

selection can act, can alone result in evolutionary change over time. While natural selection is the driving force behind all adaptive evolution, non-adaptive processes such as genetic drift, meiotic drive, and a few other forces can also lead to evolutionary changes (Futuyma 1998). However, Bering's hypothesis would not be any more valid if it were based on non-adaptive evolutionary forces.

To be fair, Bering is hardly alone in misapplying the theory of evolution to explain higher cognitive functions. Since all living things are products of evolution, there is a widespread tendency to treat evolution as a default explanation for all things biological. Although this is understandable, it is also scientifically naïve. Of course, that is not to say either that cognitive phenomena have no basis in evolution or that they inherently defy evolutionary explanations. Rather, it is to emphasize that any evolutionary explanation for a given biological phenomenon, cognitive or otherwise, must at a minimum demonstrate that the relevant trait is heritable and, in cases where natural selection is invoked, that it increases fitness. The genuine difficulty of studying the evolutionary basis of cognitive phenomena is that both heritability and fitness effects are exceedingly hard to establish for these phenomena. This does not mean that no evolutionary explanations for such phenomena are to be ventured, but that they are to be ventured with appropriate caution and adequate groundwork. Clearly, Bering's hypothesis is burdened with neither.

In a sense, evolutionary biology of higher cognitive phenomena is like astrophysics or paleontology, where direct measurements are often all but impossible, and experimentation is harder. In such cases, one has no choice but to substitute tests and measurements with informed speculation, "informed" being the operative word. But in such an event, the speculative aspects must not only be acknowledged, but highlighted, and the underlying risks and implications of the substitutions must be carefully assessed. Bering does none of this. In light of all these problems, it is surprising to us that Bering chooses to couch his hypothesis in the onerous theory of natural selection and not some less exacting and more suitably ambiguous concept like cultural evolution (see, e.g., Mesoudi et al. 2006; Richerson & Boyd 2005). Why must it be natural selection and why won't a less demanding theory do? Bering does not say.

Ultimately, in order to establish that his hypothesis has any relation to the theory of natural selection, Bering must, at a minimum (1) demonstrate heritability and fitness effects for the belief system in question, (2) prove that these parameters are somehow irrelevant to his hypothesis, or (3) show that our formulation of the minimum requirements of the theory of natural selection is incorrect. Failing this, he must concede that his hypothesis has no basis whatsoever in evolutionary theory.

## Natural selection and religiosity: Validity issues in the empirical examination of afterlife cognitions

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**Abstract:** Bering's target article proposes that the tendency to believe in an afterlife emerged (in evolutionary history) in response to selective pressures unique to human societies. However, the empirical evidence presented fails to account for the broader social context that impinges upon researcher-participant interactions, and so fails to displace the more parsimonious explanation that it is childhood credulity that underlies the acquisition of afterlife beliefs through cultural exposure.

As part of a fascinating case for a folk psychology of souls, Bering argues that believing in an afterlife is an evolutionarily inherited human tendency. However, although he provides much illustrative evidence, it is largely circumstantial in nature. Bering fails to take account of threats to validity that inevitably arise when researching such speculative and sensitive cognitions as people's beliefs in their own psychological immortality.

To support the claim that afterlife beliefs are innate, Bering cites research where child participants are asked to describe the ongoing thoughts of a recently killed (fictitious) mouse (Bering & Bjorklund 2004). The assumption inherent in this work is that as children have not yet developed explicit religiosity, their quasi-religious views are more likely to be innate than acquired. Thus, when the children respond that the animal continues to have thoughts and wishes, the researchers conclude that this indicates their belief in an afterlife. However, the external, internal, and construct validity of such research is highly questionable.

External validity is threatened because children's views on dead mice are not clearly generalizable to their beliefs about the immortality of souls. For one thing, children's well established capacity to engage in counterfactual thinking (Riggs & Peterson 2000), which underlies their ability to engage in pretend play, may lead them to think differently about dead mice in experimental vignettes compared to dead people in real life. Internal validity is threatened by a failure to include a control condition, wherein children's beliefs about the agency of inanimate objects in general might be probed. The attribution of agency to inanimate objects has been observed in both children and adults (Barrett & Johnson 2003). Thus, it is impossible to determine whether children's comments about the "thoughts" of dead mice are any more profound than similar comments about chairs, cars, or computers.

As is typically the case in research with children, construct validity is threatened by the likelihood that responses to experimental questions will be influenced by the experimenters' seniority in age and status. The fact that children make what for them are counter-intuitive inferences in order to accommodate the assumptions implicit in (adult) researchers' odd questions is long documented in psychology (e.g., McGarrigle et al. 1978; cf. Hilton 1995). In this case, perceiving the adult to be an authority figure, child participants may have inferred from the questions asked that it is *to be expected* that the mouse's mind continue to function. As it cannot be guaranteed that participants genuinely hold the beliefs attributed to them, the question of whether such beliefs might be innate becomes moot.

Rather than postulating an innate propensity to believe in souls, a more parsimonious theory might invoke the evolutionary benefits of credulity among children. Given the need for guidance to navigate the treacherous environments that characterize early childhood, it is likely that children's unquestioning faith in whatever adults tell them is highly adaptive (Dawkins 2003). As virtually all young children are presented (directly and indirectly) with the idea of the immortality of souls, it should be unsurprising if such a notion becomes widely believed. It is this propensity for credulity that represents evolution's legacy to spiritualism, and not an innate propensity to intuit the existence of an afterlife per se. By relying on fewer antenatal inputs, theories of innate credulity are more parsimonious than ones of innate beliefs about existence. Indeed, researchers who infer an innate belief in afterlives in the absence of sufficient evidence could themselves be accused of holding unsubstantiated beliefs in a *beforelife*, namely, the sense in which an individual's personhood "exists" (such that it is endowed with fundamental beliefs) before he or she is even born.

However, Bering may well be correct about the reasons why many *adults* develop strong beliefs in afterlives (which are then transmitted to credulous children). Nonetheless, gathering empirical evidence here is also problematic, as problems arising from experimenter-participant interactions are not

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 afterlife?”). 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.