

confined to research on children. For example, in another study cited (Bering 2002a), adult participants are presented with vignettes and asked questions like “Now that [the person] is dead, does he want to be alive?” This research is mentioned in the context of simulation constraints, and so participant hesitation is taken to imply an incapacity (among adults) to imagine what being dead is like. However, again, the participant’s judgment of the researcher’s own mental state is being ignored. It could simply be that participants hesitate because they are confused by an apparently bizarre interrogation (asking themselves “Is this a trick question?”), or are contemplating how best to be polite in a socially awkward situation (“How do I respond without offending the questioner’s apparent belief in an after-life?”). Adults may readily imagine death, as might be suggested by research that examines the consequences of being invited to do so (e.g., research into Terror Management Theory; Goldenberg et al. 2000).

However, despite the precarious nature of self-report evidence in studies of controversial, emotionally charged belief systems, Bering’s argument is not necessarily empirically unsupportable. Comparison of the views of children who are and are not presented with afterlife concepts by their environments (e.g., by their parents) might elucidate to what extent children develop such beliefs spontaneously. Objective (e.g., biological) indices of behavior may also be revealing. Studies of phenomena such as the placebo effect and its stimulation by social support (Wall 1999) may corroborate claims that humans possess innate characteristics that reinforce “moral” behavior (which, by providing people with a stake in long-term outcomes of behavior, would indirectly support folk assumptions regarding psychological immortality), while also informing theories about the evolution of moral judgment. Complementary evidence may emerge from research into the genetics of altruism (e.g., Jansen & van Baalen 2006).

In summary, it is clear that many people believe in an afterlife. However, Bering’s case that such a belief is evolutionarily primed (and therefore innate) is persuasive but not conclusive. It does not displace the more parsimonious explanation that childhood credulity underlies the acquisition of afterlife beliefs through cultural exposure.

Transcendental self-organization

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Abstract: Bering makes a good case for turning attention to an organized system that provides the self with transcendental meaning. In focusing on the evolutionary basis of this system, however, he overlooks the self-organizing properties of cognitive systems themselves. We propose that the illusory system Bering describes can be more generally and parsimoniously viewed as an emergent by-product of self-organization, with no need for specialized “illusion by design.”

Bering seeks to direct the cognitive science of religion beyond its recent focus on concept acquisition and agency detection toward considering how supernatural inferences frame the meaning and morality of the self. This shift potentially opens the door for links with the emerging study of spiritual development, which has otherwise been focused on issues of meaning, morality, and identity (see Roehlkepartain et al. 2006). In his present article, however, Bering speaks exclusively to evolutionary scholars, encouraging them to explore the possibility that an illusory cognitive system evolved as the result of selective pressures.

While worthy of exploration, Bering’s evolutionary proposal is limited in two significant ways. First, the “Darwinian

mechanisms” are left completely unspecified. Second, the Darwinian proposal is not weighed against a non-Darwinian alternative.

Bering leaves it for future investigators to explore the mechanisms that generate the illusory existential system. It is not even clear what the mechanisms are supposed to produce. The system as a whole includes three components: ordinary cognitive processes (simulation, teleology, and theory of mind), the specific illusions, and their organization into a cognitive system. Presumably, Bering is not looking to account for the basic cognitive processes. The search, hence, must be for some added illusion-producing and integrative mechanisms that generate a distinctive metaphysical theory of self.

The alternative, more parsimonious possibility is that the cognitive illusory system emerges from ordinary processes through self-organization. In a Kantian sense, transcendental illusions are the inevitable product of the operation of ordinary cognitive processes as they extend beyond normal boundaries of operation. Beside the illusions that Bering describes, there are classic illusions that arise from reflective ideas, wherein the order inherent in concepts is uncritically assumed to exist in the world. In any case, once generated, these transcendental ideas are powerfully relevant and pragmatically regulatory, precisely because they reflect higher-order organization that is intrinsically valuable to the self (see Johnson 2000).

Systems of transcendental belief are thus the result of self-organization, whereby ideas generated by the self come to organize and regulate the self. In this framework, religious ideas are not the sterile by-product of cognitive relevance (attention and memory). Nor are they specifically adaptive illusions by design. Rather, they are emergent by-products that have self-relevance.

Epidemiologically, religious ideas are spread, not simply because of their cognitive relevance, but because of their vital relevance. Religious ideas stick around because they are relevant to the goals, status, and value of the self.

Transcendental illusions are the natural outgrowth of human cognitive organization. The cognitive system primarily functions to orient the organism to what is vitally important, not what is strictly, objectively real. To this end, information is organized in terms of prototypes, ideals, essences, narratives, and the like. These organizational processes commonly give rise to ideas regarding the existence of a higher, deeper order, beyond the perceptible given.

Clearly we need to know a lot more about the origins and adaptive function of transcendental ideas. Bering turns attention to a particularly intriguing system of belief. Whether or not this particular system was selected by design, we need to better understand the wider human tendency to imagine transcendental order that serves to regulate the self.

Six feet over: Out-of-body experiences and their relevance to the folk psychology of souls

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Abstract: During an out-of-body experience (OBE), one sees the world and one’s own body from an extracorporeal visuospatial perspective. OBEs reflect disturbances in brain systems dedicated to multisensory integration and self-processing. However, they have traditionally been interpreted as providing evidence for a soul that can depart the body after death. This mystical view is consistent with Bering’s proposal that psychological immortality is the cognitive default.

Religious experience and behavior play important roles in all human cultures and hence deserve to be treated as natural phenomena worthy of careful scientific investigation (Dennett 2006). We commend Bering for his insightful and provocative contribution to this new field of research.

Bering argues that “common-sense mind-body dualism” is a cognitive adaptation that evolved through natural selection. According to this view, human beings are *designed* to believe that everyone has an immaterial, immortal soul that is linked to the body during life but leaves it behind after death (see Humphrey 2006, pp. 124–29, for a similar argument). In this commentary we relate Bering’s proposal to one of the most bizarre and emotionally powerful alterations of consciousness that people are capable of undergoing, namely out-of-body experiences (OBEs), in which the subjective sense of self appears to part company with the physical body (e.g., Blackmore 1982; Blanke et al. 2004; Brugger 2006; Green 1968; Metzinger 2003).

Blanke and Arzy (2005, p. 16) state that an OBE has three phenomenological characteristics: “disembodiment (location of the self outside one’s body), the impression of seeing the world from a distant and elevated visuospatial perspective (extracorporeal egocentric perspective), and the impression of seeing one’s own body (autoscopy) from that elevated perspective.” This is illustrated by the following example (Irwin 1985, case 1): “I was in bed and about to fall asleep when I had the distinct impression that I was at the ceiling level looking down at my body in the bed. I was very startled and frightened; immediately [afterward] I felt that I was consciously back in the bed again.” OBEs have a prevalence of approximately 10% in the general population (Blackmore 1982; Irwin 1985, pp. 219–59). They occur in many diverse cultures (Shiels 1978) and are frequently mentioned in folklore, mythology, spiritual writings, and literature (e.g., Arzy et al. 2005; McCulloch 1992). Indeed, they are so widespread that Metzinger (2003, p. 502) calls them a “phenomenological archetype” of humanity. Although OBEs can be induced by hallucinogenic drugs such as ketamine (Hansen et al. 1988) and phencyclidine (PCP; Rosse et al. 1994), they happen spontaneously only once or twice in a lifetime (Blackmore 1982; Green 1968), usually in dangerous, traumatic situations such as rape (Sierra & Berrios 1998) and near-death episodes (Greyson 2000). Remarkably, in such circumstances subjects feel as if it is their *bodies* that are threatened, not their selves. Taking all of these factors into consideration, it is not surprising that OBEs have been widely regarded throughout history as confirming the intuition that every human being has an ethereal soul that can literally detach from the physical body, most importantly when that body expires. Metzinger (2003, p. 503) even goes so far as to formulate the “soul hypothesis,” which maintains that OBEs are what “first led human beings to believe in a soul” (see also Metzinger 2005).

As yet, however, psychological experiments have failed to verify the supernatural interpretation of OBEs as involving genuine mind–body separation (Alvarado 1992; 2000; Blackmore 1982, pp. 200–39; Irwin 1985). In addition, Olaf Blanke and his colleagues have succeeded in demystifying OBEs even more by marshalling several sources of neuroscientific evidence that suggest that these strange experiences arise from abnormal self-processing in the temporo-parietal junction (TPJ), predominantly in the right hemisphere (for reviews see Blanke & Arzy 2005; Blanke & Mohr 2005; Mohr & Blanke 2005). During an invasive cortical mapping procedure with an epileptic patient, it was found that direct stimulation of the TPJ reliably elicited OBEs and other types of visual body-part illusions (Blanke et al. 2002). More recent studies with neurological patients (Blanke et al. 2004) and healthy subjects (Blanke et al. 2005) have corroborated the importance of the TPJ in generating OBEs and have begun to reveal the specific neurophysiological mechanisms that underlie them. Normally the TPJ helps create a unified, central representation of the body – a physical anchor for the mental self – by integrating visual, tactile,

proprioceptive, and vestibular signals. OBEs may therefore arise when paroxysmal dysfunctions in the TPJ lead to strong discrepancies between the felt and the seen position of one’s own body. Blanke and Arzy (2005) suggest that otolith vestibular dysfunctions may be an especially important precipitating factor for OBEs, because they have been independently linked not only with feelings of elevation and floating, but also with 180° inversions of one’s visuospatial perspective. In particular, such illusions have been experienced by astronauts during space missions (Mittelstaedt & Glasauer 1993) and by pilots during the microgravity phase of parabolic flights (Lackner 1992). Further research will undoubtedly continue to illuminate the neural bases of OBEs and their role in religious activity (Previc, in press). For example, there may be connections between OBEs and new evidence that the TPJ is engaged when a person imagines how the spatial relations between two objects would appear from someone else’s point of view (Aichhorn et al. 2006). Similarly, there may be connections between OBEs and new evidence that partially distinct cortical regions subserve the visual perception of one’s own and other people’s body parts (Saxe et al. 2006).

Nevertheless, it seems likely that no matter how much progress is made in explaining OBEs solely in terms of the structures and operations of the brain, a substantial proportion of the human population will still prefer to interpret OBEs as involving a true liberation of the soul from the body, a liberation of the kind that everyone ultimately undergoes when they die. After all, as Bering points out, belief in psychological immortality seems to be our cognitive default.

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Our title is borrowed from Roach (2006).

Cultural adaptation and evolved, general-purpose cognitive mechanisms are sufficient to explain belief in souls

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Abstract: It is suggested that general-purpose cognitive modules are the proper endophenotypes on which evolution has operated, not special purpose belief modules. These general-purpose modules operate to extract adaptive cultural patterns. Belief in souls may be adaptive and based in evolved systems without requiring that a specific cognitive system has evolved to support just such beliefs.

In its strong form Bering’s evolutionary adaptationist argument in the target article proposes to explain how it is that so many hundreds of millions of people are capable of believing the same six impossible things before breakfast. In this same strong form it leaves unanswered the question of why so many hundreds of millions of people (estimates vary but see Barrett et al. 2006) disavow such beliefs. Bering suggests that the evolved tendency to believe in souls remains operative even in self-proclaimed “extinctivists,” some of whom endorse the idea that dead people know that they are dead (Bering 2002a), but this finding hardly shows that this confusion reflects an *evolved* adaptation. Thoughtful and clever as it is, Bering’s analysis presents us with a false alternative between two explanations of the widespread belief in souls. The cultural epidemiological alternative views all religious ideas, including ideas about an afterlife, as non-adaptive byproducts of general-purpose cognitive processes. Bering’s alternative is that the belief in an afterlife is a specific, evolved adaptation that extends the temporal boundaries of the self in ways that minimize counter-reproductive behavior. I