He introduces the concept of patternicity with a thought experiment that is certainly familiar to most researchers of evolved human behavior – “Imagine you are a hominid walking along the savanna of an African valley three million years ago” (p. 59). Shermer goes on to emphasize the adaptive importance of recognizing threats in one’s immediate environment; “You hear a rustle in the grass. Is it the wind or is it a dangerous predator?” As the actor in this hypothetical scenario, we are faced with two familiar choices: We can (a) assume the noise was just wind and go about our business, or (b) assume the disturbance was made by a dangerous predator and get out of dodge. If we assume that the noise was a predator but it turns out to simply be the wind, we have made a false positive (i.e., a Type I error) and have erred on the side of safety. If, however, we assume that the noise was the wind and it turns out to be a predator, we have made a false negative (i.e., a Type II error), and the cost could be our life. This type of reasoning is known by many evolutionary psychologists as Error Management Theory (Haselton and Buss, 2000; Haselton and Funder, 2006), and it proposes that people will tend to err on the side of safety because it offers advantages for survival or reproductive opportunities.

Shermer argues that the ability for animals to recognize patterns in the environment is crucial for navigating and surviving in a dangerous world. He describes human brains as “evolved pattern-recognition machines that connect the dots and create meaning out of the patterns we think we see in nature” (p. 59). Patternicity is therefore defined as the tendency to find meaningful patterns in both meaningful and meaningless noise. Much like Gilbert (2002), Shermer believes that for the sake of survival human’s default position is to assume that all patterns are real. Thus, people often “believe weird things because of our evolved need to believe non-weird things” (p.62). Humans’ weird beliefs include our proclivity to trust anecdotal evidence over statistical evidence – a problem that is often harmless but can result in dire effects, as in the case of thousands of parents who denied their children proper vaccination in the face of celebrity testimonies against its “dangers” – as well as the very common superstitious behaviors often practiced by sports fans and athletes (e.g., if I don’t wear my lucky socks on game day my team is going to lose).

Shermer also argues that people are born with the hardwired tendency to spot particular patterns that elicit functional emotional responses. For instance, thoughts of sexual relations with close others, especially those we have grown up with, elicit feelings of disgust – a case of patternicity that natural selection has endowed us to help prevent the genetic maladies that can result from incest. Although not discussed by Shermer, such instances of patternicity can help explain behavioral immune system responses studied by Schaller and colleagues (e.g., Schaller and Park, 2011). These researchers have repeatedly found that people will respond with negative biases toward out-group others who are heuristically associated with pathogen transmission, such as people who are obese or physically disabled (Park, Faulkner, and Schaller, 2003; Park, Schaller, and Crandall, 2007)

– a clear-cut case of how evolved pattern formation can lead to irrational beliefs and negative behaviors toward others.

The other cognitive process that acts as a major player in the formation of beliefs is *agenticity*, the tendency to infuse patterns with meaning, intention, and agency. Shermer argues that our evolved theory of mind, or capacity to be aware of the mental states and desires of others, has led people to attribute intentionality to the (often false) patterns we perceive. What can result are beliefs in things such as souls, spirits, ghosts, gods, demons, karma, fate, and a vast array of other intentional agents controlling aspects of our lives. Amusing examples of agenticity include children's tendencies to draw faces on things that do not have intentionality, such as the sun, and cross-cultural beliefs that genital shaped foods such as oysters or bananas increase sexual potency. Shermer argues that people naturally develop supernatural and superstitious beliefs due to our evolved tendency to find meaningful patterns and impart to them intentional agency. He uses this evolutionary hypothesis to help explain other supernatural beliefs such as communication with the dead and the sensed-presence (or guardian angel) effect.

In his biological analysis, Shermer additionally discusses neurological influences on belief systems. Shermer uses scientific evidence to argue that what we often attribute as the "mind" is simply a byproduct of natural, evolved brain activity, thus dispelling the notion that the mind and brain are separate entities. He also argues that theory of mind is likely to be the result of evolved neural networks that enabled people with abilities crucial to survival in a complex world, such as the ability to distinguish animate and inanimate objects, to follow and hold another's eye gaze, to distinguish action and intention of others, and to plan goal-directed actions. These natural neural processes, however, may also play a crucial role in common dualistic beliefs of the mind as separate from the brain and the soul as separate from the body – these dualistic beliefs are often a very important component of religious and spiritual beliefs, the topic of the following section of Shermer's book.

Belief in Things Unseen: Religion, Aliens, and Conspiracies

Shermer treads familiar ground in the section of his book dedicated to "Belief in Things Unseen." He cleanly lays out arguments claiming that because people have the evolved tendencies to impart agency and intention to both animate and inanimate objects, because psychological processes lead many of us to believe in dualism of mind/brain and soul/body, and because our brains efficiently weave sensory input and thought into a cognitively cohesive and understandable story, it only comes natural that people believe in a number of supernatural phenomena, such as the after-life and an eternal soul, aliens, and conspiracy theories. He also jokingly claims that *Homo sapiens* could be renamed *Homo religiosus*, citing the preponderance of religious behavior today and throughout human history. Following the work of others who have examined religion from an evolutionary perspective (e.g., Boyer, 2001; Dennett, 2006), Shermer argues that God is hardwired into human brains as the ultimate intentional agent, thus giving the unknown universe meaning and purpose. He also acknowledges religion's role as an evolved social institution that has aided human survival by acting as a cultural mechanism to encourage cooperation and altruism, give meaning and purpose to the world, and punish moral transgressors. Although

Shermer argues that belief in such unseen phenomena such as religion are the result of natural cognitive processes, and that religious institution has played a key role in the development of human civilization, he questions the utility of religion in a modern, science-based world. Likewise, Shermer encourages that humans challenge themselves to break from these evolved tendencies and embrace the information available through the tools of science. Through use of the scientific method, he claims that we can dispel unsound beliefs about the world and focus on addressing the problems that such irrational beliefs have helped create (e.g., religious and group-based intolerance, disbelief in evolution and global warming, holocaust denial, etc.).

Belief in Things Seen: Politics, Psychology, and Science

In the final section of his book, Shermer addresses “Belief in Things Seen.” This section includes a chapter on belief and politics, focusing predominantly on the differences in moral reasoning by conservatives and liberals. As in his previous book *The Science of Good and Evil* (Shermer, 2004), Shermer argues that moral systems are a product of the interaction between evolutionary and cultural history, and he cites work by Haidt (e.g., Haidt, 2007) suggesting that moral decisions are grounded in automatic moral feelings as opposed to rational calculation. Much like Haidt (e.g., Haidt, Graham, and Joseph, 2009), Shermer contends that many of the differences in beliefs held by conservatives and liberals can be attributed to individual differences in moral intuition. Although the argument for an evolved moral system is scientifically grounded and strong, it is in this same chapter that Shermer seems to noticeably detract from his key points for the first time in the book. Following his discussion of evolved moral systems and the differences between conservatives and liberals, Shermer momentarily steps on a soapbox to promote libertarianism, with a focus on personal freedoms (granted those freedoms do not impede on the freedoms of others). Although his arguments for considering libertarianism are not invalid and not necessarily out of place given the subject of this chapter, this particular inclusion is a bit distracting as Shermer drops the objective scientist voice that he uses throughout much of the book and instead adopts a testimonial writing style. Despite the minor distraction, this chapter offers an engaging and convincing argument that evolution has played an undeniable role in the development of moral and political beliefs. Shermer also includes an important point to consider when taking sides in moral disagreements – he notes that “our moral minds evolved to unite us into teams, divide us against other teams, and convince ourselves that we are right and that other groups are wrong” (p. 241).

In the chapter titled “Confirmations of Belief,” Shermer veers away from specific beliefs and focuses on the various psychological processes that reaffirm our beliefs. This chapter could easily pass as a chapter on social cognition, as Shermer discusses and gives examples of a multitude of cognitive biases, including the confirmation bias, hindsight bias, attribution bias, and the big three heuristics: availability, representativeness, and anchoring and adjustment. Taken together, these examples each support his primary argument that beliefs are initially formed for subjective, emotional, psychological, and functional reasons, and are then reinforced, justified, and explained with post-hoc rationalizing.

Of the sixteen chapters in this book (including the prologue and epilogue), the final

chapter (“Cosmologies of Belief”) is among the longest and is arguably the most difficult to grasp. In this chapter, Shermer detours from psychological science and focuses on the history of cosmological theories concerning nebulae and galaxies. He details the arduous trial and error process that scientists went through before coming to a wide acceptance of Kant’s “island universe” theory of multiple independent galaxies. The purpose of the chapter is to both express how difficult it is for belief systems to change, even in the face of evidence, and to lead into Shermer’s final appeal of the book – that only through the scientific process of collecting data and testing hypotheses can we ultimately come to a better understanding of the natural world around us. The arguments of this chapter are followed by an epilogue, doubling as a call-to-arms, detailing the ways in which we (both scientists and laypersons) can use the scientific process (e.g., the null hypothesis, convergence of evidence, comparative method, etc.) to help us come to reasoned conclusions in everyday life.

Conclusion

The information presented in *The Believing Brain* brilliantly synthesizes evolutionary and cognitive science. Although some of the arguments may not be new to evolutionary psychologists, the real value of the work (as with much of Shermer’s previous work) lies in Shermer’s ability to explain to non-experts the utility of evolutionary psychological science. The general population may not be ready to accept evolutionary explanations of everyday human behavior – in a 2009 Harris Poll (Harris, 2009) cited by Shermer (p. 2), 82% of Americans expressed belief in God, 60% in the devil, and 45% believe in Darwin’s theory of evolution. It is therefore incredibly beneficial for evolutionary psychology to have a credible and prominent proponent such as Shermer endorsing our field of science. Shermer sums up the issues evolutionary psychologists face quite well; “The problem,” he notes, “is that superstition and belief in magic are millions of years old whereas science, with its methods of controlling for intervening variables to circumvent false positives, is only a few hundred years old” (p.63). Indeed, for evolutionary psychologists to encourage people to understand human behaviors as evolved behaviors, we must fight those same evolved processes that lead us to believe irrational things. Shermer has written an entertaining and informative book that serves as a great resource for helping people understand why we form such beliefs in the first place.

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