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The folk psychology of souls

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Abstract: The present article examines how people's belief in an afterlife, as well as closely related supernatural beliefs, may open an empirical backdoor to our understanding of the evolution of human social cognition. Recent findings and logic from the cognitive sciences contribute to a novel theory of existential psychology, one that is grounded in the tenets of Darwinian natural selection. Many of the predominant questions of existential psychology strike at the heart of cognitive science. They involve: *causal attribution* (why is mortal behavior represented as being causally related to one's afterlife? how are dead agents envisaged as communicating messages to the living?), *moral judgment* (why are certain social behaviors, i.e., transgressions, believed to have ultimate repercussions after death or to reap the punishment of disgruntled ancestors?), *theory of mind* (how can we know what it is "like" to be dead? what social-cognitive strategies do people use to reason about the minds of the dead?), *concept acquisition* (how does a common-sense dualism interact with a formalized socio-religious indoctrination in childhood? how are supernatural properties of the dead conceptualized by young minds?), and *teleological reasoning* (why do people so often see their lives as being designed for a purpose that must be accomplished before they perish? how do various life events affect people's interpretation of this purpose?), among others. The central thesis of the present article is that an organized cognitive "system" dedicated to forming illusory representations of (1) psychological immortality, (2) the intelligent design of the self, and (3) the symbolic meaning of natural events evolved in response to the unique selective pressures of the human social environment.

Keywords: causal reasoning; death concept; evolutionary theory; existential psychology; folk biology; intelligent design; intentionality; mental representation; teleological reasoning; theory of mind

> Life is a jest, and all things show it; I thought so once, and now I know it.
>
> — John Gay, *Epitaph*

1. Introduction

By stating that psychological states survive death, one is committing to a radical form of mind-body dualism. Yet this radicalism is especially common. In the United States alone, 95% of the population reportedly believes in life after death (Greeley & Hout 1999; Lester et al. 2002). The majority of people from other societies, as well, see death as a transitional event that unbuckles the ethereal self from its body. The *soul* is typically represented as the conscious personality of the decedent and the once animating force of the now inert physical form (Thalbourne 1996). Although there are many varieties of afterlife beliefs, each – at least implicitly – shares a dualistic view of the self as being initially contained in bodily mass and as exiting or taking temporary leave of[1] the body at some point after the body's expiration (Bloom 2004; Boyer 2001).

There is clear evidence showing that emotive factors can be powerful contributors to people's belief in life after death (e.g., Alvarado et al. 1995; Dechesne et al. 2003; Thalbourne 1996). In general, psychologists who study this area have tended to focus on individual differences, specifically the role of death anxiety, and have posited a variety of "comfort hypotheses" involving the human motivation to construct such supernatural beliefs. In contrast, less is known about the basic components underlying the strong cognitive bias to entertain belief in an immortal soul (Astuti, forthcoming a). These more basic questions concerning the cognitive architecture behind afterlife representations are also important pieces of the puzzle and will be explicitly addressed in the present article. Whatever one's personal motivations for rejecting or endorsing the idea of an immaterial soul that can defy physical death, the ability to form any opinion on the matter would be absent if not for our species' defining capacity to differentiate unobservable minds from observable bodies (Povinelli & Bering 2002; Suddendorf & Whiten 2001; Tomasello & Call 1997).

Some researchers have already begun laboratory investigations into the question of whether humans are "common sense dualists," work that seems to have implications for our understanding of people's intuitive conceptions of souls and the afterlife (see Bloom 2004). For example, in a modification of the classic expectancy violation paradigm (which uses looking time as a measure of nonverbal infants' "surprise" at an event), Kuhlmeier et al. (2004) positioned identical twin experimenters at different points in the laboratory to test 5-month-olds'

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ability to reason about the law of continuous motion as it applies to human bodies. Like any material substance, human bodies cannot go from A → C without first passing along the trajectory of B (a contiguous space between the two points). For inanimate objects, infants are surprised (i.e., look longer) when the object disappears from behind one barrier and then seems to reemerge from behind another nonadjacent barrier. In the case of a human who violates the law of continuous motion, however, 5-month-olds are not surprised (i.e., they do not look longer at this event than the non-violation event). The authors speculate that "infants do not readily view humans as material objects" (Kuhlmeier et al. 2004, p. 101) and that an "appreciation that people *are* just objects may be a developmental accomplishment" (p. 102; emphasis in original).

But how do we get from the common-sense dualism of infants to beliefs of the afterlife so soberly entertained by adults? Even a superficial pass over such beliefs strikes one as involving many of the core problems in cognitive science: *causal attribution* (how is mortal behavior causally related to one's afterlife? how are dead agents envisaged as communicating messages to the living?), *moral judgment* (why are certain social behaviors, i.e., transgressions, believed to have ultimate repercussions after death or to reap the punishment of disgruntled ancestors?), *theory of mind* (how can we know what it is "like" to be dead? what social-cognitive strategies do people use to reason about the minds of the dead?), *concept acquisition* (how does a common-sense dualism interact with a formalized socio-religious indoctrination in childhood? how are supernatural properties of the dead conceptualized by young minds?), *teleological reasoning* (why do people so often see their lives as being designed for a purpose that must be accomplished before they perish? how do various life events affect people's interpretation of this purpose?), and so on.

In what follows, I examine how this human folk psychology of souls, as well as closely related supernatural beliefs, may open an empirical backdoor to our understanding of the evolution of human social cognition. Recent findings and logic from the cognitive sciences contribute to a novel theory of existential psychology, one that is grounded in the tenets of Darwinian natural selection. The central thesis of the present article is that an organized cognitive "system" dedicated to forming illusory representations of (1) psychological immortality, (2) the intelligent design of the self, and (3) the symbolic meaning of natural events evolved in response to the unique selective pressures of the human social environment.

2. Psychological immortality as a cognitive default

> I'm a materialist, I swear it to you; I'm not going crazy. But something's the matter. I see my corpse; that's not hard but I'm the one who sees it, with my eyes. I've got to think . . . think that I won't see anything anymore and the world will go on for the others. We aren't made to think that.
>
> — Jean-Paul Sartre (1937/1969), *The Wall: And Other Stories*

From an evolutionary perspective, it is important to first ask whether humans "naturally" reason about death as a transitional state of consciousness or simply acquire such ideas through cultural exposure (perhaps from adults who "invent" such notions to ameliorate their own death anxiety; see, e.g., Dechesne et al. 2003; Harris & Giménez 2005). Although conventional wisdom tends to favor a general learning hypothesis for the origins of afterlife beliefs, recent findings suggest a more complicated developmental picture.

For example, in a study by Bering and Bjorklund (2004), children (as well as an adult comparison group) were presented with a puppet show in which an anthropomorphized mouse was killed and eaten by an alligator, and then asked about the biological and psychological functioning of the now-dead mouse. Kindergartners understood that various biological imperatives (e.g., the capacity to be sick, the need to eat, drink, and relieve oneself) no longer applied to the dead mouse. The majority of these children even said that the brain of the dead mouse no longer worked, which is especially telling given that children at this age also understand that the brain is "for thinking" (Bloom 2004; Gottfried & Jow 2003; Johnson & Wellman 1982; Slaughter & Lyons 2003). Yet when asked whether the dead mouse was hungry or thirsty, or whether it was thinking or had knowledge, most kindergartners said yes. In other words, young children were cognizant of the fact that the body stops working at death but they viewed the mind as still active. Furthermore, both the children and adults were particularly likely to attribute to the dead mouse the capacity for certain psychological states (i.e., emotions, desires, and epistemic states) over others (i.e., psychobiological and perceptual states), a significant trend that will be addressed in the following section.

In general, however, kindergartners were more apt to make psychological attributions to the dead mouse than were older children, who were not different from adults in this regard. This is precisely the opposite pattern that one would expect to find if the origins of such beliefs could be traced exclusively to cultural indoctrination. In fact, religious or eschatological-type answers (e.g., Heaven, God, spirits, etc.) among the youngest children were extraordinarily rare. Thus, a general belief in the continuity of mental states in dead agents seems not something that children acquire as a product of their social–religious upbringing, because increasing exposure to cultural norms would increase rather than attenuate afterlife beliefs in young minds. Instead, a natural disposition toward afterlife beliefs is more likely the default cognitive stance and interacts with various learning channels (for an alternative interpretation, see Astuti, forthcoming a). Moreover, in a follow-up study that included Catholic schoolchildren, this incongruous pattern of biological and psychological attributions to the dead mouse appeared even after controlling for differences in religious education (Bering et al. 2005).

Unlike intuitive reasoning about dead agents' bodies, which may help to motivate physical avoidance of these dangerous objects in the environment (via the emotion of disgust or agency detection mechanisms which err on the side of caution for ambiguously dead/sleeping agents; Barrett & Behne 2005; Rozin et al. 1993), intuitive reasoning about dead agents' minds would seem to leave open the possibility for continued social relationships with the dead.

2.1. The simulation constraint hypothesis and the afterlife

> Our own death is indeed unimaginable and whenever we make the attempt to imagine it we can perceive that we really survive as spectators.
>
> — Sigmund Freud, *Thoughts for the Times on War and Death*
>
> Try to fill your consciousness with the representation of no-consciousness, and you will see the impossibility of it. The effort to comprehend it causes the most tormenting dizziness. We cannot conceive of ourselves as not existing.
>
> — Miguel de Unamuno (1912/1954), *Tragic Sense of Life*

The causal mechanisms that lead young children to represent dead agents' minds as being psychologically active have yet to be precisely identified. Nevertheless, there is evidence that simulation constraints (i.e., the inability to know what it is "like" to be dead) may comprise an important set of factors. Like reasoning about one's past mental states during dreamless sleep or while in other somnambulistic states, consciously representing a final state of unconsciousness poses formidable, if not impassable, cognitive constraints (Barrett 2004; Bering 2002a; Bering & Bjorklund 2004; Bering et al. 2005; Clark 1994; Gilbert 2001; Nichols, in press). By relying on simulation strategies to derive information about the minds of dead agents, one would be compelled to put themselves "into the shoes" of such organisms, which is an impossible feat. These constraints may lead to a number of telltale errors, namely "Type I" errors (inferring mental states when in fact there are none), regarding the psychological status of dead agents. Koocher (1973, p. 374) described, for instance, how a group of children tested on death comprehension reflected on what it might be like to be dead "with references to sleeping, feeling 'peaceful,' or simply 'being very dizzy'."

Attempts to simulate dead agents' minds may even result in Type I errors made by adults who profess not to believe in the afterlife. Bering (2002a) found that when undergraduate students were asked to reason about the psychological abilities of a protagonist who had just abruptly died in an automobile accident, even some participants who later classified themselves as "extinctivists" (i.e., those who endorsed the statement "what we think of as the 'soul,' or conscious personality of a person, ceases permanently when the body dies"; after Thalbourne 1996), nevertheless stated that the dead person *knew* that he was dead.

In addition, there is reason to believe that certain types of mental states are more difficult to imagine being permanently without than are others. In the study by Bering and Bjorklund (2004), for example, participants at every age were more likely to attribute emotions, knowledge, and desires to the dead mouse than that they were psychobiological and perceptual states (see also Bering et al. 2005). This may be understood in relation to children's growing scientific knowledge. With regard to psychobiological states, such as hunger or thirst, Slaughter and her colleagues have shown that once children display an understanding of the vitalistic purpose of the behaviors tied to these states (i.e., that eating and drinking function to sustain life), this knowledge facilitates scientific reasoning about death (Slaughter & Lyons 2003; Slaughter et al. 1999). Indeed, children who appeal to a vitalistic biological framework when reasoning about human bodies are more precocious in their understanding of death (Slaughter & Lyons 2003).

Similarly, because perceptual states are closely tied to obvious bodily structures, children who possess teleofunctional biological knowledge about these structures (e.g., that ears are "for hearing") may begin to reason that, so long as the body has stopped functioning, the capacity for such states must also become defunct at death (O'Neill & Chong 2001).

In addition, because individuals are aware from their own previous or current experiences what it is like, say, *not* to be sleepy, *not* to hear, or *not* to be hungry, they may draw from the phenomenal negation of such states and apply these experiences to the minds of dead agents. Thus, in some cases, simulation may actually corroborate scientific knowledge and further reduce Type I errors.

In contrast to these categories of psychological states, however, the nature of the body's role in producing the subjective experiences of emotions, desires, and beliefs seems not as amenable to children's scientific theories of dead minds (or, indeed, even to adults' formulation of scientific theories regarding phenomenal consciousness and the brain, e.g., *qualia*; see McGinn 1991). These aspects of consciousness are not obviously related to the body's survival, nor are they linked to external bodily accoutrements (i.e., sense organs) that become "broken" by death. In the absence of scientific theory concerning the isomorphic relationship between the brain and the mind, individuals may defer to a simulation strategy in reasoning about dead others, a strategy that inevitably leads to Type I errors for these particular mental capacities (Bering 2002a; Clark 1994; Gilbert 2001; Nichols, in press). Firsthand experiences with the phenomenal negation of mental functions such as desires, emotions, and thought can never be had because these states are constantly "turned on" during conscious periods (e.g., it is epistemologically impossible to know what it is like not to think), making people inclined to impute these capacities to dead agents. Indeed, in looking at participants' response latencies to state that a dead protagonist lacked the capacity for various mental states, Bering (2002a) reported that it took people longer to answer that this was the case for "difficult-to-imagine-the-absence-of" states (e.g., desire: "Now that he's dead, does he *want* to be alive?") than for "easy-to-imagine-the-absence-of" states (e.g., psychobiological: "Now that he's dead, is he still *sleepy*?").[2]

2.2. Offline social reasoning: Why the afterlife is a place

> I forced myself to stop thinking of her as someone still somewhere, if only in memory, still obscurely alive, breathing, doing, moving, but as a shovelful of ashes; as a broken link, a biological dead end, an eternal withdrawal from reality.
>
> — John Fowles (1978), *The Magus*

In addition to simulation constraints, there are other aspects of human social cognition that may encourage attributions of continued psychological functioning to dead agents. When investigating peoples' intuitive conceptions of dead agents' minds, we are wise to remember, for instance, that human relationships are largely characterized by offline social events; those with whom we have relationships are only periodically directly

observable (e.g., Dunbar 1993; 2004). An offline social system leads us to tacitly assume that individuals with whom we have relationships are engaged in actions even when we cannot observe them doing so. The fact that your mother is not in the room at the moment does not compromise your capacity to reason about her mind, though obviously the accuracy of your social judgments will be limited. When conjuring up her offline image you are likely to imagine her as *somewhere* and as doing *something* – in the kitchen washing dishes, in bed sleeping, playing squash with the neighbor, and so on. Similarly, the dead are envisaged not as inanimate objects slowly decomposing in situ under the earth, but instead as having relocated to some unobservable locale where they are very much "living" their dead lives.

When it comes to death, human cognition apparently is not well equipped to update the list of players in our complex social rosters by accommodating the recent nonexistence of any one of them. This is especially the case, of course, for individuals who have played primary roles in our social lives, who did so for a long time, and who were never presumed to be continuously stationary when they were out of our sight. Because our minds are designed for offline as well as online social processing, we expect the periodic physical absence of social partners. Casual observation reveals that individuals will often, for example, pick up the phone with the intention of calling the decedent or fleetingly imagine how the decedent will react when told about some good news, only to remember that the person is not where they usually are – they have "passed on" to someplace else.

Although these automatic cognitions are probably the residue of habitual social behaviors, they also reveal something about the challenges faced by the human cognitive system when it attempts to process information concerning the truth about dead agents' *physical* whereabouts. A person who has recently died and whose body has already been disposed of may continue to be processed by an offline social system for an undetermined period of time. This place error is seemingly compounded by nonnegotiable simulation constraints that tempt us into reasoning about these dead agents' continued psychological functioning (as discussed in the previous section).

2.3. By-product versus functional analyses of belief in immortal souls

> THE CHILD: I'm frightened.
> THE WOMAN: And so you should be, darling. Terribly frightened. That's how one grows up into a decent, god-fearing man.
>
> — Jean-Paul Sartre (1937/1969), *The Flies*

There may be good reason to argue that natural selection operated on the foregoing psychological biases. Representations of the afterlife are culturally recurrent, proximally driven by emotions, frequently implicated in social and reproductive matters, and superficially fitted to the ecological niche in which the human organism develops (Bering & Bjorklund 2004; Dechesne et al. 2003; Reynolds & Tanner 1995). These features are consistent with what we know about the nature of psychological adaptations (Bjorklund & Pellegrini 2002; Tooby & Cosmides 1992). This is not to say that *specific* afterlife beliefs – the culturally variable vicissitudes of the hereafter – are direct products of natural selection. As will soon be discussed, investigators such as Boyer (2001) and Atran (2002) have shown that the "selection" of explicit religious ideas occurs at the cultural level, with the "survival" of such ideas being a feature of their ability to become ensconced in the evolved architecture of exposed human minds (Sperber & Hirschfeld 2004). Instead, it is to argue that the subtle contours of a uniquely human adapted design may stand out when closely examining the folk psychology of souls, an intuitive pattern of reasoning that does not appear to hinge on the presence of explicit religious concepts per se (Bering 2002a).

But how might a representational bias for envisioning personal immortality have impacted the net genetic fitness of individual humans in ancestral environments? Unfortunately, among cognitive scientists, scant attention has been paid to the evolutionary significance of the human capacity to represent the self *sub specie aeternitatis* ("under the aspect of eternity"). Instead, many scholars categorize afterlife concepts in the same way they do other types of religious concepts, as especially virulent strains of culturally transmitted ideas that are highly effective at pirating core cognitive architecture (Atran 2002; Boyer 2001; for an exception, see Baron-Cohen 1999). According to this perspective, only the cognitive architecture itself can be the product of natural selection; religious ideas are seen as simply being parasitic on this evolved architecture – as nothing more than noise that shares a general frequency between cultures (e.g., Pyysiäinen 2001; Sperber & Hirschfeld 2004). For example, in his book *Religion Explained*, Boyer (2001, p. 40) writes: "People have religious notions and beliefs because they acquired them from other people. On the whole, people get their religion from other members of their social group."

Boyer and other *cultural epidemiologists'* view afterlife concepts, as well as other types of supernatural concepts, as unavoidable carryovers of cultural selection. Specifically, Boyer (2000; 2001) has argued that religious ideas exploit information-processing mechanisms into paying attention to them because they violate ontological regularities by hybridizing or transgressing natural categories (see also Mithen 1996). Thus, religious ideas are especially likely to attach to evolved cognitive templates that are designed for reasoning about exemplars from natural categories – such as PERSON or ANIMAL – because these templates act as flypaper for salient, "counterintuitive" cases (Atran & Norenzayan 2004; Barrett 2000; 2004; Pyysiäinen 2001; Slone 2004; Sperber & Hirschfeld 2004). According to Boyer (2003a), then, a ghost is a person who is without a physical body and as such is a conceptually seductive idea. The concept of an afterlife therefore is easily generated and transmitted between minds. Like all other religious concepts, however, it is otherwise treated as a biologically sterile by-product.

Similarly, Sperber and Hirschfeld (2004, p. 44) write that, "explaining religion by a religious disposition lacks insight and plausibility." Instead, these scholars argue that religion is a non-adaptive by-product (i.e., a spandrel), one that arises through adapted human cognition acting in concert with culturally migrating counterintuitive concepts that change shape both within and between minds (for critical reviews, see Alcorta & Sosis 2005; Bulbulia 2004; 2005; Sosis & Alcorta 2003).

2.4. Inhibition and the preservation of reputation

I believe that I am in hell, therefore I am.

—Arthur Rimbaud (1873/1999), *A Season in Hell*

Once the ability to entertain supernatural agent concepts evolved, such ideas might have led our ancestors to inhibit socially proscribed actions out of the fear that gods or dead agents, now "full access strategic agents," were watching them (Boyer 2001). Some empirical support for this general argument was found in a recent study by Bering et al. (2005). In this study, undergraduate students who were casually told that a ghost was recently spotted in the laboratory were less willing to cheat on a competitive computer task – as measured by latency of response to delete the "accidentally" revealed answer – when they were tested alone in the room than were control participants who heard nothing of the fictitious ghost (see also Burnham & Hare, in press; Haley & Fessler 2005). In the case of supernatural beliefs, therefore, it is helpful to highlight Haselton and Buss's (2003, pp. 29–30) general adaptationist point that, "the human mind is designed to reason adaptively, not truthfully or even necessarily rationally." The genetic fitness effects of such behavioral inhibition have real currency in natural selection theory.

The relationship between supernatural morality and behavioral inhibition is potentially a very important point for evolutionary biologists. Because natural selection is pragmatic, the illusion of a supernatural morality, if it served to curb selfish behaviors and thus preserved social reputation in the ancestral past, may be an illusion by design (Alcorta & Sosis 2005; Bering 2005; Bering & Johnson 2005; Bering et al. 2005; Boyer 2001; Bulbulia 2004; Dunbar 2004; Hinde 1999; Johnson & Krüger 2004). Many writers have argued that, at some point in the recent evolutionary past, hominid sociality underwent a relatively abrupt shift that was characterized by strong selective forces operating on reputation-related behaviors (Alexander 1987, p. 110; Bering & Bjorklund, in press; Bering & Shackelford 2004; Daly & Wilson 1994; Emler 1994; Frank 1988; Goffman 1959, 1963; Hilton et al. 1993; Schelling 1960; Wright 1994). Because of the risks associated with social detection of selfish acts, and the peculiar "stickiness" of bad reputations (e.g., Baumeister et al. 2001; Goffman 1963), psychological traits that facilitated the inhibition of selfish acts were likely subjected to natural selection. The costs of underestimating the risk of social detection would have been disproportionately greater than the costs of prosocial decisions that were contextually maladaptive. Even if altruism was costly *every* time, if it avoided a lethal cost *once*, those other costs would become negligible (Nettle 2004).

Experimental findings of prosocial behavioral change in light of supernatural primes (e.g., Bering et al. 2005) also link up with the ethnographic database concerning afterlife beliefs. In some religious ideologies, the fate of the soul *after death* is determined by the social behaviors of the individual *during life*. Reflections on the ultimate consequences of (im)moral actions (e.g., whether the soul is expelled to Hell or dissipated in nirvana) should be capable of exerting a causal influence on today's overt behavior, which would have the effect of preserving reputation by encouraging the inhibition of selfish acts or facilitating self-control. In the United States, for example, the majority (79%) of people believe that there will come a day when God judges them and decides whether they will go to Heaven or Hell (Gallup Organization 1999; see also Lester et al. 2002). For current purposes, such poll data may actually be misleadingly low. What people say they believe about the supernatural and how they implicitly reason are quite different things (Subbotsky 1997; 2001). Scientific knowledge about causal relations between behaviors and consequences may therefore destabilize this adapted system, but more by overriding supernatural beliefs than by replacing them (McCauley 2000; Subbotsky 2001).

In many traditionalist religious societies, the emphasis is on worldly punishment for moral transgressions, whereby norm violators are visited by sickness, poverty, or other types of misfortune (see Bering & Johnson 2005). Mostly, punishment is seen as being imposed by disgruntled ancestors (Hinde 1999; Reynolds & Tanner 1995). In some cases, belief in the vicarious punishment of dead agents achieves similar prosocial effects. In medieval Europe, where people's social behaviors were thought to determine the fate of dead loved ones whose souls were at limbo in purgatory, thoughts of the dead were so prevalent in the daily affairs of the living that at least one historian has even referred to the dead as constituting a separate "age group" (Davis 1977; as cited in Luria 2001).

Although critical developmental studies have yet to specifically address the etiology of full-access strategic agent concepts and their consequences for behavioral inhibition, some related findings with young children do point to a human cognitive system prepared to reason about "omniscient" supernatural agents (Bering 2005; Bering & Johnson 2005). In a recent study, Barrett et al. (2001) report that because, theologically, God is all-knowing and therefore cannot hold false beliefs (and therefore cannot be deceived), the social cognitive systems of young children may be better suited to reasoning about the culturally postulated mind of God than about the epistemologically limited minds of humans and other animals. For example, whilst 3-year-olds *incorrectly* reason that a naïve person knows the true contents of an inaccurately labeled box, they *correctly* reason (at least, in a theological sense) that God knows the true contents as well. Thus, according to the authors, because of egocentric biases in early childhood, there may be cognitive precursors for full access strategic agent concepts that developmentally precede even natural mental agent concepts.

3. Souls and intelligent design

The concept of man in the mind of God is comparable to the concept of paper-cutter in the mind of the manufacturer, and, following certain techniques and a conception, God produces man, just as the artisan, following a definition and a technique, makes paper-cutter. Thus, the individual man is the realization of a certain concept in the divine intelligence.

— Jean-Paul Sartre, *Existentialism and Human Emotions*

However, to understand the relationship between belief in gods or other supernatural agents who are interested in our social behaviors and belief in immortal souls requires that we disentangle several related strands of causal reasoning. Consider that if God does not exist, then the

unique self (i.e., the individual "soul" of any given person) cannot be the product of intelligent design; rather, it is simply the end product of standard machinations of genetic and environmental recombination. If the soul is not the product of intelligent design, then there is no teleological function that it is designed to fulfill, no *raison d'être* to explain its existence beyond human attributions of purpose. The task remains for cognitive scientists to determine why the teleological position is so frequently adopted, and prospers so vehemently, over the mechanistic alternative. The human mind cannot seem to easily accommodate itself to a godless, evolutionary canon when it comes to the self's existence.

In fact, resistance to the mechanistic theory of natural selection may have as much to do with a cognitive bias toward intentionality as it does with an emotionally laden or moralistic bias. Recent findings converge to show that humans have a strong teleological bent when it comes to reasoning about the origins of artifacts, animals, and natural objects (e.g., Evans 2001; German & Barrett 2005; Kelemen 2004; Kelemen & DiYanni 2005). Kelemen (2004) has even gone so far as to dub children "intuitive theists" because of their so-called "promiscuous teleology." According to Kelemen, most young children would prefer the teleo-functional explanation that a cloud is "for raining" rather than assent to the experimenter's suggestion that perhaps raining is just something that a cloud does. This cognitive bias shows that young children are "endorsing the view that natural entities are 'made for something' and that is why they are here" (Kelemen 2004, p. 295). In a similar vein, Evans and her colleagues have found evidence that most young children prefer creationist arguments over evolutionary ones when reasoning about the origins of species (e.g., Evans 2001).

Teleological reasoning is often applied to the origins of the self, as well, such as talk about what one was "born to do" or that one is leading a life that he or she was not "meant for." Indeed, the term *conceive* (from the Latin *concipere*, "to take in and hold"), though originally used to describe impregnation ("to take into the womb, become pregnant"), was within that same century (c. 1280–1340) adopted to describe an intentional mental process ("to take into the mind").

The tendency for people to reason about the special purpose of the unique self may differ from other forms of teleo-functional reasoning in two important ways. First, it appears to be much more resistant to scientific knowledge. Although teleo-functional beliefs about natural objects are found in Romanian Gypsy adults, a group that does not possess scientific knowledge regarding natural artifact origins (see Kelemen 2004), they generally decline with age and are relatively rare among scientifically educated adults. In contrast, ascriptions of intelligent design when reasoning about the purpose of individual lives appear to remain stable (and perhaps even increase) over the life course, probably due to the accrual and retrospective interpretation of autobiographical experience (Bering 2003b; Bruner 2001; McAdams 2001).

Second, when it comes to lay beliefs about souls, attributions of purpose occur frequently for individual members of the same conceptual family. People tend to ascribe special purpose more often to the specific case – such as "what am *I* meant for?" – than they ascribe shared purpose to members of the same natural category – such as "what is the *human species* meant for?" For no other natural categories do such special teleological ascriptions seem to occur. (Imagine an evolutionary biologist hypothesizing about the special purpose of a specific heart of a specific organism of all the possible such organisms within a given species.) Even for artifacts, teleo-functional judgments for class categories (e.g., CHAIR) appear to trump within-category exemplars (e.g., both a gothic revival style and a Chinoisserie style chair are "for sitting" although they may differ in design for posturing the body), and rarely occur within the exemplar class itself (e.g., the special purpose of an individual Chinoisserie style chair) (Defeyter & German 2003).

The categorical question "Why am I here?" is important for evolutionary analysis because it may set the stage for an obligatory social relationship between the self and its presumed supernatural creator. If this cognitive illusion, enriched with social affect, plays a causal role in generating genetic fitness-enhancing responses (e.g., through the individual's behavioral compliance with moral norms which the creator is believed to have authored), then an adaptationist hypothesis for the folk psychology of souls gains support.

The tendency to endow human lives with an a priori meaning is particularly obvious in the wake of recent loss. Despite differences in religiosity, individuals who are in mourning commonly report feeling a sense of meaninglessness (Davis & Nolen-Hoeksema 2001; Golsworthy & Coyle 1999; Smith et al. 1992; Yalom 1980). Such existential despair, characteristic of the early stages of the grieving process, betrays people's implicit belief that they are part of a privileged social relationship with some abstract agent who exerts a causal influence over their everyday lives. Many types of "premature" death (e.g., accidents, fatal illnesses, homicides) seem to force surviving individuals to acknowledge that this privileged social relationship is illusory: the existence of the self is abruptly surrendered to a veridical belief in the fundamental and mindless laws of natural probability. The resulting existential despair can be attributed to the realization that the predictability and controllability of one's own death, like that of the decedent's, is in actuality very low.

In this light, there is no emotionally invested God who favors or disfavors the continued survival of the self. Consequently, whatever social contracts previously entered into with this nonexistent agent that led the self to expect a *reasonable* deferment of death until old age are exposed as being spurious. Avenues by which individuals may reenter into this illusory contract include "just world" beliefs (e.g., by reasoning that the person must have been somehow deserving of death), and judging that the decedent was different from themselves (and thus unlikely to have been in the same sort of privileged social relationship with God) (e.g., Hafer & Bègue 2005; Lerner 1980; Lerner & Miller 1978; Pyszczynski et al. 1995).

The fact that most individuals do tend to reenter into these illusory social contracts, even in the face of seemingly egregious violations, suggests that the affective push to do so is capable of overthrowing any rationalist *Weltanschauung*. However, if this is the expression of an evolved system, as the current model alleges, then any explicit philosophical position that discards meaning is naturally disadvantaged, because the self can no sooner

"choose" to be a subjective atheist than retinas can "choose" not to convert light energy into signals that are carried to the brain by the optic nerve (Bering 2005; McCauley 2000). Adapted psychological systems, by definition, determine the way that information can be processed due to design solutions in the brain that were engineered by natural selection. In the present case, just as we can close our eyes to prevent light from being converted into neural signals, science may provide a minority (i.e., nonbelievers) with the armamentarium to close their eyes to the supernatural.

3.1. Suicide as a violation of intelligent design

> I condemn that nature which, with such impudent nerve, brought me into being in order to suffer – I condemn it in order to be annihilated with me.
>
> —Fyodor Dostoyevsky (1877/1949), *Diary of a Writer*

Public opinions concerning suicide further serve to highlight the role of the design stance in the existential domain. Those who believe that one's life is owned by God are more likely to view suicide – as well as abortion, capital punishment, and medical euthanasia –as being morally wrong (Ross & Kaplan 1994; Worthen & Yeatts 2001). It is not suicide per se that sheds light on this teleo-functional bias, but the moral repugnance for the act. Religious rules against suicide reveal a more complex cognitive stance than is immediately apparent. It is a counterintuitive stance in which the self's will is seen as imposing itself over the will of the creator of the self's will. According to the premise that a person's life belongs to God, an individual does not have the right to purposefully cause his or her own death, because this right is seen as being God's alone. This conception suggests that suicide is viewed as a moral transgression in which an individual "cheats" God by stealing the latter's power of intentionality in causing the self's death. Suicide therefore becomes a form of intellectual theft; the self redesigns its end in an act of mutiny against its creator.

Suicide must be distinguished from acts of martyrdom, in which an individual engages in self-sacrifice as a political or wartime strategy (e.g., "suicide bombers" or kamikaze pilots) (Atran 2003). Even here, however, we see how intentionality critically underlies the folk psychology of souls. Although suicide is treated as a sin by many of the world's religions, including Islam, those who are martyrs are seen by some religious adherents as having been chosen by God to fulfill His wishes and as being rewarded with special experiential luxuries in the afterlife. For example, during World War II, one of the most intense and successful military operations ever launched by Japanese fighter pilots against an American fleet was deemed "Operation Heaven" by the Japanese commander (Blanchard n.d., p. 17), and "kamikaze" is literally translated as "divine wind."

The religious messages that are conveyed by charismatic leaders may be especially seductive because they capitalize on an innate teleological bias for ascribing a special purpose to the unique self. For example, in a transcribed television interview from CNN in 1997, Osama Bin Laden commented that: "We believe that no one can take out one breath of our written life as ordained by Allah. We see that getting killed in the cause of Allah is a great honor wished for by our Prophet." When juxtaposed with simulation constraints concerning what the afterlife may be "like" for those who sacrifice themselves for prosocial in-group reasons, this becomes a particularly volatile social cognitive phenomenon since martyrs are promised privileged states of consciousness after death. As one member of the Palestinian group Hamas put it: "By pressing the detonator, you can immediately open the door to Paradise – it is the shortest path to Heaven" (Hassan 2001).

4. Meaning, morality and the afterlife

> Some say that we shall never know and that to the gods we are like flies that the boys kill on a summer day, and some say, on the contrary, that the very sparrows do not lose a feather that has not been brushed away by the finger of God.
>
> —Thornton Wilder, *The Bridge of San Luis Rey*

Because the adjudication of an afterlife of eternal reward or damnation is seen as superseding "mere" human authority, people's understanding of the *origins* of moral deontology – what one *ought* and *ought not* to do in life – shows a strong cognitive bias toward belief in a supernatural creator of human morality (rather than, for instance, a bias toward belief in design by nature or human whim). Reincarnation beliefs that rely on karmic principles are no exception because such principles require an intelligent designer of this morality-based rebirthing cycle. This overall vein of reasoning helps to explain why people expect divine retribution for moral transgressions only, rather than, say, for breaches of social etiquette (e.g., Roes & Raymond 2003). As Camus (1943/1991) writes, "revolt against men is also directed against God" (p. 94). From a genetic fitness perspective, what is important is that it is moral transgression that scars reputation most deeply and has the most costly effect on future social relations (Goffman 1963) and therefore behavioral compliance in this domain is critically important.

Surprisingly, cognitive scientists who study religion have given the topic of morality relatively short shrift. For example, Atran and Norenzayan (2004) recently argued that culturally acquired supernatural concepts (cf. Boyer 2001) receive emotional staying power because they are lent support by an evolved *hyperactive agency detection device* (see also Atran 2002; Barrett 2000; Guthrie 1993). According to Atran and Norenzayan, this mechanism serves the protective function of hyper-vigilance in potentially dangerous environments, but as a consequence, affectively primes individuals and causes them to overattribute intentions to the natural world, such as might happen when a branch falls in the forest. The authors conclude that "supernatural agents are readily conjured up because natural selection has trip-wired cognitive schema for agency detection in the face of uncertainty" (Atran & Norenzayan 2004, p. 720). In particular, supernatural attributions occur because environmental stimuli "achieve the minimal threshold for triggering hyperactive facial-recognition and body-movement recognition schemata that humans possess" (p. 720).

Atran draws on findings from developmental psychology showing that agency overgeneralization is an innate

feature of human cognition. For instance, in a variety of controlled experiments using nonverbal measures, Csibra and his colleagues have demonstrated that, if causal cues indicating rational agency are present, even infants see inanimate movement as purposive behavior (e.g., 12-month-olds ascribed intentions to dots on a computer screen moving about in a "rational" manner; see Gergely & Csibra 2003).

Despite minor theoretical differences with Boyer's evolutionary model of religion, Atran (2002) is united with Boyer and other cultural epidemiologists in denying that religion is an adaptation. However, although the explanatory utility of cultural epidemiology theory has been unrivaled among recent attempts to explain the evolutionary basis of religion, it has problems of its own. By focusing on the role of concept acquisition, this work may be overshadowing more fundamental questions about the natural foundations of religion – questions raised in section 3 (Souls and intelligent design). For example, Atran and Norenzayan's (2004) model fails to account for people's tendency to assume that supernatural agents are responsible for traumatic life events (Deridder et al. 1999; McAdams 2001; Pepitone & Saffioti 1997; Weeks & Lupfer 2000). How can reasoning about the supernatural causes of, say, suffering a miscarriage, being felled by disease, or losing a loved one in an accident be triggered by facial-recognition and body-movement recognition schemata? There are no such environmental cues capable of breaking the "hair trigger" of the authors' proposed sensory driven hyperactive agency detector, yet supernatural attribution occurs (arguably even more so than for the exemplar hair-trigger cases).

Another approach to solving the riddle of religion is to address whether the self's view that it is something more than a material body subject to the mindless and amoral laws of nature is a product of natural selection (Dennett 1991; 1995). Evolutionary scholars in this area might then begin to shift the primary theoretical frame from one that centers on concept acquisition and agency detection to one that centers on models of self representation, morality, and meaning (Bering 2002b; 2003b). Although these approaches likely reflect complementary levels of analysis rather than alternative theoretical models, the cultural epidemiology approach has, to date, not successfully bridged the representation of supernatural concepts with the Darwinian currency of behavior. What is required to bridge this gap is the self, a conspicuously absent entity in the cognitive science of religion.

4.1. "Signs": Ascribing meaning to natural events

> The intentional stance is the strategy of interpreting the behavior of an entity (person, animal, artifact, whatever) by treating it as if it were a rational agent who governed its "choice" of "action" by a "consideration" of its "beliefs" and "desires" . . . the basic strategy of the intentional stance is to treat the entity in question as an agent, in order to predict –and thereby explain, in one sense – its actions or moves.
>
> —Daniel Dennett (1996), *Kinds of Minds*

If people naturally endow the events of their lives with a hidden purpose, the self may then hold expectations about the "behaviors" of supernatural causal agents, canonical expectations that conform to standard rules of fairness and justice. Research on just-world beliefs shows that people indeed operate under the assumption that others "get what they deserve," especially when they have little control over negative outcomes and when help cannot be meted out to unfortunate innocents (for a recent review of this literature, see Hafer & Bègue 2005). Although just-world researchers have not generally sought to interpret related religious notions, often implicit in this type of causal reasoning about fortune and misfortune is the idea that some behavior in the moral domain is connected to an unrelated, uncontrollable life event. Therefore, a central question is "who" is represented as tallying up our deeds and as meting out just deserts in the form of positive and negative life events (in whatever ontological domain these happen to be administered).

Bruner (1990) has argued that, in everyday social psychology, individuals will search for meaning whenever others' behaviors violate their expectations, or otherwise fail to adhere to sociocultural scripts. For example, subtle breaches of conversational maxims, such as non sequiturs or other types of "conversational implicatures," will often encourage a search of the partner's intentions (see also Baldwin & Moses 1996; Baron-Cohen et al. 1997). Whenever unexpected autobiographical events occur, individuals may similarly seek to identify the intentions of the supernatural agent who has caused these events (or at least allowed them to happen), because this is presumably a *purposeful* agent who adheres to unwritten rules of social reciprocity (Bering 2003b). In Nazi Germany, for instance, some Holocaust survivors reportedly thought that God had gone insane, since clearly he had breached the most basic of social agreements with his followers (see Wiesel 1961).[3]

This belief in a just world is so strong, in fact, that among many groups personal calamities and hardships are taken as evidence that the individual must have done something horribly wrong. Often the only suitable remedy for these hardships is spiritual excision by way of public confession. Among the Igbo of Nigeria, for example:

> [a]dultery by a wife is regarded as bringing supernatural punishment upon herself and her husband . . . thus if a woman experiences difficult labor, it is assumed that she has committed adultery and she is asked to give the name of her lover in order that the child be born. If a man falls sick, his wife may be questioned as to whether she has committed adultery. (Ottenberg 1958/1980, p. 124)

There may also be "nonreligious" developmental precursors to this moralistic interpretation of uncontrollable negative events. Piaget (1932/1965) argued that young children evidence a belief in *immanent justice* in which "the child must affirm the existence of automatic punishments which emanate from things themselves" (p. 251). Thus, in a classic study, Piaget (1932/1965) presented children aged 6–12 years with the story of a child who steals or disobeys and then, upon crossing a bridge, falls into the water when the bridge collapses. Nearly all (86%) of the youngest children in the study reasoned that the accident would never have happened were it not for the character's earlier misdeeds.[4]

Indeed, people who have violated some moral rule often appear expectant of existential punishment, and those guilty parties who find themselves untarnished by their wrongdoing may feel as though their current happiness is undeserved. This is another common theme in

literature, exemplified by the works of Victor Hugo (e.g., *Les Miserables*) and Fyodor Dostoyevsky (e.g., *The Brothers Karamazov, Crime and Punishment*). Landman (2001), a narrative psychologist, tells the true story of a fugitive who drove the getaway car in a heist that left a security guard dead. Decades later, this woman "obsessed with a desire to be punished, to seek expiation" (Franks 1994, p. 54) turned herself in to clueless authorities. Asked why she confessed, the now model citizen told her lawyer that "my strongest weapon against suicide is my contract with God . . ." (Franks 1994, p. 42).

In many societies, not only is supernatural punishment envisioned to fall directly upon the heads of the wicked, but is also believed to be sanguineous. Some supernatural agents are seen as unforgiving and merciless, inflicting lasting and far-reaching punishments across generations (Bering & Johnson 2005). Perhaps the worst punishment of all would be for one's biological relatives, especially offspring, to be cursed for the self's misdeeds. This is a particularly recurrent theme and is illustrated very clearly in the following brief passage on the Pagai from a Dutch missionary publication:

> A missionary once acted emphatically against various [superstitious] prohibitions in order to demonstrate their inefficacy. Actually this made a totally wrong impression on the people because they said: "The man knows perfectly well that he himself won't be punished but that the punishment will fall on his children." (Anonymous 1939, p. 9)

Recent laboratory findings suggest that there may be identifiable cognitive developmental milestones that promote the pan-cultural human tendency to see "signs" or hidden messages in natural events. In a study by Bering and Parker (in press), 3- to 9-year-old children were informed that an invisible agent (Princess Alice) would help them play a forced-choice game by "telling them, somehow, when they chose the wrong box," whereas a matched control group of children were not given this supernatural prime. On two *unexpected event* trials, as soon as the child chose a box, an experimenter triggered a simulated unexpected event in the laboratory (i.e., a light turning on/off; a picture falling), and children's response to these events (i.e., moving their hand to the opposite box) was coded. Thus, the study sought to determine the age at which children first begin to view natural events as being *about* their behaviors and as stemming from the mind of a communicative supernatural agent.

Results showed a significant interaction of age group by experimental condition. The only children to reliably move their hand to the opposite box in response to the unexpected events were the oldest children ($M = 7$ years, 4 months) who were primed with the invisible agent concept. Whereas 82% of these oldest children assigned to the experimental condition (and therefore told about Princess Alice) changed their response, only 18% of same-aged children in the control group (who were not told about Princess Alice) moved their hand to the opposite box after the unexpected event. For children's post-test verbal explanations, also, only the oldest children from the experimental group saw the unexpected events as being *referential* and *declarative* (e.g., "Princess Alice did it because I chose the wrong box"). In contrast, younger children ($M = 5$ years, 6 months) saw the event as being intentionally caused by the invisible agent (e.g., "Princess Alice did it because she wanted to"), whereas the preschoolers ($M = 4$ years, 1 month) did not invoke the invisible agent at all, but only physical causes for the event (e.g., "The picture fell because it wasn't sticking very well").

Although the cause of these age differences is controversial, these findings nevertheless demonstrate that the tendency to over-attribute intentions to the natural world is not simply a matter of hyperactive agency detection (e.g., Atran 2002; Atran & Norenzayan 2004; Barrett 2000; Guthrie 1993), but rather it *also* involves, at least in older children and adults, making inferences of communicative meaning within a social context. In this case, the specific supernatural agent concept (Princess Alice), which may be a rough analogue of culturally specific supernatural agents, appeared to map onto this inferential capacity for seeing signs in natural events. Furthermore, these *subjective* inferences gave way to *objective* behaviors, which is the primary currency of natural selection. An event such as a picture falling to the ground is not, in itself, a communicative event; it can become so only through the phenomenal properties of the child's mind ("what is the *meaning* of the picture crashing to the floor, precisely at this moment in time?").

5. Conclusion

In reviewing the available – though still very limited – evidence, there are good conceptual grounds to argue that natural selection may have set to work on specific human cognitive errors. These include simulation constraints leading to Type I errors in reasoning about the afterlife, teleo-functional errors leading to belief in the soul's intelligent design, and theory of mind errors fostering a belief that natural events were intentionally caused by supernatural agents. The resultant cognitive system created the functional illusion that the social behaviors of the self "mattered" outside of human relations. As a consequence it became morally tamed under the auspices of this existential rubric and therefore was less likely to engage in acts that, if publicly exposed and harmful to one's social reputation, seriously impaired genetic fitness.

The present article has also served to lay out some general future directions for investigators to more precisely explore the Darwinian mechanisms at the heart of the existential system outlined here. Such work can further reveal how the standard architecture of ancestral human minds was co-opted by natural selection to create the functional illusion of an intelligently designed, immortal soul that was under nearly unbreakable moralistic contract with the natural world.

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NOTES

1. This is as in various physical resurrectionist beliefs, such as the Anabaptist doctrine of "soul-sleep," in which the soul is said to hibernate, or lie in wait, until it may reanimate the physically reconstituted body.

2. The simulation constraint hypothesis is indirectly supported by recent findings of egocentric social cognitive biases in adults (Epley et al. 2004). Epley and his colleagues found that participants' eye gaze preferentially moved to privileged visual space in response to an experimenter's ambiguous referential communication. For example, the command "move the bunny" elicited automatic eye gaze toward a stuffed bunny that could be seen by the participant, but which was occluded from the experimenter's perspective, over a chocolate Easter bunny to which both the participant and experimenter had visual access. The authors argue that these findings show that egocentrism is just as prevalent in adults as it is in young children. Adults, however, more rapidly correct their egocentrism to adjust for others' limited knowledge (e.g., by quickly shifting their gaze and moving the chocolate Easter bunny). If, as Epley et al. (2004) reason, individuals do become better with experience at making adjustments to correct for their initial egocentric views, but then rely on simulation to revise their social attributions, then even the best perspective-taking skills should falter when it comes to reasoning about dead agents' "perspective-less" minds. This is because any attempt at correcting for egocentrism by using simulation would still run up against simulation constraints (e.g., "does he *know* that he's dead?") and generate attributions of continued psychological functioning. Indeed, this is what is generally found.

3. The atrocities of the Holocaust forced many survivors to question God's "benevolent" intentions, apparently prompting some Jews to revise their theological views to accommodate the possibility that God is in fact morally corrupt. Nowhere is this theme more salient than in the semi-autobiographical chronicles of Holocaust survivor Elie Wiesel. In *Gates of the Forest*, Wiesel (1966, p. 197) writes:

> In a concentration camp, one evening after work, a rabbi called together three of his colleagues and convoked a special court. Standing with his head held high before them, he spoke as follows: "I intend to convict God of murder, for he is destroying his people and the law he gave to them . . . I have irrefutable proof in my hands. Judge without fear or sorrow or prejudice. Whatever you have to lose has long since been taken away." The trial proceeded in due legal form, with witnesses for both sides with pleas and deliberations. The unanimous verdict: "Guilty." . . . [But] after all, He had the last word. On the day of the trial, He turned the sentence against his judges and accusers. They, too, were taken off to the slaughter. And I tell you this: if their death has no meaning, then it's an insult, and if it does have a meaning, it's even more so.

4. In his *Bridge of San Luis Rey* (1927/1955), Thornton Wilder fictionalizes the sad tale of a collapsed bridge in eighteenth century Peru that brought five travelers to their deaths in the abyss below. In two chapters, one titled "Perhaps an Accident" and the other titled "Perhaps an Intention," Wilder describes how the resident monk, Brother Juniper, troubled by the seeming arbitrariness of this horrific event, embarks on a "scientific experiment" to reveal why God chose to end the lives of *these five* people rather than *some other five*, by collecting and analyzing the facts and details of each person's value in terms of goodness, piety, and usefulness. Alas, "the thing was more difficult than he had foreseen" and his quest for spiritual understanding went unresolved. In a case of life imitating art, 14 people lost their lives in 2001 when a runaway tugboat rammed two barges into an interstate bridge and caused about a dozen cars to collapse into the Arkansas River. One of the victims was a young army captain and father of four from California on his way home to Virginia. *The Oklahoman* newspaper reported that his commanding officer, echoing the thoughts of Brother Juniper, "pondered the odds of making a 2,929-mile drive and landing on a 500-foot stretch of bridge that, in the most bizarre of accidents, plummeted precisely as he crossed it. 'If [he] just stopped at a rest stop or stopped to get gas . . . There's just so many variables—and the timing.'" (Owen 2002).

Open Peer Commentary

Simulation constraints, afterlife beliefs, and common-sense dualism

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Abstract: Simulation constraints cannot help in explaining afterlife beliefs in general because belief in an afterlife is a precondition for running a simulation. Instead, an explanation may be found by examining more deeply our common-sense dualistic conception of the mind or soul.

Early on in his stimulating target article, Bering notes that the ability to conceive of an afterlife requires a dualistic conception of the relation between the conscious mind or soul and the body; and he is sympathetic (as I am also) to the idea that our common-sense concept of the mind/soul is dualistic, and in all likelihood innate. An important question for Bering is "how . . . we get from the common-sense dualism of infants to beliefs of the afterlife [. . .]" (target article, sect. 1, para. 4). And a major part of his answer is given by his "simulation constraint hypothesis," the idea that afterlife beliefs are explained by our attempts to mentally simulate "what it's like to be dead": putting ourselves "into the shoes" of dead agents, we are compelled to ascribe to them mental states.

While simulation constraints may help explain the specific types of mental states we project into the afterlife (as Bering argues), I do not think they can help explain why people believe in an afterlife in the first place. The point of a mental simulation, after all, is to generate conclusions about an agent's mental states or behaviors (with the type of simulation run depending on the types of mental states or behaviors about which one wishes to derive information). The cognitive mechanisms involved in planning simulations, accordingly, must assume the existence of a mind – namely, that mind into the nature of which one aims to gain insight through simulation. But this must hold for the afterlife case too: prior to simulating a dead agent's mind, it must be assumed there is a mind to simulate. But that *already* is to assume an afterlife. This mind/soul may be taken to be phenomenally rich, or relatively barren (experiencing "darkness," "nothingness," or what have you), but it must be taken to exist, at least implicitly. Notice that Bering seems to grant this in referring to "simulation strategies to derive information *about the minds* of dead agents" (sect. 2.1, para. 1, emphasis mine). It follows that nothing about a simulation itself can explain our belief in an afterlife, since some such belief or assumption is a precondition for the planning and running of any such simulation.

If that is right, how might afterlife beliefs be explained? I believe that the route from our common-sense dualism to

afterlife beliefs is considerably shorter than Bering supposes. Afterlife beliefs may fall out quite directly from how our common-sense dualism is conceived. It may follow from our dualism that the destruction of a person's body has no bearing whatsoever on the existence of his or her mind/soul – much as it is entailed by my common-sense conception of the apple and orange in my refrigerator that eating the apple will leave the orange intact. Most of the work in explaining afterlife beliefs on this view, therefore, will be done by a detailed account of our concepts of our body, mind/soul, and their interrelations (and how the question of an afterlife arises).

Regardless of the extent of the gap between our common-sense dualism and afterlife beliefs, discovering how one gets from the former to the latter will require a detailed characterization of our dualist conception, something we currently lack. We would thus do well to examine the features of our conception of the mind/soul that are implicated in our conceiving the mind and body as distinct. It will not do simply to say that we conceive of the body and soul as ontologically distinct, and leave it at that, because we must understand the particular type of distinctness involved, and how it is grounded in the concepts of body and soul. (Objects and events are also ontologically distinct categories, but are interdependent in ways that bodies and souls are not.) We should examine our conceptions of ourselves as conscious beings, selves, experiencers, and "witnesses"; of the mind/soul as being essentially private, "internal," subjective, or phenomenal. For it is something about these conceptions, arguably, that makes the mind/soul seem so utterly unlike anything physical, that destroying the body can leave the mind/soul intact.

One way to tap children's understanding of the privacy and "innerness" of conscious phenomena is to explore children's understanding of dreams, imagery, and sensations, conceived of as private and "internal." I shall hint at some possible directions for research, with a few anecdotes. (Since I am not a psychologist, they should be taken with a grain of salt; with that said, their purpose is merely to illustrate some questions for investigation.) At age three, my daughter appeared to understand the idea that dreams involve "pictures in her head," and seemed able to sing her favorite song "in her head" and report when she had finished. She insisted that others could not see the pictures or hear the sounds "because they were hers," and found the suggestion that others might see them or hear them silly. (Interestingly, she also insisted that she did not *see* the pictures in her head; they were just there.) This conception of privacy also applied to sensations like pain. Also at age three, she went through a brief stage of lying about having hurt herself (for sympathy, hugs, etc.) when noticing her baby sister receiving attention. That she confidently lied about feeling pain in the presence of others suggests she believed her sensations were accessible only to herself.

Another matter to explore is children's capacity to conceive of objects, properties, and events in their experience as *merely phenomenal*. I have in mind the capacity to grasp that what appears in dreams is "not real," as well as grasping the concepts of hallucination (including radical hallucination, as in "The Matrix"), illusion, after-images, and the appearance–reality distinction more generally. One way to get at some of these issues may be to probe children's understanding of "inverted qualia," the idea that what you visually experience when looking at objects we both call "blue," for example, might be qualitatively very different from what I experience when looking at those objects. This idea can be explored intrasubjectively by adapting one of a child's eyes to bright light, and then having the child look at a uniformly colored object one eye at a time. The object's color will appear to alternate between two different shades. Assuming the child does not infer that he or she is causally affecting the object by blinking, some understanding of the concept of phenomenal color might be expected to reveal itself.

Conceptual abilities of these sorts enable Descartes to doubt away the physical world while his mind/soul (plus phenomenology) remains. This is a first step in Descartes' argument for dualism. However, it is also already very close to the idea of an afterlife, since it is the idea of a mind/soul existing without the physical world. This too suggests that the distance from our common-sense dualism to afterlife beliefs may be short, at least if our common-sense dualism is Cartesian in relevant respects.

Social cognition of religion[1]

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Abstract: Research on religion can advance understanding of social cognition by building connections to sociology, a field in which much cognitively oriented work has been done. Among the schools of sociological thought that address religious cognition are: structural functionalism, symbolic interactionism, conflict theory, phenomenology, and, most recently, exchange theory. The gulf between sociology and cognitive science is an unfortunate historical accident.

Bering is entirely correct that religious beliefs can help us understand the evolution of human social cognition, but I would go further to say that research on religious cognition could become the first span of a substantial bridge between the cognitive and the social sciences. Broad territories in my own field, sociology, are cognitive in nature, and I would venture to say that the largest troves of systematic data relevant to religious cognition have been collected by sociologists. Some of these data are freely available, such as the General Social Survey (sda.berkeley.edu) or the many questionnaire datasets at The Association of Religion Data Archives (www.thearda.com).

One function of Bering's article is to alert readers to the impressive group of cognitive or developmental psychologists and cultural anthropologists who have done so much good work on religious cognition over the past decade. This group, however, has ignored vast bodies of relevant social science literature, probably for two reasons. First, any new school of thought needs to mature in intellectual isolation, until its ideas are sufficiently well developed to stand critical scrutiny. We can call this the *allopatric principle of cultural innovation*, by analogy with allopatric speciation in biology: New cultural movements develop more readily under conditions of social isolation from existing movements.

Second, sociology, political science, to some extent economics, and even important portions of social psychology remained aloof thirty years ago when the multidisciplinary field of cognitive science was being formed. This tragedy was largely the result of misunderstandings and prejudices, augmented by turf defense and an unwillingness to do the hard work required to bring the disciplines together. Major schools of thought in sociology – structural functionalism (Parsons et al. 1951) and symbolic interactionism (Blumer 1969) – were predominantly cognitive, emphasizing concepts such as overarching values, social roles, group identity, and definitions of the situation. But these approaches made little use of rigorous statistical methodologies, and thus may not have seemed "scientific" enough to be included in cognitive science. For all its emphasis on ideology, the Marxist movement that was so influential in sociology claimed to be materialist, an example of false consciousness if ever there was one. However, Marxism informed conflict theory, and a cognitive scientist can draw from that broader tradition an awareness that sometimes language and even cognition itself may be moves in a game of social power (Habermas 1971).

A psychologist seeking cognitive research in sociology might find it in unexpected places. Cognitive scientists tend to dissociate themselves from behaviorism, which in psychology disparaged speculations about internal mental states. However,

in sociology behaviorism was remarkably cognitive in nature, as illustrated by the extended analysis of the exchange of advice for approval in *Social Behavior* by George C. Homans (1974). Influenced by Homans, later sociologists developed the exchange theory or rational choice explanation of religion: Humans seek many rewards that are not available, following cognitive explanations that become progressively supernatural in nature as the humans continually fail to attain the deeply desired reward. If the recent cognitive theories of religion lack an essential ingredient, it is the motivation that drives people to act upon religious cognitions, and to build complex and costly religious institutions. Sociological exchange theory often makes use of artificial intelligence computer simulation. This methodology has been applied profitably to religion, and one direct reinforcement neural net program showed that deprivation can cause an agent to develop minimally counterintuitive beliefs (Bainbridge 2006).

Phenomenological sociology and its cousin ethnomethodology are among the least rigorous approaches, but they still may have something to contribute. Bering's reports about how people conceptualize death are reminiscent of the insightful early work by theorist Alfred Schutz about the phenomenology of time. Schutz is especially famous for his work on multiple realities, which can be distinguished because their subjective flow of time is different, and religious experiences are a case in point (Schutz 1971). Less well known is his theory that humans conceptualize the future as a kind of past, seen as if it had already occurred (Schutz 1967), a contradiction not unlike that when people conceptualize a dead person: Dead is to alive as future is to past.

Potentially relevant empirical research in sociology is of many kinds, including historical accounts of the thoughts of religious leaders, ethnographies of religious movements, and a very well developed tradition of questionnaire research. Bering discusses suicide, and official statistics have been analyzed in ways relevant to cognition, suggesting that the power of faith to deter suicide is declining in advanced societies (Bainbridge, in press). Given Bering's emphasis on death, it is worth noting that the General Social Survey contains several questions about how people conceptualize the afterlife, and that the same questions have been administered to members of radical religious groups, allowing comparisons of such beliefs as how erotic the afterlife is (Bainbridge 2002).

Bering talks about morality, but does not introduce the extensive quantitative research on how religious faith does or does not shape behavior. Especially relevant is the research on juvenile delinquency. Consider the phenomenon I call the *Stark effect*, because Rodney Stark discovered it: "Religious individuals will be less likely than those who are not religious to commit delinquent acts, but only in communities where the majority of people are actively religious" (Stark 1996, p. 164). That is, in primarily secular communities, adolescents who believe in supernatural sanctions for misbehavior are just as likely as their irreligious peers to steal or vandalize property. In communities where the majority of adolescents are religious, the beliefs of the individual child are indeed predictive. Thus, cognition alone may not deter antisocial behavior.

A further complication is that many studies show that the Stark effect does not apply to hedonistic behaviors, and religious adolescents are less likely to use drugs or engage in sexual experimentation even in very secular areas. Perhaps religion serves an advisory function, helping to guide the adolescent's cognitive deliberations away from danger (Bainbridge 1992). This research area is still unsettled, and studies by cognitive scientists would be especially welcome.

NOTE

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Parenting, not religion, makes us into moral agents

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Abstract: The universal early experience of all humans, which means being totally dependent on caretakers who attempt to inculcate impulse control, should be considered as the psychological framework for the creation of significant supernatural agents. The same early experiences put us at the center of a moral universe, but there is no necessary connection between the two processes. We do not need disgruntled ancestors to make us behave; disgruntled parents will do.

"What came into existence beside the dead body of the loved one was not only the doctrine of the soul, the belief in immortality and a powerful source of man's sense of guilt, but also the earliest ethical commandments" (Freud 1915, p. 295). Bering, like Freud, ties religion to death and morality, and makes the startling theoretical claim that we should regard religion as an evolutionary adaptation, because it supports viewing the self as a moral agent. The universal tendency to tie misfortune (and blessings) to supernatural agents buttresses group cooperation and thus has great evolutionary value. One problem with this notion is theoretical, and has to do with cooperation and reputation effects. According to Ohtsuki et al. (2006), cooperation is a fundamental aspect of all biological systems, and among humans it can evolve even in the absence of reputation effects, but Henrich (2006), points out that the reputation effect may act to stabilize maladaptive and immoral behaviors.

Accounting for the parallel development of morality and religion should involve both panhuman experiences and innate tendencies. Both innate architecture and panhuman socialization processes lead to the universal perception of the self as moral agent. Evolved architecture leads, indeed, to an innate readiness to over-detect causality and intentionality. The three kinds of behavior described here – supernatural agents, ghosts, and magical thinking ("Princess Alice") – can all be accounted for by the general hyperactive agency detection mechanism, which operates to detect not just biological processes, or activity, but another consciousness or another mind. The survival value of detecting, and negotiating with other minds is so great that it accounts for this hyper-vigilance. Friend–foe identification enables us to be cared for and then take care of others.

Our early experience of our own consciousness and that of other conscious beings leads to our belief in the enormous power of the mind, our eternal soul. It was William James who already stated: "Religion, in fact, for the great majority of our own race, *means* immortality and nothing else" (James 1902, 1961, p. 406). Souls are important because they give us more information about promised immortality. The supernatural premise is fleshed out, so to speak, by enumerating the entities in the spirit world, most of whom must be human souls before birth and after death.

Some dead agents are psychologically important because we have known them and interacted with them; they informally join the pantheon outside the official hierarchy. The author's analysis of the role of the souls of the ancestors ignores the fact that dead ancestors were once live parents.

Our innate architecture also produces egocentrism, attachment-seeking, and the panhuman process of socialization. The human baby is hard-wired to seek a caretaker and find security as soon as it comes out of the womb (Bowlby 1973). The baby's helplessness is matched by the caretaker's readiness to create it in her own image. Socialization of the young aims at impulse control. They are asked to reduce their egocentrism and impulsivity in return for parental love. Whatever we call morality is tied to powerful bonds developed between children and caretakers. In all cultures, love is finite and conditional, and punishments and the withdrawal of love are frequent and swift.

Children are made into moral agents easily through socialization and social control mechanisms, as they are assigned blame and learn to blame others and especially themselves. The panhuman experience is that parents are the carriers of morality, as they convey to their children a fantasy of a world ordered into right and wrong, reward and punishment. The moral universe we all inhabit was developed in early childhood in our private consciousness, and it may be projected on the universe.

Do we need religion to support behavioral inhibition, as Bering claims? The basic pattern of socialization precedes the use of religious ideation. We are afraid of mother and father because they punish us, long before they become the souls of the ancestors. References to divine authority are sometimes used by parents to bolster their authority in disciplining children. Thus, the parents become allied with divine authority. Examples can be found in all cultures (Geertz 1960). Nunn (1964) found that this "coalition" with divinity was prevalent among parents who were ineffectual and powerless.

Bering correctly points out that the connection between morality and religion is rarely addressed in the behavioral literature. But this is true not only for cognitive science or psychology, but also for history, anthropology, and sociology, and with good reason. Showing that religion has any consequences in prosocial behavior has not been easy.

The four-dimensional model of religiosity (ideological, ritualistic, experiential, and intellectual) so often used, originally had a fifth dimension – the consequential – designed to measure the effects of religiosity on conduct in other spheres. It was dropped because consequences in nonreligious behavior could not be found (Beit-Hallahmi & Argyle 1997). Modern findings indicate that religion does have a considerable effect on secular behavior in two areas: sex and the use of illicit drugs. Generalizing beyond these specific areas has been difficult (Beit-Hallahmi & Argyle 1997). We should note that not only has the academic study of religion ignored morality, but the academic study of moral development has largely ignored religion, with no apparent damage or deficits.

The global secularization process means that we no longer interpret misfortune as caused by supernatural agents. Some misfortunes (earthquakes) result from inanimate natural forces, and are viewed as unrelated to any moral agents (Neiman 2004). What can be morally condemned is human action. We can condemn human cruelty, and we do. Moreover, the Enlightenment has led to a new, totally secular, public discourse about morality, focusing on justice, rights, equality, and human welfare, and marginalizing the impulse control discourse. This sea change in our moral outlook is evident in the Universal Declaration of Human Rights (1948) and in such secular groups as Amnesty International and Medecins sans Frontières. Lifelong atheists have been found to be well-socialized, law-abiding, and nonviolent (Beit-Hallahmi 2006). They obviously go through blaming themselves, and others, and feel guilty. They may anthropomorphize their diseases and inclement weather. They have have gotten all that from their evolved architecture and early experience, without the help of any functional religious illusions.

Religion and morality: An anthropological comment

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Abstract: This commentary criticises Bering on two counts. First, because we do not know what he attributes to natural selection and what he sees as derived representations. Second, Bering's ethnography of religion is inadequate. People who practise ancestor worship are not concerned with their own survival but with that of others. Many supernatural beings are not thought of as morally motivated.

Jesse Bering's article is nothing if not ambitious. It starts with an experiment showing that young children attributed psychological functions to a recently dead mouse and ends up with a proposal that amounts to saying that religion, especially religion of a kind which is strikingly similar to what Harold Bloom has called "American Religion" (Bloom 1992), is innate, since it is the product of natural selection. That is a long way to go, especially because, as far as I am aware, most religious systems are not much concerned with the survival of the souls of rodents.

The connecting links in the argument are that humans are natural dualists because they inevitably have a belief in the survival of some elements of agency on the part of the dead, who consequently are attributed with mental states; that this leads to similar beliefs about other supernatural beings such as God; that the existence of supernatural agents give meaning to the individual self in the world; that these beliefs make people behave morally; and that this is good for them and their inclusive fitness because a reputation for morality leads others to treat you and your offspring well.

I react to this proposal in two ways: first, as a critic of the general theoretical issues raised by Bering; second, as a traditional anthropologist who wants to test the theory against the ethnographic record.

Bering claims to give us an evolutionary account that, in certain respects, is critical of theories such as those of Boyer, Sperber, and Atran because these seem to make religion the product of an unfortunate malfunction of our cognitive apparatus. This indeed seems odd for such a central feature of human culture, and I too have been critical of these writers for linked reasons (Bloch 2002). Nonetheless, Boyer and those others seem to me to have an advantage over Bering in an important respect, that is, they are very clear as to what they are claiming. I do not find such clarity in Bering. Following such writers as Tooby and Cosmides, he tells us that natural selection has led to the evolution of certain necessarily innate characteristics, which, as dispositions, have affected the history of culture. Such a proposal requires a strict division between that which is claimed to be innate, the product of natural selection, and the cultural phenomena that have been affected by such innate dispositions – inevitably together with many other factors. It is precisely this distinction between exactly what it is claimed natural selection has bred in us and the derived factors that are affected by these inherited mechanisms which is missing. Is it the morality/religion complex that has been selected for in the distant past of the species? Or is it merely the belief in the survival of the dead? I am not sure. For example, Bering tells us, inter alia, that "people naturally endow their lives with a hidden purpose." What does "naturally" mean here? Does that mean that natural selection has made us into beings that "naturally" think in this way? Are we to understand that certain other dispositions inevitably, but indirectly, lead us to see our lives in this way? I do not feel I know.

Now let us turn to more ethnographic matters. At least two key elements in the argument are to me unacceptable. One concerns the characterisation of ancestors, the other concerns the characterisation of supernatural beings in general.

Even if we accept that it is frequent to believe in some aspect of the continuing functionality of the psyche of dead people, this does not mean that these are regularly represented as concerned with morality. However, it is this involvement which, for Bering, would explain the selective advantage of such a representation and therefore its frequent recurrence. For example, the Trobrianders famously described by Malinowski have elaborate beliefs in various forms of life after death, but they do not believe for all that, that the dead enforce the morality of the living (Malinowski 1916). There are many other examples of such moral indifference, as in the case of ancient Greece as described in *The Iliad*. Even in Catholic Christianity dead souls

of ordinary people are not concerned with the morality of their descendents, and the early fathers of the church actually went out of their way to eradicate such "pagan" beliefs.

Those people who do believe in ancestors as some sort of moral police are also very different from what Bering seems to assume. Such people are not concerned about what happens after their own death; what matters is what the souls of already dead people might do to them if they are displeased. This makes Bering's argument about the importance of the belief in intelligent design for one's own behaviour irrelevant. And, even then, ancestors are rarely concerned with maintaining a universal morality; they are concerned with punishing or rewarding actions which ensure their own selfish reproduction via their descendants. This interest in their own inclusive fitness is not particularly altruistic and often overrides the interests of their own descendants (Fortes 1959). The ethnographic record of beliefs in an afterlife therefore gives us a quite different picture to that suggested in the target article.

This is equally true of Bering's characterisation of god-like supernatural beings. The author seems to assume that supernaturals are invariably on the side of good and against evil. This is to forget that such creatures as devils and witches are on the side of evil. Even more commonly, supernaturals are represented as neither good nor evil, but as simply unconcerned with moral issues, though their very existence certainly is believed to cause trouble. This is the case, for example, of the nature spirits common in Africa, of the spirits of aborted foetuses in Japan, and of the ancestral spirits of Amerindians. Similarly, there are many cases of supreme gods, such as the famous African otiose gods, who also are characterised by indifference and arbitrariness (Forde 1954).

Prosocial aspects of afterlife beliefs: Maybe another by-product

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Abstract: Bering argues that belief in posthumous intentional agency may confer added fitness via the inhibition of opportunistic behavior. This is true only if these agents are interested parties in our moral choices, a feature which does not result from Bering's imaginative constraint hypothesis and extends to supernatural agents other than dead people's souls. A by-product model might handle this better.

Bering's brilliant unpacking and explanation of afterlife beliefs includes the claim that a disposition to such cognitive errors may confer greater fitness by motivating prosocial (and inhibiting opportunistic) behaviors (sect. 2.4). Indeed, in most cultures, beliefs in dead agents are associated with moral feelings. However, the particular evolutionary argument offered here may not be the most parsimonious account of the evidence, because (a) people associate morality with their supernatural beliefs in many different ways, some of which do not mention afterlife beliefs; and (b) more important, there is massive evidence for these very same prosocial attitudes and inhibitions outside of supernatural beliefs.

In some cultures people construe morality in terms of a *code* given by the gods or a single god or ancestors or a specific cultural hero; in other cultural environments they express moral norms in terms of similarity to the behavior of *paragons* such as heroes or gods; in other places the norms derive from constant *interaction* with spirits or gods or ancestors; and in many places people mix all three modes (Boyer 2001). This is a problem for Bering's account. Such diversity suggests that the association between morality and supernatural beliefs is rather ad hoc, perhaps best seen as a relevant, attention-grabbing and inferentially powerful combination of prior elements that evolved for different reasons. Indeed, the evolution of prosocial behavior and moral feelings certainly does not require supernatural beliefs. A whole suite of prosocial cognitive mechanisms evolved in human beings. They include for instance *reputation-monitoring*, whereby we construct precise and dynamic databases about the reputational effects of own and others' actual behavior, as well as inferred dispositions and character (Wojciszke et al. 1998); *commitment signals* that evolved out of other forms of reliable, hard-to-fake signals and provide information about likely future behavior (Nesse 2000); a *coalitional psychology* that helps us maintain strong associations of non-kin and manage interaction with rival coalitions (Harcourt & de Waal 1992; Kurzban & Leary 2001); in-group *strong reciprocity* whereby we suspend ordinary principles of exchange to create a domain of valued and selfless interaction (Gintis 2000); *ethnic signals* that help maintain the boundaries of this domain (Kuran 1998); *commitment gadgets* that help us tie our own hands to force ourselves to behave non-opportunistically (Schelling 1960); and *moral feelings* that provide immediate, negative emotional rewards for opportunistic plans and thereby compensate the motivational effects of the discount curve (Frank 1988). All these dispositions and processes evolved independently of supernatural and religious beliefs, operate in similar ways in people with or without such beliefs and regardless of differences in these beliefs, and recruit different neuro-cognitive machinery from the supernatural imagination (Boyer 2003b).

So we seem to have plausible hypotheses for the *independent* development, cognitive implementation, and evolutionary history of (a) beliefs in supernatural agents (including dead people) and (b) prosocial dispositions. This may help provide a parsimonious "by-product" explanation of morally relevant dead agents.

If we accept the first part of Bering's scenario, a set of cognitive constraints lead us to construe dead people as intentional agents. These constraints do not necessarily imply that the agents are "interested parties" in our moral choices with "full-access" to morally relevant information about us (Boyer 2001). But all that is required to entertain concepts of such full-access agents is an assumption that is already contained in many of our prosocial cognitive mechanisms. The dispositions listed above all carry the assumption that information about our own behavior is not safely confined, that it may leak to other parties in unforeseen ways, and that it is generally safe to assume in others more knowledge of our decisions than can be observed. This assumption itself is not terribly mysterious in origin. There is a cognitive cost in computing the extent to which others do not share information that is manifest to us, which is why understanding false belief takes children more time than understanding belief, and can be impaired by a variety of pathologies, as well as attentional load or altered states. So the assumption that others know what is manifest to us is a default value of our intuitive psychology more than a special elaboration of it.

Given all these elements, it would seem that the notion of "full-access supernatural dead agents with moral interest" develops without much cognitive effort, as it only combines prior assumptions, and has great inferential potential. In particular, it provides an explanatory context in which one's own moral feelings, the outcome of implicit processes, may be readily explained. This by-product scenario seems more parsimonious than the one offered in the target article.

The principle of ontological commitment in pre- and postmortem multiple agent tracking

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Abstract: This commentary suggests that understanding the "Folk Psychology of Souls" requires studying a problem articulating ontology with psychology: How do human beings, both as perceivers and thinkers, track and refer to (1) living and dead intentional agents and (2) supernatural agents? The problem is discussed in the light of the principle of the ontological commitment in agent tracking.

Jesse Bering's article addresses fascinating questions that certainly deserve to be studied in an interdisciplinary science of the "Folk Psychology of Souls" (henceforth, FPS). Whereas the author alludes to *existentialist* philosophy, he nonetheless overlooks research in contemporary *analytic* philosophy about two relevant themes: (1) the problem of reference (Campbell 2002; Evans 1982; Kripke 1980; Perry 2001; Quine 1960; Strawson 1959) and (2) the problem of personal identity (Locke 1689/1975; Merricks 2001; Olson 1997; Parfit 1984; Rorty 1976; Shoemaker 1959). Understanding the FPS requires studying this fundamental question: *How do human beings, both as perceivers and thinkers, track and refer to (1) living and dead intentional agents and (2) supernatural agents such as ghosts and gods?* I name "tracking" the ability to trace, follow up, or pursue over space and time a set of traceable individuals; it is useful to distinguish *perceptual* tracking, in which a target individual is directly tracked by a sensory-motor system, from *epistemic* tracking, in which an individual is spatio-temporally pursued by indirect epistemic means such as communication and reasoning.

In several passages (e.g., about simulation, cognitive system), the author seems to overlook the problem raised by the multiplicity of skills and methods used by human beings to track (1) actual living and dead agents and (2) fictional mortal and immortal agents. An account of this multiplicity might threaten the hypothesis that evolution has selected a unique organized cognitive system dedicated to forming illusory representations of psychological immortality and supernatural agents. This multiplicity becomes apparent when one considers how deeply the varied kinds of agent tracking depend upon the *multiple* assumptions available about *agents' (purported) ontology*. By "ontology" I mean an implicit representation or an explicit understanding of the birth, persistence, and survival conditions of the tracked agent. Philosophers have distinguished bodily (Thomson 1997; Williams 1970) and biological criteria (Olson 1997) from psychological criteria (Parfit 1971; 1984; Shoemaker 1959; 1999) capable of defining the survival of a person, or intentional agent. As considered in the discussion of sortal concepts (Carey & Xu 2001; Hirsch 1982; Pylyshyn 2003; Wiggins 1997; 2001), subjects or cognitive systems performing tracking must possess information about some uniquely distinctive features of the tracked agent in order to direct their agent-tracking attitudes and actions appropriately. This can be expressed by this Principle of the Ontological Commitment in Agent Tracking:

The skill or method that a human subject (or a perceptual, cognitive system) ***s*** uses to track a unique target intentional agent ***a*** are dependent upon the ontology that she (or it) ascribes implicitly or explicitly to ***a***. (Characters in italicized and bold fonts are standing for proper names.)

The author's hypothesis is that the ontological commitment about the immortality of the soul of postmortem agents is the "default cognitive stance" selected by evolution. I would like to remark that even if the hypothesis were true, we would still have to account for multiple ontological commitments in agent tracking and multiple manners of referring to afterlife agency. This problem is relevant to the target article because it is sometimes difficult to determine *which kinds* of agent-tracking behaviors are discussed by the author. Do they involve behaviors and beliefs relating to interactions with the tracked immortal soul? Do they involve beliefs about the possibility of localizing the soul? What are the purported characteristics of individual souls that guarantee their survival and traceability? What are the relationships between visual tracking (Pylyshyn 1989; 2003) and living/dead agent tracking (Bullot & Rysiew 2005)? Can these relations be studied experimentally? Some of the previous questions might have distinct answers in cultures that have evolved differently (Richerson & Boyd 2005) and are upholding different ontological commitments.

To focus on a precise case: the author mentions the "continued social relationships with the dead" (sect. 2, para. 4). Such a phrase is ambiguous with regard to ontological commitment and tracking. If one accepts empirical realism, this continued social *reference* can be of at least two different types (see Fig. 1): (1) reference to, and physical interactions with, existing material traces of a dead agent, or (2) reference to a fictional immortal soul as in "common-sense dualism" (Bloom 2004). (This dichotomy is reminiscent of the distinction between knowledge by acquaintance and by description; see Russell [1912; 1918; 1956], Strawson [1959, pp. 18–20], Evans [1982, pp. 143–203], Clark [2000, pp. 130–63] or Campbell [2002].) In type (1), the acquaintance- or *empirically grounded* reference, subjects are referring either to an actual agent ***a*** or to the material traces left by him. In type (2), the description- or *fictionally grounded* reference, subjects are referring to a nonexisting fictional agent ***f*** such as Sherlock Holmes or a ghost. When facing type (1), for example, if someone is heard having a discussion about an individual named "***a***," you can search for that particular individual. In frequent cases, you may eventually find her and be in a situation to perceive ***a***'s organism and the surfaces/movements that convey information about ***a***'s mental states. Similarly to the case of other kinds of individuals (Campbell 2002; Pylyshyn 2003), perceptually tracking of ***a***'s organism thus opens a wide range of epistemic possibilities, such as verifying propositions about ***a***'s current properties via, for example, demonstrative identification, prosthetic perception, and biometric measures. Even after ***a***'s death, it is usually still possible to trace and reach ***a***'s remains or possessions (think about archeological investigations: ***a***'s corpse is marked with perceivable traits or scars that are historical vestiges, which act as evidence of events in ***a***'s life). These epistemic actions are not available with fictional reference, for the characteristics of a fictional agent can only be known by means of descriptions or imaginary depictions. If ***f*** is a fictional character, any search of the referent of the name "***f***" will end in a so-called "block" in the naming network (Donnellan 1974; Perry 2001). The dichotomy is

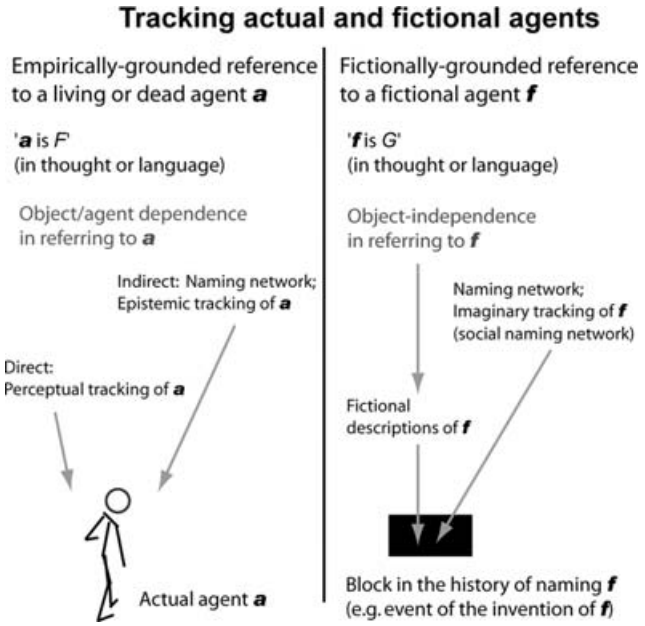

Figure 1 (Bullot). Fundamental differences between tracking actual and fictional agents.

essential for understanding the FPS, because each type implies drastically different cognitive procedures: type (1) accesses a realm of empirical and perceptual evidence that is ontologically closed to type (2) and type (2) accesses a realm which rests on descriptive resources and individual/collective imagination.

Ecological variability and religious beliefs

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Abstract: Religious beliefs, including those about an afterlife and omniscient spiritual beings, vary across cultures. We theorize that such variations may be predictably linked to ecological variations, just as differences in mating strategies covary with resource distribution. Perhaps beliefs in a soul or afterlife are more common when resources are unpredictable, and life is brutal and short.

Religious beliefs, including those about an afterlife and omniscient spiritual beings, vary across cultures (Cohen & Hall, submitted; Cohen et al. 2003). This does not mean they are not adaptations, because human behavior represents a continual and dynamic interplay between flexible evolved mechanisms and variable environmental inputs (Kenrick 2006; Kenrick et al. 2002). Rather, an evolutionary ecological perspective inspires questions about whether variations in religious beliefs and practices are adaptively keyed to variations in human physical and social environments (ranging from food and shelter to social structure: e.g., status hierarchies, access to mates, and geographical distribution of kin relative to self). Cultural norms surrounding sexual liaisons (often centrally incorporated into religious beliefs) provide one illustrative case. Such norms vary widely, with some societies and some religions sanctioning only monogamy, many also accepting polygyny, and a small percentage permitting polyandry. These variations correlate predictably with physical and social ecology. For example, Tibetan families in which one man marries one woman have fewer surviving children than do families in which brothers pool their resources (Crook & Crook 1988). By sharing one wife, brothers can preserve the family estate, which would not even support one family if it were subdivided each generation. Brothers in other species also engage in polyandrous mating when resources are scarce. Regarding polygyny, multiple women are particularly likely to marry one man when several conditions converge: (1) a steep social hierarchy, (2) a generally rich environment so one family can accumulate vast wealth, (3) occasional famines so the poor face occasional danger of starvation (Crook & Crook 1988). Under these circumstances, a woman who joins a large wealthy family reaps benefits, even if she would have to share her husband with other women. This pattern is also found in other species. For example, indigo buntings vary between monogamy and polygyny, but multiple females only pairup with the same male when that male controls a resource-rich territory and his neighbors have poorer territories (Orians 1969).

We wish to apply a similar analytic strategy to variations in belief in souls and the afterlife. Different religions have very different emphases on the importance of belief in an afterlife (emphasized less by Jews, more by Fundamentalist Protestants, for example; Cohen & Hall, submitted). And within a religion, some individuals have much stronger beliefs in an afterlife than others do (Cohen et al. 2005). Furthermore, there are vastly different forms of belief in life after death, including reincarnation, heaven and hell, ghosts, and so forth. Similarly, individuals and cultures vary in views of God as vengeful and punishing (Abramowitz et al. 2002). It is sometimes claimed that the Old Testament God is more vengeful, whereas the New Testament God is more forgiving (but see Cohen et al. 2006).

Certainly, such variations may be due to particular historical factors affecting the development of a particular religion or the learning history of a particular individual. However, taking a cue from Bering, and Atran and Norenzayan (2004) and others, we propose a novel direction for theorizing about belief in life after death. It would be worth investigating whether variations in beliefs in afterlife or observant spirits are linked to recurrent variations in social or physical ecology. Bering has proposed that belief in souls has a moral function, among others. Perhaps beliefs in a soul or afterlife are more common when resources are unpredictable, and life is brutal and short. If most people have predictable and sufficient resources, there may be less need to regulate cooperation. If resources are unpredictable or scarce, however, supernatural agents may be more necessary: As Durant and Durant (1968, p. 51) suggested, "as long as there is poverty there will be gods."

Similarly, a belief in an omniscient God (who also metes out punishment, both during life and after) might be more common in societies in which people spend more time around non-relatives (who are more likely to punish your transgressions severely, and to cheat on you). If true, one would expect not to find such beliefs as commonly in small groups of closely related hunter-gatherers. In social groups including unrelated individuals, on the other hand, other people can't be watching you all the time to make sure you are not poaching others' mates or stealing their food. But invisible, supernatural agents can (or, at least, you don't know when they are and when they are not). According to this line of reasoning, one might suppose that the variable and harsh desert culture in which the Old Testament is rooted promoted a view of God as harsh and vindictive, whereas the more stable societal structure of the New Testament promoted a view of God as more forgiving. Religions that exist in harsh or unpredictable environments (or religions rooted in such environments) may be more prone to belief in souls, or may view God as more punitive. Religions that exist in stable or resource-rich environment (or religions rooted in such environments) may be less prone to belief in souls, or may view God as more forgiving.

This analysis suggests a need for a functionally based taxonomy of religious beliefs and practices, which can be mapped onto a taxonomy of ecological variations to which human groups need to adjust. An ecological approach suggests that the traditional beliefs of international religions originally emerged in interaction with particular environmental factors. There are likely pressures to maintain the belief systems intact as members migrate to new physical and social environments. Our analysis implies that the group-level beliefs will change (perhaps slowly) to match new habitats, and that individual commitment to particular features of those beliefs will change (perhaps more rapidly) to reflect operation of context-triggered behavioral and cognitive mechanisms. It may be, for example, that even Roman Catholics (who belong to a religion with strongly institutionalized checks on heretical thinking) have very different complexes of supernatural beliefs and imagined offenses depending on whether they are from an Irish fishing village, a Sicilian farming community, or a California suburb.

Production of supernatural beliefs during Cotard's syndrome, a rare psychotic depression

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Abstract: Cotard's syndrome is a psychotic condition that includes delusion of a supernatural nature. Based on insights from recovered

patients who were convinced of being immortal, we can (1) distinguish biographical experiences from cultural and evolutionary backgrounds; (2) show that cultural significance dominates biographical experiences; and (3) support Bering's view of a cognitive system dedicated to forming illusory representations of immortality.

Cotard's syndrome (CS) is a rare condition in which the central symptom is a delusion of negation. Patients suffering from the syndrome may deny that they exist or that a part of their body exists. They may also complain of damnation, possession, or other delusional ideas, such as feeling enormous and immortal or believing that nothing exists or that another person's identity (doctor, mother) is false. CS generally occurs in patients suffering from major depression with psychotic features, but it can also occur in patients suffering from schizophrenia or organic mental conditions (e.g., general paralysis, epilepsy) (Berrios & Luque 1995). In young people, it is often associated with bipolarity (Consoli et al., in press; Soultanian et al. 2005). While the descriptions of many psychiatric conditions have changed during the last century (e.g., catatonia, hysteria), CS has been shown to have very stable clinical characteristics since it was first described in 1880 (Berrios & Luque 1995). Healthy people's beliefs in an afterlife or in other closely related supernatural ideas are not expressed in a delusional way. In the case of CS, subjects are temporarily and without self-questioning convinced that both their soul and body are immortal, or, alternatively, that they are already dead or damned. The very existence of CS supports Bering's view of a cognitive system dedicated to forming illusory representations of immortality and symbolic meaning of natural events. We can hypothesize that, for unknown reasons, the system is productive during CS without any activation of inhibitory or elaborative repression. Because most patients recover, it gives us an opportunity to get some insights from subjects themselves regarding their feelings of being immortal, guilty, or damned. This allows us to distinguish biographical experiences from cultural and evolutionary backgrounds.

Table 1 summarizes the clinical characteristics of 8 patients who we have treated during the last 20 years. The first striking observation is that, for most of the subjects (6/8) with CS, their delusional ideas could be related to their own life stories (Table 1, column 5), despite their having a similar delusional framework that included delusions of immortality in 5 cases (Table 1, column 4). The last two subjects provided little information about their CS state because of negativism and mental retardation, respectively. Case 3 is particularly interesting as she showed remarkable insight after treatment with electroconvulsive therapy (ECT) (Cohen et al. 1997). The delusion consisted of the patient's absolute conviction she was already dead and waiting to be buried, that she was immortal, that she had no teeth or hair, and that her uterus was malformed. When she recovered, we asked her to express the free associations that came to mind when her delusional ideas were evoked. Concerning having no teeth, she was surprised to find herself thinking of her brother-in-law, a dentist. She added that she would be ashamed to receive dental treatment from him, and that she had cried every night since her sister's wedding and departure. Concerning the idea of a genital malformation, she remembered guilty feelings associated with masturbation, which she had practiced from childhood until the onset of puberty.

The second striking observation relates on the fact that despite a history of syphilis confirmed by immunology testing, a 55-year-old man with CS (Case 5) had hypochondriacal concerns about AIDS, showing that collective and cultural significance dominates biographical experiences during CS. Because of pressure from the human social environment, AIDS has substituted for syphilis as God's punishment for sins of the flesh. In summary, over time, first syphilis then AIDS symbolized the amalgam of flesh, punishment, sin, guilt, sexuality, and the devil. Indeed, the last case of CS with hypochondriacal fears of syphilis was published in the 1970s (Bourgeois 1969). Since the 1980s, and in the current series ($N = 3$), AIDS has the same symbolic significance that syphilis had until the 1970s.

Based mainly on cognitive and developmental psychology, Bering has postulated that an organized system dedicated to forming illusory representations of immortality evolved in response to selective pressures by the human social environment. If we consider CS as a psychopathological model to explore the pathological production of supernatural beliefs, Bering's hypothesis implies that (1) the beliefs should associate personal elements with stable superstructured collective schemas; and (2), while stable in their significance, collective schemas should integrate influences from the social environment. As highlighted

Table 1 *(Cohen & Consoli). Clinical characteristics of eight subjects with Cotard's syndrome focusing on delusional ideas related to biography*

Age	Sex	History	Cotard's symptoms	Examples of delusions and links [↔] with biography
62	M	MDE Dementia	Negation, immortality, enormity	[Enormous medical knowledge] ↔ [Physician]
70	F	Bipolar	Negation, immortality, enormity, damnation, guilt	[Nazi criminal] ↔ [Family died in deportation] [Urines invaded the whole world killing all children] ↔ [First child was stillborn]
15	F	Bipolar	Negation, immortality, damnation	[No uterus] ↔ [Masturbation until age 9] [No teeth] ↔ [Brother-in-law a dentist]
58	M	Bipolar	Negation, immortality, damnation, hypochondria	[Father not dead] ↔ [Father died as a hero] [AIDS] ↔ [?]
55	M	Bipolar	Negation, damnation, hypochondria	[AIDS] ↔ [Guilt because of hypersexuality during mania]
19	F	Bipolar IQ = 65	Negation	[No blood] ↔ [?]
17	F	MDE	Negation, enormity, damnation, hypochondria	[Diabetes] ↔ [Mother died from diabetes] [AIDS] ↔ [?]
19	F	MDE	Negation, immortality	[No body] ↔ [?]

MDE = Major Depressive Episode; IQ = Intellectual Quotient.

by the data from recovered patients with CS, both hypotheses are supported.

Taking a psychodynamic view that is not part of Bering's report, we can also refer to the theory of archetypes (Jung 1934), where an archetype is the collective schema or *architecture of ancestral human mind* (see Bering's conclusion). Interestingly, Jung's hypothesis was based on comparative studies of religious and supernatural beliefs. In particular, following Levy-Bruhl's studies of primitive societies (1910) and mythology (1935), Darwin's theory of selection, and his own experience with the psychodynamic approach to psychotic patients, Jung also postulated that humans have a natural disposition to believe in an afterlife and religious concepts, influenced by evolution.

Evidence for early dualism and a more direct path to afterlife beliefs

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Abstract: Ample evidence for dualism in early childhood already exists. Young children have explicit knowledge of the distinction between mental and physical phenomena, which provides the foundation for a rapidly developing theory of mind. Belief in psychological immortality might then follow naturally from this mentalistic conception of human existence and thus require no organized cognitive system dedicated to producing it.

Bering proposes an organized cognitive system dedicated to forming what he terms illusory representations of an afterlife and psychological immortality. Belief in the continuation of psychological states after death is, as Bering notes, a radical form of mind–body dualism, and he seeks evidence for this dualism early in individual development. In this commentary I briefly summarize existing empirical evidence, not mentioned by Bering, demonstrating that very young children are already and explicitly dualists. I conclude by questioning the claim that belief in psychological immortality requires a cognitive system dedicated to producing it. I suggest instead a more parsimonious alternative in which this belief is just a natural extension of how people, including young children, already think about human existence.

Bering is astute to focus on the common-sense dualism between mind and body because this conceptual distinction and its close relatives play a key role in cognitive development by providing the foundation for a mentalistic understanding of human behavior. This "theory of mind," as I will argue, might then be extended to become one source of intuitive notions about the soul and an afterlife. However, it is simply not the case that research into "whether humans are common-sense dualists" is just beginning, as Bering implies. In fact, abundant research, some of it now two decades old, clearly demonstrates that very early in the preschool years children already understand and use a whole family of conceptual distinctions closely related to mind–body dualism. These include the basic ontological distinction between the mind and the external world, as well as kindred distinctions between mental and physical phenomena, between fantasy and reality, and between specific thoughts and the things they represent (Estes 1994; Estes et al. 1989; Wellman & Estes 1986).

Briefly, this research shows that by 3 years of age children already recognize the defining criteria that distinguish the internal-mental from the external-physical world. They know that mental entities (thoughts, memories, dreams, mental images) are not real in the way that physical entities are, and that they have no permanent existence apart from the mind in which they occur, are inherently private rather than public, and cannot be seen, touched, used, or shared with others in the way that corresponding physical objects can. It is important to emphasize here that preschool children's knowledge of this fundamental dualism is not just implicit in their behavior and not merely inferred from their responses in different experimental conditions. Instead, they clearly have explicit knowledge of how mental and physical phenomena differ, as demonstrated by their capacity to articulate this understanding with convincing verbal justifications for their responses. These explanations are typically telegraphic but interpretable at 3 or 4 years of age and become remarkably adult-like by the age of 5 or 6. These experimental findings are supported and extended by naturalistic research on language development showing that even before 3 years of age children spontaneously refer to the distinction between mind and external reality in their conversations in natural settings (Bartsch & Wellman 1995).

How do young children comprehend with such apparent ease this fundamental distinction between the internal-mental-subjective realm and the external-physical-objective realm, of which mind–body dualism is one aspect? It may well be the case that this distinction is of such crucial importance in human social life that, like language or face recognition, we are prepared by evolution to get it quickly and easily. But at another level of analysis, that of everyday human experience, it is also the case that this is just how the world is. Children, perceptive creatures that they are, rapidly discern this fundamental distinction, which is constantly manifesting itself in their experience, just as it is in ours. We have minds and we have bodies; there is an internal-mental realm and an external-physical realm; and there is ample evidence in the child's ongoing experience from which to abstract these natural categories.[1] The boundary between them may of course break down under rigorous philosophical or scientific analysis, but regardless of our expertise or theoretical allegiances, we all take this foundational distinction for granted and constantly use it in everyday life. The research cited earlier shows that preschool children do so, as well.

How do we get from this basic dualism to belief in souls, an afterlife, and psychological immortality? Bering's rather clever solution involves a collection of cognitive biases and errors that together produce these "functional illusions" and thereby enhance genetic fitness by making it less likely that individuals will engage in acts harmful to their reputations. Leaving aside the perennial question of whether there might really be an afterlife of some unknown variety,[2] and granting that the specific mechanisms in Bering's account (e.g., simulation constraints, offline social reasoning) may indeed be part of the story, perhaps the path from the young child's dualism to belief in an afterlife for immortal souls might be fairly direct and require no special evolutionary solution. As we have seen, very young children already have the distinction between mental and physical phenomena solidly in hand and thus recognize the existence and nature of immaterial entities. This provides the essential basis for a mentalistic folk theory of human behavior and the framework on which our more general beliefs about human existence are based. Beliefs about an afterlife can thus be seen as just beliefs about this life, idealized and extended in our imagination beyond the mystery of death. And who wouldn't want more of such a good thing?

NOTES

1. In addition to abundant naturalistic evidence documenting that they spontaneously talk about their mental states (e.g., Bartsch & Wellman 1995), there is also experimental evidence indicating that preschool children have conscious access to some types of mental activity (Estes 1998), which of course would be a prerequisite for abstracting the mental–physical distinction from their own experience.

2. And who knows for sure? Not Bering. And not Francis Crick (1994), Theodosius Dobzhansky (1967), Martin Gardner (1999), or me.

A case of stunted development? Existential reasoning is contingent on a developing theory of mind

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Abstract: Missing from Bering's account of the evolutionary origins of existential reasoning is an explicit developmental framework, one that takes into account community input. If Bering's selectionist explanation was on target then one might predict a unique and relatively robust developmental trajectory, regardless of input. Evidence suggests instead that children's existential reasoning is contingent on their developing theory of mind.

Bering's focus is naive or intuitive religion in the sense of its import and place in human thinking about one's own soul, values, and place – its existential focus. He highlights important issues, and presents many intriguing ideas concerning the evolutionary origins of these existential themes. But missing is an explicitly developmental framework; in the absence of such a framework, it is difficult to agree with his claims.

Modern evolutionary theory is itself undergoing a radical reconceptualization with development playing a central role, so-called Evo-Devo (e.g., Carroll 2006). The discovery of critical regulatory genes that alter patterns of gene expression over development was only made possible because of this focus. Similarly, any attempt to offer a modern evolutionary account of a psychological process should incorporate development. Intuitive existential psychology is closely aligned with intuitive psychology – our everyday understanding of self and others as intentional, believing-desiring, communicating agents – and, according to Bering, with intuitive conceptions of intelligent design. Past research is clear: intuitive psychology (theory of mind) develops – initial infant biases lead to early conceptions that are considerably revised and expanded in the course of childhood development – and intuitive understanding of the origins and functions of human life also develops. If Bering is correct and existential reasoning is a consequence of selection pressures, and not a spandrel, then one might predict a unique trajectory, one that is robust and relatively independent of these other developments. Bering indeed talks of possible developments. One clear point is that, unfortunately, little is known, yet both the developmental and evolutionary stories to be told must be tightly constrained by such details. Developmental details are also needed to frame and evaluate the connections between existential psychology, theory of mind, and intuitive conceptions of origins.

Regarding existence and mind, Bering's selectionist arguments encompass claims of early appearing existential sensitivities backed by some admittedly preliminary data. The data definitely demonstrate development, but the details are not only unknown and insufficiently established, they are currently contradictory. For example, Bering suggests (following Barrett) that young children's conceptions might be specially commensurate with supernatural conceptions (e.g., gods are not subject to false beliefs). But Barrett et al.'s (2001) work is just as easily interpreted to show that conceptions of God as omniscient are only made possible when children are able to reason about false beliefs. Prior to that point, children cannot make such judgments. Moreover, in Bering's Princess Alice studies, for example, the youngest children (4-year-olds) interpret unexpected events as physically caused and only older children see them as indicative of supernatural acts. Such findings suggest that existential reasoning is contingent on a developing theory of mind.

An important claim is that a naïve dualism leads to beliefs in an afterlife in which mind continues independent of body (psychological immortality) after death. The developmental unfolding of understandings of mind and of death thus becomes intriguing indeed. Bering (also Bering & Bjorklund 2004) presents a scenario in which younger children (5-year-olds) attribute ongoing mental functions after death and such attributions decrease with development. Although 5-year-olds attribute mental functions to dead individuals in Bering's research, they do not do so (and neither do 4-year-olds) in other research (e.g., Barrett & Behne 2005; Poling & Evans 2004). Furthermore, in Flavell's research 5-year-olds often fail to attribute ongoing mental functions (thinking) to waking persons; relative to older children, they systematically downplay the amount of consciousness that everyday folk have in everyday life (Flavell et al. 2000). These findings provide an unlikely platform for the bold proposal that rampant attribution of mental life to the dead provides a natural starting point for intuitive existential questions. We agree that how children understand these issues is important and can inform our theories of intuitive understandings of mind, existence, and the divine. But, those developments, while to-be-discovered, do not as yet conform to Bering's initial outlines. Understandings of death also figure into children's understandings of origins and design.

Regarding existence and origins, Bering argues that conceptions of intelligent design are effortlessly aligned with beliefs in immortal souls. Yet, Evans' (2000; 2001) studies of concepts of species origins tell a more extended developmental story, and one that varies depending on the context. Not surprisingly, children from Christian fundamentalist communities, whatever their age, prefer creationist (God made "X") ideas. Younger children from non-fundamentalist communities, on the other hand, endorse a mixture of spontaneous generationist (the very first "X" came out of the ground) and creationist ideas. Not until 8 to 9 years of age were children consistently creationist, regardless of community of origin. More recent work along these lines suggests that the younger children were not in a position to grasp origins concepts, because they had not yet fully confronted existential questions (Evans 2005; Evans et al. 2001). To be able to respond to questions about the origins of animal kinds, children have to understand that animals are not eternal, in that they were not always here on earth, nor will they continue to be on earth. In the latter studies, the creationism of 4- to 10-year-olds was related to their ability to grapple with existential concepts (death, eternity), and to their understanding that humans (not God) create artifacts, independently of the effects of age. Once such existential questions have been grasped, only then can the "origins" question arise: How did the animals get on earth in the first place? Evans' claim (2001; 2005) is that children transfer their understanding of the human as an intentional manufacturer of new tools, and apply that to objects that have arisen naturally, such as "new" species. For younger children, the idea that "God did it," appears to be loosely associated knowledge, not yet integrated into a conceptual structure (Evans 2001), suggesting that "testimony" (Harris & Koenig 2006) plays a crucial role in early God concepts. In sum, God as intelligent designer is a complex (albeit possibly naturally developing), not an effortless, idea, which becomes firmly rooted only at the point when children reliably confront existential questions and fully understand the role of human artifice (Evans 2005; see also Defeyter & German 2003).

Thus predictions that might follow from Bering's thesis, such that existential reasoning is effortless, early acquired, and relatively independent of other developmental processes, are not borne out. On the contrary, we suggest that children's developing understanding of the mind, in particular, their naïve theories of intention, undergird and make possible religious/existential reasoning. Furthermore, this development seems to require an interaction between these processes and community input. Ideally, we need an evolutionary-*developmental* theory of existential reasoning that takes into account cultural context. We are grateful to Bering for initiating this process.

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Culture and development matter to understanding souls, no matter what our evolutionary design

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Abstract: For Bering, appreciating that people are objects is a developmental accomplishment. Baldwin and Piaget agree. However, for Piaget, an immanent conception of the divine is more developed than a separate transcendent God. Culture also matters. In Plato's *Phaedo*, Socrates' belief in immortality was a reasoned conclusion – not "built in" – for reasons similar to those still held by modern scientists.

Almost a century ago, J. R. Angell (1911) wrote, "The term soul has generally been applied to the supposed spiritual essence of human personality which persists after death. As such, it is connected with problems not soluble by empirical methods. Psychology as an empirical natural science has consequently ceased to use it as a familiar part of its terminology" (p. 46). He goes on to say, "the term consciousness itself is likewise in danger of extinction or at least essential modification" (p. 47). Prophetic words. But with the return of an "essentially modified" science of consciousness, the soul is again a candidate for rehabilitation – as long as it remains subject to Neo-Darwinian natural selection within a distinctively human social environment, and as long as it is "illusory" (or at least that its immortality and purpose are illusory).

For Bering, asking "Why am I here?" suggests a social relationship between the self and a presumed supernatural creator – a "cognitive illusion" that can help produce "genetic fitness-enhancing" behavior by promoting normative prosocial behavior that that creator has mandated. Bering also suggests that because human social interaction relies on believing that absent agents continue to exist, we have a hard time imagining anyone to be dead; that our minds/brains are not well equipped to update complex social rosters. But why go so far? Without invoking anything supernatural, Parker's (1998) proposal that self-conscious emotions, like shame, may have evolved to allow parents to govern their children when not physically present to enforce social norms – an influence that might persist beyond death. If so, then the idea of a universal care-giver, God, is a natural (but culturally bound) extension of this direct social experience.

Piaget devoted his first lab at the Jean Jacques Rousseau Institute to the study of religious experience, and lectured on his results and their implications at Sainte Croix (1923; 1928; 1930). Vidal (1994a; 1994b) claims that Piaget's early empirical work on religious experience aimed to provide empirical evidence for his own metaphysical framework, centered around the idea of the "immanence" of the divine in human experience. Indeed, these early studies by Piaget showed that unconscious and affective attachment to different kinds of religious experiences of God (transcendent or immanent) depends on the type of parenting one receives and the general socio-political cultural environment of one's upbringing (see also Bemmer 2002). Piaget's (1932/1978) studies of morality grew directly out of his work on religious belief.

God thus becomes a "super-parent" – an idea also advocated by James Mark Baldwin at the turn of the last century. Bering's very interesting point that it is structurally simpler and so developmentally easier to imagine an omniscient other, God, than to imagine someone who holds false beliefs is directly in line with these older theories of development. Likewise, Bering's claim that appreciating people to be "just objects" is a developmental accomplishment is exactly Baldwin's thesis – an idea he leverages for a very creative resolution of the mind–body problem (Baldwin 1903; see also Ferrari 2003). Similarly, Piaget's (1928; 1930) mature thoughts on religious experience led him to believe that the tension between transcendent and immanent conceptions of God could be resolved developmentally – that an *immanent* conception of the divine (i.e., God as intrinsic to our lived experience) was a more developed stage of religious experience than experience of a separate, transcendent God. Writing in a very different Zen tradition, Suzuki (1962/1972) captures this view well when he writes that, the "ultimate Self is above all forms of dichotomy, it is neither inner nor outer, neither metaphysical nor psychological, neither objective nor subjective. If the term 'Self' is misleading, we may designate it as 'God' or 'Being' or 'the Soul,' 'Nothing' or 'anything'" (p. 3).

Are these claims unscientific? I agree with James (1902/1961), that a "rigorously impersonal view of science might one day appear as having been a temporarily useful eccentricity rather than the definitively triumphant position which the sectarian scientist at present so confidently announces it to be (p. 395, footnote 8)." Certainly, empirical studies support the claim that immanent experience of the divine is indeed much rarer and develops later than transcendent experiences, documented in children as young as age six (Argyle 2000). Thus, Bering's suggestion that children understand God to be a separate and higher being is only half of a more sophisticated developmental argument proposed by developmental psychologists of the last century.

In another line of reasoning, Bering also proposes that because we find it impossible to imagine what it is like for ourselves to be dead (what he calls a "simulation constraint") people – especially children – naturally tend to think that psychological agents survive death. The "simulation constraint" on imagining death is very plausible. However, although it may be impossible to imagine our own nonexistence psychologically, we need not reason about the afterlife by analogy to our own spiritual life. As Bering himself says, we know and understand forms of human existence in which we are unaware – a dreamless sleep, for example – and can imagine not returning from that state. Or, to take a classic example, in Plato's *Phaedo* (c. 350 bce/1977, subtitled, *On the soul*), Socrates believes he will survive death but wants to debate this so as not to die holding a false belief. One objection, made by Cebes, is that most "men find it very hard to believe what you said about the soul [i.e., that it survives death]. They think that after it has left the body it no longer exists anywhere, but that it is destroyed and dissolved on the day the man dies, as soon as it leaves the body; [. . .] dispersed like breath or smoke, has flown away and gone and is no longer anything anywhere" (*Phaedo*, 70a). A little later (85e–86d), Simmias proposes this analogy: the soul is a kind of harmony produced by the body, like the music of a lyre; smash the instrument and the harmony is lost. This analogy is essentially the Darwinian analogy for mind, something generated by the body through the course of human evolution to help it survive. Socrates has an answer to these objections, although one that may not convince a modern audience – perhaps not even Aristotle, writing a few decades later (see Wilkes 1992) – but this shows that the idea of immortality was a reasoned conclusion. It was not "built in," at least not for most adults of that time, for reasons that resemble those still held by modern scientists; that is, that the soul is nothing other than an expression of the operation of the body, which itself is just a biological material thing, having nothing immaterial about it that can survive death.

Autism, language, and the folk psychology of souls

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Abstract: Anecdotal evidence suggests that people with autism, with known impairments in mechanisms supporting a folk psychology of mind or souls, can hold a belief in an afterlife. We focus on the role language plays, not just in acquiring the specific content of beliefs, but more significantly, in the acquisition of the concept of life after death for all people.

The main goal of Bering's article is to sketch a Darwinian model that accounts for the near-universal belief in an immortal soul and an afterlife. He argues that human social cognition has evolved to process information in specific ways that both allow for and engender dualistic thinking about mind and body, as well as related areas of religious or existential thought. It is this underlying cognitive architecture that constitutes the "folk psychology of souls." Bering stresses the role of theory of mind and related cognitive systems in promoting default representations of mental states surviving death.

This is an interesting and important hypothesis that has many ramifications for the study of human cognition and culture. Our commentary focuses on the consequences of this view for predicting how people with specific social-cognitive deficits might conceive of and react to death. We then explore the implications of social-cognitive deficits for Bering's model, to address the question of whether underlying cognitive architecture is both necessary and sufficient for representing life after death.

Can people with autism believe in life after death? Bering's model offers guidelines for who is most likely to entertain beliefs in a soul and afterlife, namely, individuals with an intact theory of mind. Indeed, Bering cites evidence that most people claim that what endures after death is the person's mental states. What about populations with deficits in this domain of human cognition? It is widely accepted that autism (ASD) is, in part, characterized by atypical social-cognitive development and domain-specific impairments in theory of mind (e.g., Baron-Cohen et al. 2000). People with ASD have difficulty representing the mental states of themselves and others even when high-functioning individuals with ASD have above-average IQ scores and relatively good language skills (Baron-Cohen 2000).

Bering's model suggests that people with autism would be much less likely to engage in "existential" thought or to consider mental states surviving death, given that they generally fail to consider a person's mental states even when they are alive. Although we know of no systematic research that has tested this hypothesis, anecdotal evidence suggests a more complex picture. On the one hand, although people with ASD do form emotional attachments (Rutgers et al. 2004), in our experience, it seems that they do not respond with the same degree of distress to the death of a loved one as do non-autistic individuals. This provides support for Bering's view, as he argues that affective responses may trigger the formation of afterlife representations based on existing social-cognitive mechanisms. Because people with ASD have deficits in these underlying mechanisms, they may not react to death with the same kind of existential crisis, and may therefore be less likely to represent life after death. On the other hand, this picture is complicated by the fact that, again based on anecdotal evidence, some people with ASD can hold a *belief* in a soul and afterlife. When asked about what happens to a person after they die, some people with autism claim that they continue to exist in some form; for example, that dead people ascend to heaven.

We hypothesize that a person with autism may acquire the belief in an afterlife via *language*, in the same way as they can learn to pass false belief tasks (Tager-Flusberg & Joseph 2005). Numerous studies have demonstrated that for children with autism, the single best predictor of passing false belief and other theory of mind tasks is linguistic knowledge, especially vocabulary and grammatical knowledge. However, even people who pass theory of mind tasks seem not to engage the same neurocognitive mechanisms when reasoning about beliefs (e.g., Castelli et al. 2002), suggesting that language may provide an alternative way of bootstrapping mental state attribution in people who have impairments to the mechanisms that are generally engaged for processing theory of mind tasks.

Does language contribute to the folk psychology of souls? While Bering acknowledges the role of socio-cultural indoctrination in the formation of *specific* religious concepts, his theory emphasizes the causal role of underlying cognitive mechanisms in giving rise to *generally* dualistic concepts and modes of thought. However, given that people with autism can hold dualistic religious beliefs, might language play a more significant role in the development of the folk psychology of souls? That is, does the structure of our linguistic concepts help shape the way we think about mind, body, and soul? Again, we know of no empirical research addressing this specific claim, but the behavior of people with autism suggests that language may play a *causal* role in the development of the folk psychology of souls. Consistent with this hypothesis, many philosophers have proposed that it is conceptual and linguistic confusion that encourages mind/body separation, rather than any innate predisposition. Specifically, they highlight the various metaphorical ways we talk about the mind and mental activity and argue that it is these disparate conceptual representations that propel dualistic thought (e.g., Lakoff & Johnson 1999; Melser 2004; Papineau 2002; Ryle 1949; Wittgenstein 1953). Language and cognition are intimately tied together, and the experimental evidence cited by Bering cannot distinguish between the cognitive and linguistic factors that could be driving universal dualistic beliefs.

Human social-cognition may have evolved in such a way so as to support belief in a soul and afterlife, but this underlying architecture may be neither sufficient nor necessary for such beliefs. In our view, the prevalence of these beliefs likely indicates a complex and dynamic process consisting of multiple interdependent cognitive, affective, linguistic, and cultural components. As Bering's own research demonstrates, most people probably do not have a stable, rational set of beliefs in the afterlife. It may therefore be premature to privilege specific social-cognitive factors underlying the "folk psychology of souls." There is an important need for future research to disentangle the different elements that motivate these beliefs, and to address the issues raised in both Bering's article and in these commentaries.

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The supernatural guilt trip does not take us far enough

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Abstract: Belief in souls is only one component of supernatural thinking in which individuals infer the presence of invisible mechanisms that explain events as paranormal rather than natural. We believe it is

important to place greater emphasis on the prevalence of supernatural beliefs across other domains, if only to counter simplistic divisions between rationality and irrationality recently aligned with the contentious science/religion debate.

We are in agreement with Bering's general thesis that the folk psychology of the soul can be traced to the development of intuitive theories regarding the nature of the reality and intentionality, as well as the difficulty of conceiving of the state of nonexistence. However, we contend Bering's claim that there exists an "organized cognitive 'system' dedicated to forming illusory representations" of an afterlife that has "evolved in response to the unique selective pressures of the human social environment" (target article, sect. 1, para. 5). Bering has proposed that a belief in the afterlife has the effect of promoting prosocial behavior because of the perceived connection between the moral implications of our actions whilst alive and the possible recriminations from the deceased and/or possible jeopardizing of our immortal souls on death. The first problem we have with this central thesis is that there are other social mechanisms that do not have anything to do with the folk psychology of souls that also act to constrain and control social behaviour. A brief consideration of the vast research field on compliance and cognitive dissonance proves that people conform to social conventions through the effect of peer pressure and social evaluation. A belief in retribution from beyond the grave may contribute to this list of cognitive mechanisms for socialization but it does seem a little ad hoc to make it a primary mechanism operating under Darwinian selection. After all, many social animals also show behavioural inhibition and prosocial behaviour without necessitating a specialised cognitive mechanism for a belief in souls.

Our second problem with this central thesis, and the alternative theoretical standpoints addressed in the article, is that they fail to appreciate the extent of supernatural thinking as a general feature of human cognition. Bering offers a convincing range of evidence for the universality of beliefs in an afterlife to cast doubt over the "spandrel hypothesis" of supernatural thought. We would add that a growing body of literature suggests that belief in an afterlife has many positive cognitive effects, such as perceptions of control and security, which may have adaptive advantages. We also agree that previous models of supernatural belief based only on agency-detectors may be sufficient for deities and ghosts but fail to capture many aspects of human experience that are perceived to be under supernatural control. For example, compelling evidence for supernatural beliefs in the domain of folk biology comes from Paul Rozin and colleagues (e.g., Nemeroff & Rozin 1994) who have repeatedly shown that moral contagion from items associated with "evil" people is extraordinarily difficult to ignore and is supported by a belief in a physical manifestation of a moral stance. Or consider the peculiar and yet prevalent belief (found in around 90% of adults) that we can detect the unseen gaze of others (Titchener 1898). In both these examples, we expect that a sizeable number of individuals who explicitly reject notions of the afterlife and souls would still nevertheless follow the general position that garments can be contaminated and that they can feel the unseen gaze of others.

There are similar examples of naïve beliefs in supernatural forces in the domain of folk physics. For instance, naïve reasoning about dynamics is predominantly in terms of the belief that objects are kept moving by internal forces and not external ones (e.g., McClosky et al. 1980). These supernatural internal forces are in direct contradiction to Newtonian laws of physics, but are characteristic of medieval impetus theories and are widely spread throughout both naïve populations and those with formal physics training. Like supernatural beliefs in an afterlife, these naïve impetus theories can be very hard to overcome and are often held simultaneously with formal theories of Newtonian dynamics and used interchangeably (e.g., Viennot 1979). The "hyperactive agency detector" could not extend to explain these diverse supernatural beliefs across domains of thought. On the other hand, it has not been suggested that dedicated and uniquely human cognitive systems have evolved individually in each of these domains that account for these pan-cultural, early developing, and intransient naïve errors. So while we agree that supernatural thinking about the soul could serve to cement social cohesion, supernatural thinking in many domains could operate as socializing mechanisms that enable us to think of ourselves as connected to others by tangible forces, even though much of that reasoning may be implicitly held. We would argue that supernatural thinking, in the form of positing invisible forces that defy scientific validation, is an innate human tendency that goes far beyond the realm of religious thought into all domains of knowledge. We see little evidence in this article that proves that naïve beliefs in an afterlife are qualitatively different from naïve theories in folk biology and folk physics.

We feel that it is important to extend this work into other realms of reasoning because recent commentary, figure-headed by such prestigious names as Richard Dawkins and Daniel Dennett, polarizes the debate by aligning religious belief with irrational memes propagated by the church and aligning atheism with rationality. If religious inclination instead proves to be associated with a universal human tendency towards supernatural beliefs, from which even atheists are not exempt, this arbitrary divide could prove to be both dangerous and scientifically untenable. Rather, we would prefer that the proposal for future research, and the debate in general, recognized that we all entertain supernatural belief systems which must be taken into account when studying human cognition and behavior.

Souls do not live by cognitive inclinations alone, but by the desire to exist beyond death as well

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Abstract: Bering's analysis is inadequate because it fails to consider past and present adult soul beliefs and the psychological functions they serve. We suggest that a valid folk psychology of souls must consider features of adult soul beliefs, the unique problem engendered by awareness of death, and terror management findings, in addition to cognitive inclinations toward dualistic and teleological thinking.

Bering's analysis provides an inadequate "folk psychology of souls" because folks have motivational and affective concerns and are heavily influenced by culture, and these factors must be considered, along with cognitive propensities, to account for soul beliefs.

Bering's reliance on cognitive biases particularly pronounced in children is insufficient for two reasons. First, people relinquish many childish beliefs as they mature, as Bering's research shows. Adults generally do not believe dead mice get hungry, or that taller glasses necessarily contain more milk. Why do soul beliefs persist, when so many childhood ideas do not? How can someone smart enough to elude security and commandeer and steer an airliner precisely into a building believe he will enter a paradise filled with 72 virgins on impact?

Second, adult spiritual beliefs seem quite different than mere cognitive errors of imputing mind; they vary widely across cultures and are often quite complex (e.g., Watson 2005). In some cultures, there was no immortal soul, in others only the

wealthy, or only men, or only women who died in childbirth had immortal souls. In some, moral action affected one's afterlife, in others, not. The first Chinese emperor sent vessels in search of the Islands of Immortality. In the Sumerian Epic of Gilgamesh, Gilgamesh, disturbed by the prospect of death, embarked on a search for immortality. The Christian and Islamic conceptions of soul and afterlife are extraordinarily elaborate, buoyed by many symbols and rituals. The Aztec conception involved sixteen stages of existence and elaborate rituals, including the excision of sacrificial human hearts while still beating. If immortality beliefs were a simple default by-product of cognition, why would these beliefs be so varied and so complex? These fervently held belief systems, with their extensive time, effort, and life-consuming rituals, are neither child's play nor simple elaborations of cognitive errors.

By-products of cognitive inclinations cannot account for the elaborate nature of soul beliefs and the deep commitments to them. Nor is it likely they are primarily products of selection for avoidance of socially prohibited behavior. The prophet Zarathustra replaced the Persian class-based notions of afterlife reserved for the wealthy with the first modern beliefs in the soul's fate determined by moral behavior on earth (Kriwaczek 2002). Thus, belief in afterlife rewards for altruism was culturally constructed (partly to enhance social control) and memetically transmitted, rather than selected for as a cognitive predisposition.

A propensity for altruism could result simply from feelings of empathy and attachment, and sensitivity to contingencies for tangible rewards and punishments. Wouldn't irrational worrying about invisible forces have been counterproductive? Wouldn't self-serving immoral behavior be most adaptive when one's deities would be the only witnesses? How could cognitive predispositions that caused individuals to sacrifice their own offspring, perform time-consuming rituals, or feel crushing guilt at acts that violated the Golden Rule, be selected for, unless these beliefs served some more pressing evolutionary function than protection of reputation?

Bering hints at such a function, mitigating existential despair, but gives it insufficient weight. As many have observed (e.g., Rank's *Psychology and the Soul*, 1931/1961), the dawning realization of the inevitability of death had to be monumentally problematic for proto-humans. Many of our physiological systems function to keep us alive in a perilous world, and yet, thanks to our intellect, we know they will inevitably fail. This had to arouse intense concerns with personal vulnerability, and the resulting potential for anxiety would have been immobilizing without comforting mythic illusions of deistic protections and an everlasting soul. To be willing and able to hunt large game, compete for resources, and so forth, such beliefs provided necessary equanimity and confidence. Although these spiritual beliefs would not always over-ride fight or flight responses to imminent danger, they would allow individuals and groups to function more effectively, with their anxieties largely in check.

Why would people fear no longer existing when they cannot easily simulate it? According to Zilboorg (1943) and others, we are predisposed to fear death because it is highly adaptive to do so – it helps keep us alive. Our brains are designed to react to things that threaten our continued existence with fear, arousal, and defensive responses; from such reactions, it is a simple cortical inference that what we fear is death. Unfortunately, there is no simple fight or flight response to the knowledge of the inevitability of death, leading to the elaborate symbolic defenses provided by culture.

Second, we fear many things before we have experienced them, things we can't simulate – cancer, AIDS, a root canal, bungee-jumping. We fear whatever might cause us pain or end our existence. Third, the non-dreaming phases of sleep and being anaesthetized are somewhat similar to death – in these states, we are not, as far as we can tell, conscious or thinking. Finally, we fear death primarily not because of what we imagine it to be but for what we can easily imagine it takes away: life. We can imagine not seeing, not hearing, not tasting, not smelling, not feeling, not being able to touch or communicate with loved ones, not being able to listen to music, watch movies, take walks, and so on.

Terror management theory (TMT), based on Becker (1971; 1973), posits that spiritual beliefs serve the function of helping humans deny the finality of death (Solomon et al. 1991). The theory posits that over childhood, the security base provided by care-taking adults is replaced by deities and cultural authorities. Just as the young child sustains the love and protection of its caretakers by meeting standards of worth, the adult typically sustains security by adhering to the standards of worth of the spiritual and secular authorities of the culture. From this perspective, deities have so commonly been patriarchal or matriarchal because they have been modeled after the childhood care-takers. Deities are also judgers and punishers because in a world full of tragic, scary events, a deity who does not dole out punishment is not plausible.

Over 250 studies supporting TMT have documented that reminders of death (mortality salience: MS) increase advocacy of beliefs and behaviors that serve to convince people that they are worthy members of a meaningful universe, rather than mere animals fated only to obliteration. For example, MS increases identification with death-transcending groups and ideologies (e.g., I am more than an animal, I am an American!) and bolsters efforts to believe the world is just; and threats to these protective beliefs increase the accessibility of death-related thought (Greenberg et al., in press).

Becker argued that worldviews with spiritual components work best for managing terror. This may be why correlational evidence consistently finds that religiosity is associated with mental health and lower death anxiety (see Pargament 1997). Importantly, experimental research provides converging evidence of a protective terror management role of spiritual belief (Greenberg et al., in press). MS increases bias toward members of one's religion and against proponents of another, reluctance to use religious icons inappropriately, and, among the religious, MS increases belief in an afterlife, religiosity, and belief in prayer. Finally, increased belief in an afterlife and making religiosity salient to religious people reduce the use of secular terror management defenses such as worldview bolstering, and also reduce death-related thinking (Dechesne et al. 2003; Jonas & Fischer, in press). Thus, spiritual beliefs protect people from concerns about mortality.

In sum, although one could limit analysis to cognitive inclinations, doing so provides a very impoverished folk psychology of souls. To truly understand the psychology of souls, we should build on extant knowledge regarding evolution, the nature of soul beliefs, and psychological defenses, and acknowledge the role of the unique selection pressures engendered by human awareness of death in the evolution of supernatural beliefs.

Learning that there is life after death

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Abstract: Bering's argument that human beings are endowed with a cognitive system dedicated to forming illusory representations of psychological immortality relies on the claim that children's beliefs in the afterlife are not the result of religious teaching. We suggest four reasons why this claim is unsatisfactory.

Bering proposes that human beings evolved a cognitive system dedicated to the belief in an afterlife. In support of that claim, he refers to experiments showing that young children often make continuity claims – they assert that mental processes, notably thoughts, feelings, and desires continue after death – whereas older children are more likely to deny their continuity. Bering concludes that this developmental pattern is consistent with the early functioning of the proposed cognitive system but not with the alternative hypothesis of religious teaching. On that hypothesis, claims that mental processes continue after life would be more frequent among older as compared to younger children.

We think the developmental pattern is more complex than Bering allows and that, on close examination, it underlines a crucial role for religious teaching. First, two recent studies indicate that continuity claims increase rather than decrease with age, both in Spain (Harris & Giménez 2005) and in Madagascar (Astuti & Harris, submitted). The most plausible explanation of this age change is that as they get older, children are increasingly likely to encounter and assimilate afterlife beliefs in their community. A likely explanation for the retrenchment of such beliefs reported by Bering is that children come to differentiate between the fate of human beings and other animals, including mice (the focus of Bering's research): they learn that human beings enjoy an afterlife whereas mice do not.

Still, Bering could reasonably insist that children start out with a global and innate set of afterlife beliefs, even if religious teaching reinforces or denies their application to particular creatures. However, other evidence undermines this defence. Astuti and Harris (submitted) report that 7-year-old Vezo children in Madagascar generally assert that all processes that sustain or are sustained by life, including cognitive and emotional processes, cease at death. The most plausible explanation for this finding is that Vezo children have considerable first-hand experience of the biology of death because they observe and actively participate in the slaughter and dismemberment of animals, and they routinely attend funerals where they observe the persistent immobility of the corpse and experience the stench of decomposition. On the other hand, they are given no explanation of the meaning of the various ancestral and burial rites that they witness (Astuti, forthcoming a).

Third, we note that other developmental findings cast doubt on Bering's simulation-based proposal that children find it difficult to conceive of the absence or cessation of mental processes, including thinking, because they have never experienced any such cessation. A series of experiments by Flavell and his colleagues has shown that young children readily conceive of an absence of thinking. Indeed, they do so in circumstances where adults would typically assume that thinking is all but inevitable. For example, when asked whether it is possible to sit quietly and entertain no thoughts for a sustained period, the majority of 5-year-olds assert that it is possible (Flavell et al. 2000).

Finally, we note that whatever disposition children and adults show toward afterlife beliefs, their assertion or denial of those beliefs is quite context-sensitive. When asked about death in the context of religious practices, beliefs in continuity are activated; when asked about death in the context of medical or secular practices, beliefs in discontinuity are activated (Astuti & Harris, submitted; Harris & Giménez 2005). This context-sensitivity is mirrored in everyday life: A dead corpse may be prepared for burial with no expectation that it retains sentience; the dead person, by contrast, may well be attributed thoughts and feelings (see Astuti [forthcoming b] for an ethnographic illustration from Madagascar).

In sum, although we do not dispute the claim that children and adults are prone to think in a dualistic fashion, we doubt that such a tendency reflects an evolved system dedicated to afterlife beliefs.

Folk psychology meets folk Darwinism

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Abstract: The fact that beliefs in the supernatural are useful to people who hold them does not necessarily mean that these beliefs confer an evolutionary advantage to those who hold them. An evolutionary explanation for any biological phenomenon must meet rigorous criteria, but the facts in this case, even when taken at their face value, fall well short of these criteria.

> Evolutionary adaptation is a special and onerous concept that should not be used unnecessarily, and an effect should not be called a function unless it is clearly produced by design and not by chance.
>
> —G. C. Williams (1966)

Bering's proposal has two main facets. The first deals with evidence that purports to show that beliefs in the supernatural are advantageous to those who hold them. For the sake of argument, we will take this evidence at face value so we can focus on the second facet of Bering's proposal, which consists of his hypothesis that such beliefs arise from "an organized cognitive 'system' dedicated to forming illusory representations" that has "evolved in response to the unique selective pressures of the human social environment" (target article, sect. 1, para. 5).

Bering claims that his hypothesis is "grounded" in the theory of natural selection, but provides no explanation whatsoever as to how. This is unfortunate, because such an exercise would have made it self-evident that an evolutionary hypothesis is neither warranted nor justified in this case. Although Bering's hypothesis is intuitively appealing, it is invalid because it arises from a misapplication of the theory of natural selection. Given the evidence at hand, invoking the theory of natural selection to explain the prevalence of beliefs is about as scientifically valid as invoking the theory of gravitation to explain the attraction between two people.

Briefly, for a given trait to evolve through natural selection, individual organisms with the trait must have greater fitness, that is, be more likely to survive and reproduce. Specifically, this means not only that a given trait must be heritable, but also that the trait must either increase the fitness of the organism by itself or must be associated with (or, technically speaking, be pleiotropic to) one or more of other heritable traits that do so (for a more rigorous treatment of the subject, see Futuyma 1998).

In the present context, the aforementioned evolutionary principles require not just that the belief in the supernatural be a heritable trait, but also that those in the relevant previous generations who held such beliefs were more likely to have survived and reproduced. Bering does not even begin to establish either the heritability or the increased fitness, much less both. The closest he comes to doing this is to argue that the beliefs in the supernatural are useful to people who hold them. But sociological utility is a far cry from fitness. In other words, the fact that those who hold such beliefs fit in better from the social standpoint does not mean that they have greater fitness from the evolutionary standpoint. Of course, our objection here is not that Bering fails to use insider's jargon when referring to evolutionary concepts, but that he confuses non-evolutionary concepts for evolutionary ones. In as much as he infers natural selection based on sociological utility, Bering is indeed confusing utility with fitness. As to heritability, the closest Bering comes to addressing it is to argue that "Kindergartners understood that various biological imperatives . . . no longer applied to the dead mouse" (sect. 2, para. 2), which hardly lays the issue to rest.

Of course, natural selection is not the sole mechanism of evolution. Mutation, the ultimate source of variation on which natural

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? Being 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.

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 otholithic 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

would like to suggest a third option that combines the cultural selection of the former view with a limited version of the adaptationism of the latter approach.

This cultural adaptationist view has to show that the case for specific biological adaptation is weak, while showing that belief in souls has some adaptive value under at least some circumstances. Space permits only a sketch in response to Bering's evolutionary argument, but the general strategy can be demonstrated with a few examples. For example, Kuhlmeier et al. (2004) found that 5-month-olds do not apply the same principle of continuous motion to humans that they apply to inanimate objects, from which Bering concludes that they are intuitive dualists. But Kuhlmeier et al. themselves acknowledge that one cannot tell, "whether the results of the present study are due to a distinction between animates versus inanimates, intentional agents versus non-intentional objects, or humans versus other entities" (p. 101). Nor does the fact that kindergartners make more psychological attributions to a dead mouse than do older children or adults show that the origins of such beliefs cannot be exclusively cultural. Children routinely produce conceptual overgeneralizations in early and middle childhood (Bloom 2004). Furthermore, the non-adult pattern of attributions to the dead made by young children must be viewed in the light of considerable evidence that the concept of death itself is poorly grasped until well into middle childhood (Childers & Wimmer 1971) and varies as a function of culture (Yang & Chen 2006) and religious upbringing (Florian & Kpavetz 1985). In general, alternative accounts, sketched below, are available for the evidence Bering reviews.

Bering carefully notes that specific beliefs about the afterlife can vary across cultures, arguing that the tendency to have beliefs of this *kind* is universal and thus best explained by appeal to evolutionary processes. But general-purpose cognitive mechanisms operating on varying cultural content may still find common patterns or kinds because some of these mechanisms are in the business of doing just that. For example, the fact that people continue to behave on occasion as if a deceased person is still alive has to be weighed against the same tendency to continue habitual behaviors toward vanished inanimate objects (walking around a chair that has been moved, reaching for a light switch that has been replaced, etc.). Similarly, the fact that there is a tendency in many cultures to reinforce authoritarian proscriptions by appeal to unseen watchers (ancestors, gods, or God) might be evidence for an evolved functional illusion that the self transcends time and place, but an equally sound argument can be made that a combination of a general capacity for off-line prediction and the ability to think abstractly about non-perceptual events and objects have been recruited by many successful cultures to enhance the adaptation of their members to life's vagaries. Although the relevant theory in this case is also speculative, Occam's razor favors an appeal to the evolutionarily adaptive advantages of these general-purpose cognitive endophenotypes (e.g., see Kanazawa 2004) over the appeal to a specific, error-based module for belief in souls. Belief in an afterlife is far from the only common feature of religious systems and one can't help worrying that religion modules will begin to proliferate uncontrollably. If we need a special purpose soul system, can modules for belief in creation narratives, the power of ritual and magical artifacts, angels, demons, incantations, and so forth be far behind?

Pursuing the theoretical strategy of using general cognitive mechanisms to explain religion does not, however, commit one to the view that religion is maladaptive or non-adaptive. A substantial literature indicates an association between religious commitment and happiness, health, and well-being (Hiadt 2005; Koenig & Cohen 2002; Livingston 2002). Often overlooked, however, are the individual differences in the adaptive significance of religious belief, including belief in the afterlife. For example, Ellison (1991) has shown that the benefits of religious belief tend to accrue only to those who hold them with strong conviction. Furthermore, this degree of existential certainty interacts with level of education and frequency of life trauma to determine life-satisfaction and happiness. It also appears that strong atheistic convictions confer the same benefits (Shaver et al. 1980). Content of belief may matter less than commitment, a pattern difficult to reconcile with Bering's account.

Bering has performed an invaluable service by attempting to integrate a disparate set of findings in support of an evolutionary account of why human beings seem so drawn to belief in souls. Indeed, it is easy to get caught up in finding other patterns consistent with his view (e.g., the transformation of Buddhism over the centuries from an atheistic, non-agentistic religion in its original form to a system heavily populated with souls and spirits in many of its more modern forms; see Livingston 2005). By making the case so forcefully, he compels us all to think more carefully and in greater detail about how to account for the phenomena he describes. Some reformulation of existing theory is clearly needed, but for the present, cultural adaptationism grounded in evolved general purpose cognitive systems represents a viable alternative to his account. Among the virtues of this alternative is that it more readily explains widespread and increasing rates of disbelief, as well as the folk psychology of souls.

Beliefs in afterlife as a by-product of persistence judgments

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Abstract: We agree that supernatural beliefs are pervasive. However, we propose a more general account rooted in how people trace ordinary objects over time. Tracking identity involves attending to the causal history of an object, a process that may implicate hidden mechanisms. We discuss experiments in which participants exhibit the same "supernatural" beliefs when reasoning about the fates of cups and automobiles as those exhibited by Bering's participants when reasoning about spirits.

The central claim of Bering's thought-provoking target article is that evolution has produced a dedicated cognitive system to support illusory beliefs in a soul – a psychological self that persists after the physical body has ceased to exist. Here we suggest, instead, that a more general and mundane cognitive process – one needed to track individuals over time – may account for belief in the survival of these individuals after death.

To conceive of any individual requires the ability to identify it as the *same* entity over time and place. Often, such tracking must occur through interruptions (e.g., occlusion, lapses of attention, or sleep), changes in appearance (e.g., a child growing into an adult), or feature instabilities (e.g., a cloud changing shape). Here we focus on how people reason about the persistence of objects – more formally, how people decide that a description of an object at one time t_0 belongs to the same object as does a description at another time t_1 (for a review of the way the visual system makes similar judgments, see Scholl 2001).

Most philosophers agree that causal factors play a role in object persistence (Nozick 1981; Parfit 1984). Based on these accounts, we have recently proposed a cognitive theory that specifies the role of causality in judgments of identity over time (Rips et al. 2006). According to this Causal Continuer account, two descriptions belong to the same object if (a) the object at t_1 is among those that are causally close enough to be genuine continuers of the original item, and (b) it is the closest of these close-enough contenders.

One of the key features of the causal continuer model is that changes in similarity, spatial-temporal continuity, or even

basic-level category membership do not necessarily entail that an object goes out of existence. For example, Blok et al. (2005) report an experiment in which participants read stories about an individual (e.g., Jim) who has a severe traffic accident and must undergo radical surgery. Participants learned that Jim's brain was transplanted to a different body. On some trials, scientists placed the brain in "a highly sophisticated cybernetic body," whereas on others they placed it in a human body that scientists had grown for such emergencies. In each case, Jim's old body was destroyed. The stories described the operation as successful in allowing the brain to control the new body, but participants also learned either that Jim's memories survived the operation intact or did not survive. After reading the scenario, participants rated their agreement with each of two statements: (a) the transplant recipient is Jim after the operation, and (b) the transplant recipient is a person after the operation.

Participants were more likely to agree that the post-op recipient was still Jim if Jim's memories were preserved. But whether these memories were embodied in a human or in a robot body had a much smaller effect. In contrast, agreement about whether the end product was a person mainly depended on whether the recipient object had a human rather than a robot body, and relied less heavily on whether Jim's memories remained intact. This combination of effects produced the finding that when Jim's memories survived in a robotic body, participants were much more likely to think that the transformed individual is Jim than that the transformed individual is a person! The belief that Jim persists despite a radical change in basic-level category may be analogous to the belief that there is an intuitive causal continuer that shares a person's psychological characteristics after death – the individual is the same, yet the category has changed. However, such judgments fall out of predictions made by the Causal Continuer model and need not derive from a specialized cognitive system for theological beliefs, as Bering posits.

Bering claims that the evolutionary rationale for such an innate theological system was to tame the self so that it became "less likely to engage in acts that, if publicly exposed and harmful to one's social reputation, seriously impaired genetic fitness" (sect. 5, para. 1). This system should therefore apply with particular force to people. Similarly, as Bering notes, other theories hypothesize that the concepts of person and animal may promote supernatural beliefs because these concepts "act as flypaper for salient, 'counterintuitive' cases" (sect. 2.3, para. 3) (e.g., Atran & Norenzayan 2004; Barrett 2000; Sperber & Hirschfeld 2004). Beliefs about the persistence of individual objects, however, are clearly not limited to persons or animals and are not necessarily counterintuitive or supernatural. Thus, to determine whether causal identity mechanisms provide a better account than a special theological one, it is important to consider cases involving nonpersons. For example, do we observe similar patterns of judgments with artifacts as those we found with people like Jim?

In a second study, Blok et al. (2005) told participants about a sci-fi "transporter" that was capable of dividing an object into its most basic particles (a device that surely would have stirred the interest of any Star Trek fan). Once disassembled, the particles were sent through a "particle pipeline" and then reassembled on the other end. The one catch to the transporter was that sometimes there was a glitch – occasionally the reassembled product came out looking like a different type of object. For example, a car might turn out to resemble a boat. Participants read about transformations involving both living kinds and artifacts (e.g., Jim's cat "Nancy," or Jim's car "Rustbucket"). After reading each scenario, participants rated their agreement with two statements: (a) the object is a [car] after the transformation, (b) the object is [Rustbucket] after the transformation.

Relevant to the present discussion, we observed a pattern of judgments similar to those of the person experiment described above. For both animals and artifacts, when the transformed item had the appearance of a different (but neighboring) category, ratings of category membership were reduced to a greater extent than were ratings of individual persistence. For instance, when participants were told that the car Rustbucket was sent through the transporter and reconfigured to resemble a boat, people lowered their agreement ratings more to the statement that it was still a car than to the statement that it was still Rustbucket. Thus, belief in the persistence of individuals through radical changes in kind is not restricted to persons and need not include the notion of a soul. At least for some participants, it is more likely that Rustbucket is "reincarnated" as a boat than that Rustbucket ceases to exist when it ceases to be a car. As a perhaps more ecologically valid example, some cultures buried their dead with treasured artifacts (e.g., the Egyptians or Mayans). Though obviously these artifacts (eventually) decompose along with the body, such practices are consistent with the idea that artifacts "survive" death in the same manner as persons.

In sum, we suggest that general cognitive processes – processes dedicated to keeping track of individuals across time and transformation – may account for beliefs in an afterlife. Religious and supernatural dogmas no doubt serve to enhance the richness of such beliefs. They may be responsible for the idea that deceased individuals live in a heaven populated with loved ones. But the basic process of inferring the existence of individuals after death may be a natural consequence of everyday strategies for tracking these individuals. The "illusory" aspect of belief in an afterlife may result simply from the believers' lack of knowledge about what is, in fact, a fairly sophisticated idea: that a person's psychological characteristics depend on bodily processes and therefore come to a halt when these processes do.

If this is correct, there is no need to posit a special purpose cognitive system to explain belief in a soul. Nor is there a need to trace such beliefs to a mechanism that has evolved in order to shape moral conduct. Bering could argue that object tracking is just another cognitive feature that evolution has "set to work on" to produce a system of hardwired theological beliefs. But if object tracking is the cause of belief in a soul, then the theological system seems to have little work to do, and, like the soul itself, there is correspondingly little reason to think that it exists.

Do children think of the self as the soul?

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Abstract: Bering's work provides new insight into the child's concept of the self. For his results indicate that children don't regard bodily identity as required for identity of self across time. Bering's methodology for investigating afterlife beliefs might also be exploited to explore the extent to which children think that psychological similarity is required for sameness of self.

Jesse Bering's delightful research indicates that the belief in an afterlife is quite natural for children. The work also has important, but largely unnoticed, lessons on the child's concept of the self. The results provide some evidence for, and a methodology for exploring further, the hypothesis that children think of the self as the soul.

One central tenet of the traditional view that the self is the soul is that the self is *not* the body. Surprisingly, earlier developmental work on the child's concept of self has suggested that children identify the self primarily with bodily features. For example, when young children were asked "What will not change about yourself when you grow up?", 7-year-olds tended to refer to physical characteristics (e.g., hair color) and only rarely referred to

psychological characteristics (Mohr 1978, p. 428). Indeed, one prominent view has been that young children have only a "physicalistic" conception of the self (e.g., Montemayor & Eisen 1977; Selman 1980). Bering's results provide the antidote to this view. In Bering's experiments, children tend to say that Brown Mouse is still hungry and still thinking about Mr. Alligator, despite the fact that Brown Mouse's body has been destroyed. This provides new evidence that children have a concept of self that is not identified with physical, bodily features. For it's natural to interpret the children as claiming that Brown Mouse – *the same individual* – persists after the destruction of his body. This indicates that children don't regard bodily identity as required for personal identity. The children seem to think that the same self persists across destruction of the body.

A second central tenet of the soul view is that the self can't be identified with a set of memories, thoughts, or other psychological states. Thomas Reid expresses the point with characteristic directness: "Whatever this self may be, it is something which thinks, and deliberates, and resolves, and acts, and suffers. I am not thought, I am not action, I am not feeling; I am something that thinks, and acts, and suffers" (Reid 1785/1969, p. 341). Psychological states change constantly, and so they seem too fickle to be the basis for an enduring self. Rather, soul theorists maintain that the self is the thing that has the *capacity* for psychological states, regardless of the particular psychological states it happens to have. A soul theorist maintains that it is *because* the self endures that it is possible for the psychological states to persevere.

Bering's experiments do not tell us whether children's views of the self coincide with this second tenet of the soul view. For the experiments do not explore whether children would maintain that Brown Mouse can continue to exist even if he loses his distinctive psychological states. However, Bering has given us the most promising methodology to date for exploring this question. We can use his methodology to examine the extent to which children think that psychological similarity is required for personal identity. This might be done with two changes to Bering's design. First, one would need to ask exclusively about psychological *capacities* rather than psychological states. In Bering and Bjorklund (2004), some questions are about the specific psychological states that Brown Mouse had before he got eaten. For instance, children are asked of Brown Mouse, "Is he still thirsty?" and "Is he still *thinking* about Mr. Alligator?" To show that children's views cohere with the second tenet of the soul view, we would have to ask only about capacities, like, "Will Brown Mouse *ever think again?*" The second change is more challenging – we would need to specify that after Brown Mouse is eaten, there will no longer be anyone who has the particular psychological states that Brown Mouse had. For instance, we might explicitly state that no one will ever remember the things that Brown Mouse did. If children still tend to maintain that Brown Mouse will think and feel again, then this would provide evidence that children's notion of the self also follows the second tenet of the soul view.

There is yet a third tenet of the traditional soul view – that the soul is an immaterial substance. It is natural to think of this third tenet as providing a story about the metaphysical ground of the capacity to have psychological states. Bering's data do not show that this tenet is reflected in the child's view of the self, nor does he suggest otherwise. I think it unlikely that children naturally have opinions on such rarefied issues in metaphysics. Rather, the idea that there is an immaterial substance underlying our psychological states is most likely an intellectual innovation that has become part of the culture in major religious and philosophical traditions. But if children find it intuitive that the self can survive the death of the body and the radical disruption of psychological states, this would go some distance to explaining why the doctrine that the self is an immaterial substance has achieved such cultural prominence.

The Godfather of soul

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Abstract: An important component of souls is the capacity for free will, as the origin of agency within an individual. Belief in souls arises in part from the experience of conscious will, a compelling feeling of personal causation that accompanies almost every action we take, and suggests that an immaterial self is in charge of the physical body.

Why is it useful to think we have souls? Jesse Bering would have us believe that the concept of a soul is derived from evolutionary pressures of several kinds. In his view, the soul may arise because we are enamored of the idea of *agents*, and we overextend and embellish this idea to the point of perceiving people as having essences that persist after death – if not also existing prelife. From Bering's perspective, a soul is a construction we place on others. But what of the soul we know the best – our own? Bering's approach offers no special status to our own souls because it overlooks the *experience* of human agency. One key use of the idea of a soul is to explain the unfathomable source of our own ability to do things merely by wanting them. The soul is a way of understanding the experience of conscious will.

Think for a minute of the magic of agency. You may not be able to create world peace just by willing it, but there are a remarkable number of things you can do nonetheless. You can open a soda can, lift it up, and toast Bering – all through some wildly supernatural procedure whereby the things you desire just go ahead and happen! And how do you know that *you* did this? True, there are a number of cues a person could use to sleuth out personal responsibility for action. But for the most part, conscious will is experienced as an authorship emotion rather than a reasoned deduction. We think we possess free will because it feels like we do. Feelings of personal causation are indicated by certain cues present around the time of an action, like visual feedback, and physical feedback from the body (Wegner & Sparrow 2004).

Perhaps most essential to the experience of will is the connection between thoughts and action. You find yourself thinking about eating lunch, then lo and behold you find yourself down at the diner ordering a cheeseburger. What else could have caused this, if not your own free will? According to the theory of apparent mental causation, the experience of will arises when we are aware of some thought about the action just before it happens, and the action cannot be readily connected to some other cause (Wegner 2004). Ordering the burger feels like a freely willed act if you were just thinking about cheeseburgers and their deliciousness, but less so if the cheeseburger option was just recommended by your pushy waiter.

Several studies conducted in our laboratory suggest that these three principles of priority, consistency, and exclusivity create the feeling of conscious will over actions, even if actions are not truly self-caused. In a study modelled after the Ouija board, people felt more control over the movements of the disk when given a preview where it was about to go, and if this preview occurred just before the action (Wegner & Wheatley 1999, see also Aarts et al. 2005). Feelings of conscious will are attenuated, however, when there are other competing forces or agents that might be responsible for the action. For example, people feel more responsibility if they are subliminally primed to think of the self just before an action, but when primed with the identity of other agents, feelings of responsibility decline (Dijksterhuis et al., under review). These cues are so persuasive that they can create feelings of conscious will over actions clearly beyond

personal control, including controlling the actions of others (Wegner et al. 2004) and the ability to enact actions at a distance (Pronin et al. 2006).

The feeling of conscious will is an inescapable part of life, and the experience is so compelling it is hard to imagine that it may be just an illusion. Conscious will is not only an essential component to the concept of souls, but the experience can also help explain why souls have their ethereal quality. As Bering points out, belief in souls stems in part from the inability to reconcile how mind arises from body (the *hard problem of consciousness*). Although we have a pretty good understanding of how the heart, lungs, stomach, and other organs function, when trying to comprehend how the brain thinks we are still left scratching our heads. The experience of will presents a particularly tricky question in this puzzle. Agents are seen as first causes, or uncaused causes – the origin and author of action. Discussions of the function of an authorship emotion for physical action point to the need for a controller of action, an internal operator who guides our decisions (e.g., see Wegner 2005). But if the brain is the source of cognition, then how does the thinker direct the thinking in one direction or another? Even if we thought we could pin down the location of the internal operator in the brain, we would still need to explain the controller itself. The popular solution to the search for free will is that the brain is not the ultimate source of thinking, but there is some nonmaterial self – the soul – that somehow operates to control the body.

The pervasive belief in an afterlife is possible because of this mind–body division. And wherever the soul goes, it brings free will with it. Indeed, the experience of free will is often included in the folk understanding of the moment of death: Death occurs when one is ready to die, loses the will to live, or chooses to go into the light. Bering suggests that belief in an afterlife results in part because we don't know what it is like to be dead. We may also be unable to fathom the absence of will. It is difficult to imagine that such a potent force could just dissolve into nothingness. After all its majesty and magic, surely conscious will cannot be just snuffed out of existence, at least not without its permission. James Brown, move over: Conscious will is the Godfather of soul.

No evidence of a specific adaptation

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Abstract: Bering's findings about the mental representation of dead agents are important, although his opposition between "endemic" and "cultural" concepts is misleading. Endemic and cultural are overlapping, not exclusive categories. It is also difficult to see why reasoning about the dead would require a specific cognitive mechanism. Bering presents no clear evidence for the claim that the postulated mechanism is an adaptation.

Bering argues that his theoretical framework is in some respect more plausible than the "standard model" (Boyer 2005) in the cognitive science of religion (e.g., Bering 2002a; 2003a). He claims that the "cultural epidemiologists" regard religious concepts as entirely explicit in nature and as "socially acquired" or being "generated by culture" (Bering 2002a, p. 293). Bering (2002a; 2003a), however, thinks that ghost concepts are "endemic" or "innate," not something learned from others. The "central thesis" of the target article is that an organized cognitive system, dedicated to form illusory representations of psychological immortality and symbolic meaning, evolved in response to the unique selective pressures of the human social environment.

Bering raises an important question about religion and adaptation, although his nativist claim is somewhat problematic. He argues that *specific* afterlife beliefs are *not* "direct products" of natural selection; what has been selected for is "an intuitive pattern of reasoning" that does not hinge on the presence of explicit religious concepts. Bering thus makes a distinction between explicit religious concepts learned from culture and innate patterns of reasoning. He has previously argued that "the very concept [of a ghost] itself, has natural foundations in the human mind," asking whether it might be possible that "the general idea of an afterlife is not so much implanted in people's heads by way of 'exposure' to counterintuitive tales, as it is *already present*" in human cognitive structures (Bering 2002a, p. 269).

This line of reasoning is also present in the target article. Bering argues that Boyer (2001), Pyysiäinen (2001), Atran (2002), and Sperber and Hirschfeld (2004) approach religion as a (fuzzy) set of ideas that survive in cultural transmission because they effectively parasitize evolved cognitive structures. These "epidemiologists" are not interested in how "a representational bias for envisioning personal immortality" has "impacted the net genetic fitness of individual humans in ancestral environments."

There is, however, a conceptual confusion involved in Bering's way of distinguishing his approach from the standard model. Barrett (2003), Boyer (2003a), and myself (Pyysiäinen 2003) pointed out three years ago that Bering's dichotomy between endemic and cultural concepts is misconceived; epidemiologists do not regard culture as a set of "entirely explicit" concepts that are simply learned, irrespective of implicit biases. Concepts cannot be divided into two mutually exclusive classes: those we are born with and those we learn from others. There are only concepts represented in mind; some of them are communicated to others and thus may become widespread. A representation is cultural to the extent that it is represented by many persons and is preserved in various versions over time, no matter what its origins are.

According to Barrett (2003), nativists such as Bering focus on how the cognitive machinery of individuals "produces" intuitive ideas and behaviors that may then receive augmentation from explicit ideas learned from culture. The epidemiologists, in turn, are not necessarily interested in the origins of concepts and beliefs; instead, they try to explain the distribution of representations in populations. Widespread ideas are typically such that they are easily adopted because it is possible to enrich them by one's intuitions. Thus, there need not be a contradiction between nativism and epidemiology.

The actual difference between Bering and the standard model is in that Bering presupposes a pattern of reasoning dedicated *specifically* to making inferences about afterlife. Whereas Boyer thinks that beliefs about dead agents are mediated by psychological adaptations that enable us to reason about agents in general, Bering holds that reasoning about dead agents is based on a task-specific adaptation (Boyer & Barrett 2005; cf. Stone & Gerrans 2006).

By the same token, Bering is committed to an adaptationist view of religion, whereas in the standard model religion is an evolutionary by-product (see Atran 2002; Bulbulia 2004). All ideas of counterintuitive agents, such as ghosts, gods, and ancestors are represented using the normal mechanisms of agent representation, adding one minor modification or "tweak" to an intuitive representation (Boyer 2003b). No specific mechanisms are needed to mediate different types of agent representations.

Surprisingly, Bering also suggests that interactions with imagined dead agents might be cases of "off-line" social cognition in the sense that the dead are represented as absent but existing persons. This, however, implies that there is no *specific* mechanism for reasoning about dead agents. The specificity of the "intuitive pattern" has to be only in its domain of application, not in the mechanism itself.

If this is so, then we also have to look for adaptations in agent detection and theory of mind in general, not in special concepts

of dead agents. The weakest part of Bering's contribution is precisely his evolutionary speculations. It is not much of an argument to say that supernatural illusions *may* have had fitness-enhancing effects, and that if this is so, then they *might* represent a specific cognitive adaptation (see Sterelny 2003). Bering hints at the problem of the evolution of cooperation but does not really explore it (see Axelrod 1990; Nowak & Sigmund 1994; 2005; Nowak et al. 2004; Richerson & Boyd 2005). Saying that the ability to entertain ideas about supernatural agents "might have led" our ancestors to accept the moral norms of their community raises more questions than it solves (see Boyer 2004; MacIntyre 2004; Pyysiäinen 2006). As I see it, Bering's ingenious experimental work is best interpreted within the standard model. Developing evolutionary arguments about morality and cooperation would require a more rigorous methodology.

An unconstrained mind: Explaining belief in the afterlife

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Abstract: Bering contends that belief in the afterlife is explained by the simulation constraint hypothesis: the claim that we cannot imagine what it is like to be dead. This explanation suffers from some difficulties. First, it implies the existence of a corresponding belief in the "beforelife." Second, a simpler explanation will suffice. Rather than appeal to constraints on our thoughts about death, we suggest that belief in the afterlife can be better explained by the lack of such constraints.

Why do so many people believe in life after death? According to Bering's simulation constraint hypothesis, the common-sense belief in the afterlife originates in part from the difficulty of mentally simulating a scenario in which one does not exist. Such an act of simulation is difficult because it invites one to imagine what it would be like (in the technical sense of "what it is like," from Nagel 1974) not to exist – an impossible feat. Because one cannot imagine what it would be like to be dead by imagining what it would be like not to exist, one imagines instead what it would be like to exist apart from one's body. This leads to the belief in psychological persistence after physical death.

If the simulation constraint hypothesis is correct, then, we believe in life after death because we cannot imagine ceasing to exist after death. But it is no easier to imagine one's nonexistence after death than it is to imagine one's nonexistence before the start of bodily life (say, before conception). What the simulation constraint hypothesis predicts, then, is belief in a stronger form of psychological immortality than the one Bering considers, namely, belief in the afterlife coupled with belief in the "beforelife." The question is: Do these two beliefs have equal currency?

This is an empirical question, and answering it will require careful experimental investigation, using methods similar to those described in the target article. This investigation is ongoing (Bering, personal communication). But there is reason to suspect that the answer to the question is no. There appears to be a far greater prevalence of belief in the persistence of the soul after bodily death relative to belief in the preexistence of the soul before bodily life.

In historical and contemporary Christianity, for example, the dominant views of the soul are creationism and traducianism. According to these views, the soul originates at the moment of conception, either by a creative act of God (as in creationism) or by generation from the souls of one's parents (as in traducianism). Thus, both creationists and traducianists deny that the soul exists prior to conception. Though some Christian sects, such as Mormonism, insist on the preexistence of the soul relative to conception, this is very much a minority view in Christian theology, both past and present. The same is true of Judaism and Islam. By contrast, belief in the continuing existence of the soul after death is shared by most major world religions, including Christianity, Judaism, and Islam. While this discrepancy might be explained in other ways, it suggests that belief in the afterlife and belief in the beforelife are not equally at home in common sense. If that turns out to be true, the simulation constraint hypothesis is in trouble.

Fortunately, we can explain the common-sense belief in life after death just as well without appealing to the idea of constraints on simulation. Instead, we can appeal to the relative absence of such constraints. In the target article, Bering himself gestures towards the explanation we have in mind: "[T]he nature of the body's role in producing the subjective experiences of emotions, desires, and beliefs seems not as amenable to children's scientific theories of dead minds (or, indeed, even to adults' formulation of scientific theories regarding phenomenal consciousness and the brain, e.g., *qualia*)" (sect. 2.1, para. 6).

Here's how the story goes in a bit more detail. Children and adults alike tend to think of the mind in general – and phenomenal consciousness in particular – in terms that are sharply distinct from, and even cognitively opposed to, the terms in which they think of physical-causal mechanisms such as the brain and other parts of the body (Robbins & Jack 2006; see also Bloom 2004). Those links between the mental and physical that we do understand to exist are few and far between, and they apply only to a limited range of mental states (Bering & Bjorklund 2004). Hence, our thoughts about the physical do little to constrain our thoughts about the mental.

In particular, the thought that our body will give out at some point in the future does not lead us to think that our mind will do the same. Indeed, our cognitive architecture may dispose us to reach the opposite conclusion. The very fact that the mental and the physical seem so starkly different may lead us to believe in mind–body dualism. It's a short step from belief in dualism to the belief that at least some psychological states, such as conscious thoughts and feelings (which seem terminally resistant to causal-mechanical explanation; see Robbins & Jack 2006), will persist after death.

Evolution's lost souls

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Abstract: The target article speaks loudest about what it cannot see – that man exists in God. Its claim that supernatural beliefs are "evolved errors" rests on unwarranted assumption and mistaken argument. Implications for evolutionary study are considered.

Either man is the child of God, or he is not. If he is divine, he is soulful and immortal, he transcends nature (is supernatural) and transcends psychology. If he is not divine, he is soulless and mortal, he is part of nature and his beliefs about soul and afterlife are errors and illusions of folk psychology.

The target article is clear about the facts. Infants are common-sense dualists who do not see people in the same way they see material objects. Children hold natural beliefs in an afterlife. Children reason better about the omniscient mind of God than about the limited minds of people and animals. Undergraduates

are spooked into moral behavior by the suggestion of supernatural presence. And, generally, people are "intuitive theists" who find teleology in the natural world and who find intelligent design in their personal lives.

The target article is clear also about the question raised by the facts:

> [I]f God does not exist, then the unique self (i.e., the individual "soul" of any given person) cannot be the product of intelligent design; rather, it is simply the end product of standard machinations of genetic and environmental recombination. [. . .] The task remains for cognitive scientists to determine why the teleological position is so frequently adopted, and prospers so vehemently, over the mechanistic alternative. The human mind cannot seem to easily accommodate itself to a godless, evolutionary canon when it comes to the self's existence. (target article, sect. 3)

And the target article is clear about its reckoning of this question. Human thinking suffers three evolved errors: *Type I errors* in reasoning about the afterlife, *teleo-functional errors* leading to belief in the soul's intelligent design, and *theory of mind errors* leading to belief in supernatural causes. These errors culminate in an illusion that the self is related to a supernatural creator and has a moral obligation to that creator. And these evolved errors and illusions explain why the "teleological position" prospers and thereby why the folk psychology of souls takes the form it does.

Although clear, the target article presumes everything by its question. On the premises that God does *not* exist and the soul is *not* an intelligent design, the article asks how evolution produced appearances to the contrary. These premises are not statements of scientific fact, but are statements of secular faith. Why these premises? What is the evidence and argument for them? And what is the cost in accepting them? More to the point, what if God *does* exist and the soul *is* an intelligent design? How dramatically the question changes – from being about error and illusion to being about Natural Law, from being about how people prosper in spite of themselves to being about how they prosper in the light and love of God. What the target article describes as the naïve misapprehension of the child becomes the wisdom of the child.

From its unjustified premises, the target article comes to a false conclusion. Evolutionary science cannot explain why man thinks what he does. Evolutionary science is about matter, not about meaning. It explains the origin, proliferation, and disappearance of material forms (e.g., physical traits, abilities, dispositions), but not of mental forms (e.g., ideas, beliefs, feelings) (see Atran 2002). The latter are not material survivals, but are immaterial creations. This is plain in the article's own ideas about the "errors" of religious thinking. Are these ideas also evolved? And if so, how are they selected alongside the ideas they rule out? Furthermore, evolutionary science is about natural objects, not about man. It misunderstands man when it traces his every feature, including those that are unique, to his physical being (e.g., if man is the only animal that can think creatively using symbols, it is because he has an enlarged brain with a prominent cerebrum). By confining man to his physical capacities, evolutionary science fails to account for his unique and creative use of these capacities. It leaves to question why he uses his capacities as he does and why animals that share many of these capacities (e.g., the chimpanzee) do not use them the same way. Why does man reason? Why does man make art? Why does man seek life in God? In a word, evolutionary science fails to explain man *qua* man.

This, finally and ironically, is the loud unspoken message of the article:

> [J]ust as we can close our eyes to prevent light from being converted into neural signals, science may provide a minority (i.e., nonbelievers) with the armamentarium to close their eyes to the supernatural. (sect. 3, para. 9)

To see man with eyes open – to see him as he is – is to conceive him differently. It is to see him, not in the blinkered metaphysic of evolutionary science, but in the revealing metaphysic of Divine creation (Sandelands 2005). It is to see him, not as an object of the natural world, but as a creative being in God. It is to see him as a supernatural being, a genuine soul. Only when seen in this second way – a way well-described by the world's great faiths – can satisfactory answers be found to the main questions about his life: What is a person? What is society? What is freedom? What does man want? And, what is the good? A full and true study of man must begin in God.

Reasoning about dead agents: A cross-cultural perspective

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Abstract: Jesse Bering's theory of the "folk psychology of souls" is brilliantly elucidated and warrants further empirical investigation. While additional experimental research is certainly required, we also need to interrogate the evidence on reasoning about dead agents in a wide range of real-world settings.

Bering's "folk psychology of souls" comprises six main hypotheses that warrant further investigation in light of evidence from comparative ethnography.

The *Simulation Constraint Hypothesis* proposes that an inclination to attribute consciousness to the dead arises from an inability to simulate the absence of consciousness (whereas we have less difficulty simulating the absence of perceptual capacities such as seeing and hearing). Although this hypothesis may be correct, it is not obviously so. Loss of consciousness (e.g., when sleeping) is a routine feature of human experience and apparently quite easy to conceptualize, if not to simulate. It is noteworthy that adults, in our own society at least, sometimes imagine that children will be comforted by the idea that grandma is sleeping rather than dead, not because an absence of consciousness is hard to convey (quite the opposite), but because a *permanent* absence of consciousness is *alarming*. Further, an inclination to attribute consciousness to the dead would, in itself, be inconsequential in behavioural (and thus evolutionary) terms. Dead agents must additionally be attributed capacities that enable them to intervene in human affairs: at least minimally, they must not only be conscious but also have access to socially strategic information (e.g., being able to hear and see what mortals are saying and doing). The ethnographic record furnishes abundant examples of representations of dead agents whose perceptual capacities are preserved along with conscious beliefs and desires, whereas representations of dead agents as deaf or blind are rare or nonexistent. Thus, even if the simulation constraint hypothesis proves to be correct, its impact on behaviour must in turn depend on the activation of additional cognitive tools (e.g., as proposed in Barrett 2004 and Boyer 2001).

The *Mental Continuity Hypothesis* proposes that attributions of emotions, desires, and epistemic states to dead agents ("mental continuity judgements") result from universal cognitive biases emerging early in childhood. This hypothesis seems to be supported by evidence that among American children such attributions decrease with age, "the opposite pattern that one would expect to find if the origins of such beliefs could be traced exclusively to cultural indoctrination" (target article, sect. 2, para. 3). If this finding proves to be robust then, to rule out "cultural indoctrination" and other effects of variable environments, we would need to test the hypothesis across a range of cultural settings

(a valuable start has been made by Harris & Giménez 2005 and Astuti, forthcoming a).

The *Absent Presence Hypothesis* proposes that our habit of thinking about significant others *in absentia* reinforces the illusion that they are still around after they have died. Such reinforcement may vary cross-culturally, however. In modern complex societies, close kin often live far apart, relying heavily on disembodied forms of communication to maintain contact. Bering's example of bereaved persons abortively telephoning their loved ones may best be understood in that context. In small-scale societies, including those in which our ancestors evolved, physical separation from significant others is/was more limited in duration and the reality of their absence after death perhaps less easy (momentarily) to forget. This is a potentially testable hypothesis. Are accidental communication attempts with the dead less frequent in small, face-to-face societies with low rates of out-migration than in modern urban settings?

The *Good Citizen Hypothesis* proposes that the presumed presence of supernatural agents encourages prosocial behaviour and inhibits antisocial behaviour. The idea that supernatural agents reward good behaviour and punish the wicked is a recurrent theme in the so-called ethical religions, but generalizes only with considerable difficulty. In many Melanesian societies, for instance, the ancestors are thought to incite homicidal behaviour by systematically undermining more natural tendencies towards peaceful cooperation and prosociality (Harrison 1993). A broader question might be whether prosocial behaviour enhances reproductive success in human populations, past and present, as Bering's evolutionary scheme proposes. In many societies, the cultivation of a reputation for acquisitive and aggressive behaviour, at least among males, appears to be an effective strategy in accessing resources (including women).

The *Purposeful Life Hypothesis* proposes that people are cognitively predisposed to think that they were called into existence to serve a divine plan. This hypothesis, and the related contention that suicide is an affront to God's scheme, may prove difficult to generalize cross-culturally, perhaps reflecting attitudes found mainly in highly individualistic cultural traditions of modern origin.

The *Meaningful World Hypothesis* proposes that people are cognitively predisposed to interpret happenings as communicatively driven. A readiness to interpret unusual occurrences as signs or portents initiated by supernatural agents, rather than as merely random and meaningless events, has been widely reported by ethnographers. It is not clear why such a predisposition should be adaptive, although it could be a spandrel, a product of sign-reading capacities that evolved as an aid to tracking quarry, detecting predators, and grasping the communicative intentions of other humans (among other useful applications).

From an anthropological viewpoint, Bering's arguments are highly significant and warrant careful attention in future cross-cultural research.

Author's Response

The cognitive science of souls: Clarifications and extensions of the evolutionary model

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Abstract: The commentaries are a promising sign that a research programme on the cognitive science of souls will continue to move toward empirical and theoretical rigor. Most of the commentators agree that beliefs in personal immortality, in the intelligent design of souls, and in the symbolic meaning of natural events can provide new insight into human social evolution. In this response I clarify and extend the evolutionary model, further emphasizing the adaptiveness of the cognitive system that underlies these beliefs.

R1. Introduction

Only in the past few years has the cognitive substratum of religious and supernatural experience been penetrated by the precision tools of experimental science (for reviews, see Atran & Norenzayan 2004; Barrett 2000; Boyer 2001; Whitehouse 2004). Shaky hands are to be expected in these first attempts at scientific exploration, and some trembling is also evident at places in the target article. But, as **Bainbridge** so eloquently discusses in his commentary, picking up these tools to begin with is the hard part, and I am very grateful to the commentators for offering their expert hands to steady my own.

Since the focus of most of the commentaries concerned the evolutionary model and because this issue is central to the theoretical framing of the target article, most of my response will be devoted to that topic, highlighting theoretical points in the other commentaries whenever they have some bearing on the evolutionary history of a folk psychology of souls.

R2. Clarifying the evolutionary model

By far the most frequent criticism in the commentaries questioned my evolutionary model, seeking greater clarity and further attention to deviant cross-cultural examples of religious belief systems that seemingly violate the model's core assumptions. For example, **Johnson & Nyhof** protest that "the Darwinian mechanisms are left completely unspecified." **Pyysiäinen** finds similar fault with the target article's evolutionary cast ("The weakest part of Bering's contribution is precisely his evolutionary speculations"), a concern echoed in the vituperative commentary by **Hegdé & Johnson**, among others. According to the majority of commentators who addressed the evolutionary issues, the explanatory framework into which I have placed my research programme is flawed on several counts.

To recount the original argument, I claimed that three basic cognitive mechanisms – those that produce illusions of personal immortality, of teleological authorship in the design of individual souls, and of natural events as having symbolic meaning – formed an organized "system" at some point in recent human evolution as a result of the unique selective pressures operating in our social environment. I placed the word "system" in scare quotes because I see these illusions as being connected through a sort of abstract, conjunctive tissue that biases reasoning about personal existence, not as a modular, task-specific system yielding static behaviours independent of cultural variation (**Livingston; Pyysiäinen**). I have never claimed that "religion is innate" (**Bloch**) or even that there exists "an evolved system dedicated to

afterlife beliefs" (**Harris & Astuti**; also Pyysiäinen). These are oversimplifications.

My evolutionary model identifies a suite of very basic cognitive building blocks, often but not always associated with religious beliefs. If this suite indeed comprises a true psychological adaptation that motivated adaptive responses under recurrent challenging conditions, then it should be *canalized* in modern humans, present in anyone with a normal cognitive profile (**Flusberg & Tager-Flusberg**) who does not develop under extreme and species-atypical conditions (**Evans & Wellman**). **Hegdé & Johnson** conflate adaptations, which have a heritability of zero, with heritable individual differences associated with adaptations (see Tooby & Cosmides 1992, pp. 122–31), presumably those that would contribute to varying degrees of religiosity in modern humans.

R2.1. The fact that there may be reputation maintenance mechanisms other than those entailed by the folk psychology of souls presents no difficulties for my evolutionary model

Several commentaries suggested that my evolutionary model was flawed because there are other psychological mechanisms, none of which involve souls or supernatural agents or seeing signs in natural events, which serve a reputation maintenance function (**Beit-Hallahmi; Boyer; Ferrari; Gjersoe & Hood; Greenberg, Sullivan, Kosloff, & Solomon** [**Greenberg et al.**]). This is a point elaborated by Boyer, who, after summarizing several alternative mechanisms that promote prosocial behaviours in humans, tells us that, "All these dispositions and processes evolved independently of supernatural and religious beliefs, operate in similar ways in people with or without such beliefs and regardless of differences in these beliefs, and recruit different neuro-cognitive machinery from the supernatural imagination."

I do not see a conflict here. As far as I am aware, there is no law in natural selection theory stating that there cannot be distinctly evolved mechanisms serving the same adaptive purpose. On the contrary, if these mechanisms delivered a cumulative, buffering effect in solving a shared adaptive problem or – at the very least – did not impede one another's functioning, evolution should favour the selection of multiple adaptive designs. Moreover, contrary to the criticisms raised by **Hegdé & Johnson,** an evolved folk psychology of souls meets the important criterion of Darwinian conservativeness because the types of existential illusions generated would have emerged through a set of biases produced by pre-existing structures. The system that I have outlined therefore would not have required any substantive neuro-cognitive reorganization.

Several commentaries discussed the role of shame in inhibiting normatively deviant or antisocial behaviours (**Beit-Hallahmi; Ferrari; Gjersoe & Hood**), particularly how parents instill these feelings, and implied that this obviates the adaptive utility of belief in supernatural observation or punishment. Shame, however, is usually experienced after a social transgression has already occurred; it is the emotional aftermath of transgression (Tangney 2003). Although the negative affect associated with this experience may serve to discourage similar actions in the future (see Fessler & Haley 2003; Gilbert & McGuire 1998), and may attenuate severity of punishment for an offence (Gold & Weiner 2000), shame may not be very effective at preventing the occurrence of a proscribed behaviour in the first place. Shame and observability, of course, are not mutually exclusive – in fact they are sister constructs. But belief that one is under surveillance by supernatural agents, and that there are consequences for misdeeds even when they occur in private, may effectively deter socially proscribed behaviours even in the absence of shame.

R2.2. The importance of avoiding solitary incidents of serious transgressions must be emphasized

Although reputations are mostly cumulative and can perhaps be formulated as an image score that people use to guide their interactions with social others (e.g., Nowak & Sigmund 1998), a single black mark can erode an otherwise unbroken record of altruistic tendencies. "Words are wolves," according to Jean Genet. Language would have enabled our ancestors to essentialize others into social category memberships through the heuristics of emotionally loaded words. One need only consider how socially powerful are terms such as "rapist," "paedophile," "thief," "murderer," "slut," "racist," "child abuser," or, recently, "terrorist," to see the hazards of a publicly revealed, solitary moral breach from the gene's point of view.[1]

Nemoroff and Rozin's (1994) findings of moral contagion (i.e., emotional aversion to physical objects such as clothing that have been in contact with representatives of such derogated social categories) may be seen as evidence of this type of negative essentialism (**Gjersoe & Hood**). Any public distancing from socially repudiated others would serve to advertise a personal commitment to in-group norms – that is, that one is not like the derogated individual. The sociologist Erving Goffman (1963) noted that people who are wanted on criminal warrants were once referred to as "having smallpox" and their criminal disease was said to be catching. Merely being seen with them could lead to arrest on suspicion.

The folk psychology of souls (which at its core constitutes a social relationship between the self and supernatural agents) would have helped our ancestors to censor selfish decisions associated with others judging them as being essentially bad and/or morally undesirable (and therefore to avoid the negative reproductive consequences of this labelling). This was particularly the case in situations where people were strongly tempted by selfish desires and underestimated the likelihood of detection by other in-group members. Miscalculating the odds of social exposure for certain behaviours would have had calamitous effects on reputation and, therefore, on genetic fitness. The folk psychology of souls provided adaptive illusions of watchful supernatural agents that helped to counteract these dangerous miscalculations. These illusions involved seeing supernatural agent(s) as being emotionally invested in the self's existence, as sharing (or at least understanding) the in-group's moral values, and as communicating their attitudes and opinions *about* the self through the occurrence of natural events and biographical

experiences (Bering 2002b; Bering & Johnson 2005; Johnson & Bering 2006). Natural events and biographical experiences were perceived as the "evidence" that such supernatural agents were real (cf. **Bullot**) and were capable of punishing and rewarding social behaviours, either in this life or in the hereafter.

R2.3. Experimental findings demonstrate social sensitivity to being observed

Beliefs in watchful supernatural agents appear to militate against the psychological state of *deindividuation*, which occurs whenever "individuals are not seen or paid attention to as individuals" (Festinger et al. 1952, p. 382). Festinger and his colleagues described how deindividuation is strongly associated with social disinhibition and loss of inner restraints. Numerous laboratory experiments have in fact shown that participants who believe that they are making decisions under anonymous conditions tend to be less altruistic, more aggressive, and more punitive than those who believe that their identities are known (e.g., Diener et al. 1976; Ellison et al. 1995; Rehm et al. 1987; Zimbardo 1969).

Building on experimental economic games, a flurry of recent studies have also provided evidence that ambient gaze, even when artificial, unconsciously primes prosocial behaviours in human participants (Bateson et al. 2006; Burnham & Hare, in press; Haley & Fessler 2005; Milinski et al. 2002; Wedekind & Braithwaite 2002). Burnham and Hare (in press), for example, found that people made more altruistic decisions in a task involving allocation of scarce resources even when the "witness" was simply an image of a robot with large human-like eyes. Similar results were reported by Haley and Fessler (2005), from a study in which participants behaved more generously on a computerized task when stylized eyespots were present on the screen, which the authors interpreted as evidence that subtle cues concerning observability factor prominently in reputation management. (**Gjersoe & Hood's** discussion of Titchener's classic unseen gaze findings, where people believe they can "feel" when others are looking at them behind their backs, may be interpretable within this evolutionary framework, as well; see also Colwell et al. 2000). Finally, as discussed in the target article, Bering et al. (2005b) found that, when left alone in a room, participants who were led to believe that a ghost may be observing them cheated less on a competitive task compared to those who did not receive this supernatural prime.

Real-world findings provide complementary evidence that perceptions of anonymity are positively correlated with antisocial behaviours. In a cross-cultural analysis of warfare practices, for example, Watson (1973) discovered that warriors who hid their identities before going into battle were more likely to kill, mutilate, and torture than those who did not. More recently, Silke (2003) found that, of all sectarian violence incidents reported in Northern Ireland over a two-year period (1994–1996), paramilitary members who wore masks during their offences attacked more people, inflicted more serious injuries, committed more acts of vandalism, and were more likely to threaten their victims after attacking them than paramilitary members who were implicated in sectarian violence but who did not hide their faces.

R2.4. Cross-cultural variability, supernatural beliefs, and evolutionary dynamics

Although belief in supernatural observability has not yet been targeted as a key research question in evolutionary models of religion, the ethnographic literature does suggest that such beliefs feature prominently in most religious systems. In Pettazzoni's (1955) cross-cultural analysis of the types of attributes that are most frequently attributed to the gods, one recurrent and defining characteristic is the gods' deep *knowing* of people as unique individuals (i.e., their "hearts and souls"). In Borneo, the Iban believe that "anyone who successfully cheats another, or escapes punishment for his crimes, even though he may appear to profit temporarily, ultimately suffers supernatural retribution" (Sandin & Sather 1980, p. xxviii). And Malinowski (1935, p. viii) wrote that "from the study of past religions, primitive and developed, we shall gain the conviction . . . that every religion implies some reward of virtue and the punishment of sin." Implicit here is the assumption that supernatural agents who dole out moralistic consequences are believed also to survey and observe private behaviours, keeping their thumbs on individuals within the group.

Cohen, Kenrick, & Li [**Cohen et al.**] ask whether "variations in beliefs in afterlife or observant spirits are linked to recurrent variations in social or physical ecology" (also **Whitehouse**; see Reynolds & Tanner 1995). Although we do not yet have the data to answer this important question, structuring the present evolutionary model under these (ecologically dynamic) terms may put into context the striking cultural diversity associated with the moral dimension of supernatural beliefs. For example, answering this question would potentially be capable of addressing the sceptical query posed by **Greenberg et al.,** who ask, "If immortality beliefs were a simple default by-product of cognition, why would these beliefs be so varied across cultures and so complex?" At the moment, I agree that such variation is difficult to understand, but this is due to the embryonic stage of data gathering in this area, not to any serious limitations of the simulation constraint hypothesis or the general evolutionary theory I have offered.

The commentaries reveal a wide variety of religious beliefs that appear uniquely tied to specific cultures, geographic areas, and historical settings. Why these adaptive climates give rise to particular beliefs and not others is a question for evolutionary analysis, just as **Cohen et al.** reason. For example, collective symbolic interpretations of disease and misfortune may serve to enculturate children into specific moral environments (environments that are themselves products of specific ecological and social factors). Such symbolic interpretations offer children a very clear picture of what it is that their society does not condone. In their fascinating description of Cotard's syndrome, **Cohen & Consoli** write that "collective and cultural significance dominates biographical experiences [. . .] first syphilis then AIDS symbolized the amalgam of flesh, punishment, sin, guilt, sexuality, and the devil."

We need not look at exotic cultures to see how collective symbolic interpretations of natural events can influence moral development. As an eight-year-old, I was panic-stricken that an upcoming doctor's visit, which I knew would involve a routine drawing of blood, would publicly

identify me as a homosexual. I was naïve to the medical facts about how people contracted the HIV-virus, but I knew that AIDS could be detected in blood. I also understood that many saw AIDS as a moral condemnation of gay men, specifically as God's culling of homosexuals. Whether I personally saw such a moralistic message in AIDS was inconsequential for this cultural illusion to impact on my decision not to divulge my sexual orientation, a decision that can be understood within fitness-related terms. Other peoples' symbolic interpretation of this disease was enough to teach me that something in my blood would expose me as being *essentially* bad, worthy of being shunned – and, in fact, I had such anticipatory anxiety about the social consequences of being labelled a "homosexual," that I collapsed in the waiting room.

Although I agree with **Pyysiäinen** that we are not in a position to advance a detailed evolutionary argument until a "more rigorous methodology" is developed – a task that will require massive interdisciplinary collaboration – it is unclear to me how one could ever begin to construct such a methodology without first having a general evolutionary theory capable of generating hypotheses and offering an interpretive lens through which to view the findings. I have posited a general evolutionary theory that can act as such, as a crucible for weighing competing, non-adaptationist hypotheses, something recognized by several commentators (**Cohen et al.; Evans & Wellman; Hughes; Whitehouse**).

R2.5. Absent third-party punishment is a uniquely human adaptive problem

Gjersoe & Hood comment that "many social animals also show behavioural inhibition and prosocial behaviour without necessitating a specialized cognitive mechanism for a belief in souls." This is not in debate. But what these commentators overlook is the fact that theory of mind, and the concomitant emergence of declarative language, introduced a genuinely novel adaptive problem in human sociality – that of *absent third-party punishment*. In short, absent third-party punishment is any punishment that is administered by a person (or persons) who were not present at the time of the offence, but who learned about the offence through a second-hand source (Fehr & Fischbacher 2004). Human beings are able to mentally represent an absent third-party's state of ignorance about the unobserved event and are strategically motivated – and emotionally driven – to disclose their victimization to these naïve third parties through declarative language. This is, in fact, the very basis of all criminal justice systems, no matter how informal.

What is unique about human sociality is that anybody who witnesses a social event is a *carrier* of strategic information who can then transmit that information to other minds, over great spans of time and geographical distances. "Seeing" therefore took on new meaning for human beings, the only species for which, given these social cognitive verities, short-term selfish gains were traded in for long-term reputation gains. According to Johnson (2005, p. 414), "Information about person A could propagate via person B to person C, D, E, and so on . . . even if person B and C do not care, it may not be until person Z hears the news, or until *enough* people hear the news, or until some authority hears the news, perhaps weeks later, that punishment will come." Given the calamitous effects a mired reputation could have on the actor's genetic fitness (through punitive tactics such as castigation, ostracism, exclusion, group expulsion, or even execution), the presence of nearly any watchful agent, human or supernatural, became capable of influencing behavioural decision-making.[2]

R2.6. Selective pressures for solutions to the adaptive problem were intense

It is impossible to overstate how strongly the third-party punishment problem would have influenced the course of human social evolution. This is especially evident when one considers the relatively low degree of privacy afforded to our ancestors, who lived in small-scale gossipy societies of only 120 to 150 individuals (Dunbar & Spoors 1995). In the environment of evolutionary adaptedness, individuals would have been unable to easily emigrate to new social groups and to "start over" if they spoilt their reputation in their natal group (a strategy of sociopaths in modern societies; Mealey 1995).[3]

Notice that inclusive fitness is also likely to be negatively impacted by a spoiled public identity because of a *sanguineous bias*, stigma attached to the biological kin of the individual whose reputation is impugned through transgression (e.g., see May 2000 for stigma effects on murderers' relatives). This means that third-party punishment does not necessarily end at death. These inclusive fitness issues concerning the effects of reputation on biological kin also mean, in principle, that effectively managing reputation is a more pressing evolutionary problem than mitigating existential anxieties through symbolic immortality (**Greenberg et al.**). Indeed, many of the extensive findings from the Terror Management Theory literature can be understood in these terms. If one is reminded of his own inevitable death, better for his family members' genes that he go out as a staunch, reliable defender of his community's values than as apathetic or as a social dissident.

R3. Propositional beliefs about the supernatural do not always cause behaviour (and sometimes they are in opposition to behaviour)

It is important to understand that the three existential illusions identified in the target article (immortality, teleological authorship of the soul, and symbolic natural events) may not be as salient in industrialized societies today as they were in the environment of evolutionary adaptedness, where they were unlikely to be punctured by scientific knowledge or discouraged through cultural secularization. Even in modern scientific nations, however, among well-educated and scientifically literate people, the biases identified in the target article are not recognized as illusions and continue to have deep emotional resonance. **Sandelands**, for example, concludes his theologically inspired commentary by stating that, "a full and true study of man must begin in God." (In some sense this is true: Our species like any other must be understood within the parameters of the modern synthesis and God is just another slave to human genes.) And, moreover,

even in recognizing them as illusions we fail to sever their emotional underlay, which may still pump-prime behaviour – the level at which natural selection operates. I do not *believe* in the afterlife, but as a potential homeowner I certainly would *feel* uncomfortable living in a house where a stranger has recently died. In this case, it is my eerie feelings and not my belief or disbelief in the afterlife that would be a better predictor of whether I make an offer on the house. This is not to say that propositional beliefs about religion and the supernatural are frequently epiphenomenal, but rather they are more properly viewed as rough indices of unconscious reasoning (and perhaps phenomenal states) than as accurate predictors of behaviour.

R3.1. Global secularization cannot extirpate a true psychological adaptation

Beit-Hallahmi writes that, "The global secularization process means that we no longer interpret misfortune as caused by supernatural agents." But this "god-of-the-gaps" hypothesis has now been disconfirmed in social psychology experiments (see Weeks & Lupfer [2000] for an account of distal-proximal attributions to God). Moreover, the argument that scientific or secular explanations "replace" more naïve or irrational supernatural explanations is intuitively unpersuasive; obviously they can occur alongside one another (e.g., Subbotsky 2001). Theologians who saw the recent tsunamis of East Asia as an angry, moralistic message from God were probably not naïve to the fact that they were caused by earthquakes on the Indian Ocean floor. No matter how culturally secularized we become, God pokes through, whispering in the most godless of scientists' ears. At the end of their commentary, **Gjersoe & Hood** correctly point out that in order to understand supernatural beliefs from a scientific perspective we must first acknowledge and recognize our own supernatural dispositions.

The best research designs in the cognitive science of religion are those that are able to pry apart unconscious reasoning from explicit or "theologically correct" religious beliefs (see Barrett 2000). Socrates' "idea of immortality" as described by **Ferrari** is therefore of questionable countenance, since this "reasoned conclusion" would be heavily influenced by the same underlying cognitive constraints that motivate others to think in this fashion. Innate psychological biases with regard to the supernatural (and the behaviours they generate) reveal themselves most clearly when they directly contradict stated beliefs. For example, those who believe God can do everything at once actually reason as if God were constrained by a human attention span (Barrett & Keil 1996); some people who believe that the mind stops at death nevertheless reason about a dead person as if he still has thoughts (Bering 2002a); scientific theorizers are wary of magical incantations (Subbotsky 2001); others who consider themselves to be materialists refuse to sign a contract relinquishing their souls at death to an experimenter (Haidt et al. 2004); and children who say they don't believe in monsters shy away from a box they are told contains a monster (Harris et al. 1991).

Similarly, if the folk psychology of souls is a true psychological adaptation, then it should be empirically detectable, even in atheists. For example, McAdam's (2001) findings from narrative psychology suggest that people tend to fall into one of two categories: those who view personal misfortunes as *contaminative episodes* in their life stories (where the event permanently disrupted an otherwise positive life course and cast a dark shadow over their biographies), and those who view such events as *redemptive episodes* (where the event, although difficult at the time, was responsible for a positive redirection of their life course). It may be possible to detect intentionality themes in atheists' self-narratives through the use of such paradigms (e.g., "it was a 'life lesson,' " "it wasn't supposed to happen," and so on).

R4. Developmental considerations

Evans & Wellman argue that, "if Bering's selectionist explanation was on target then one might predict a unique and relatively robust developmental trajectory, regardless of input." This is certainly true, and I believe that this trajectory will be borne out. To test Evans & Wellman's prediction, we need, first, to have an accurate developmental model that delineates the ages at which the three existential illusions (immortality, teleological authorship of the soul, and symbolic natural events) appear in childhood. We do not yet have enough data to construct such a model and therefore developmental research in this area is urgently needed. Although **Ferrari** and **Estes** are right to point out that cognitive developmentalists have for decades been exploring related questions about children's distinction between the mind and body, particularly in the area of theory of mind, this "abundant research" (Estes) hardly constitutes a targeted attempt at systematically revealing the social cognitive factors that lend themselves so seamlessly to the existential illusions highlighted in the article. On the contrary, such a targeted research programme is strikingly absent, not only in developmental psychology, but in all the subdisciplines of experimental psychology.

R4.1. Contradictory findings on the development of children's afterlife beliefs

It appears that the little we do know about the development of a folk psychology of souls is contradictory, as discussed in the commentaries by **Evans & Wellman** and **Harris & Astuti**. These commentators tell us that recent findings on children's afterlife beliefs have failed to replicate the pattern reported by Bering and Bjorklund (2004; also Bering et al. 2005a.) For example, Harris and Gimenez's (2005) findings suggest that afterlife beliefs increase with age rather than decrease and are moderated by the religious context of the experimenters' questions (with children being more likely to endorse psychological functioning after death when information about the dead character includes words like "priest" and "God"). Therefore, Harris & Astuti question whether belief in the afterlife is in fact a default cognitive stance.

R4.2. Some "contradictory" findings may not be contradictory

This conflicting pattern of developmental findings, however, is difficult to interpret at present. To begin with, the central research questions motivating these other studies on children's concepts of death are very different from my own (as well as from each other) and the methodologies vary accordingly. **Evans & Wellman** cite work by Barrett and Behne (2005) as evidence that, in contrast to my findings, four- and five-year-olds in this study did not attribute psychological states to dead agents. Barrett and Behne's study, however, did not investigate children's afterlife beliefs, but instead concerned children's ability to differentiate between dead and sleeping animals in the physical environment. The investigators reasoned that this is an adaptive function in that it prevents unnecessary vigilance toward the bodies of dead animals through the cue-driven activation of an innate "living/dead remapping mechanism."

In the study by Barrett and Behne (2005), children were asked five questions about the dead versus sleeping animal: *Can it move? Know you were there? Move if touched? Can it be afraid? Can it hurt you?* The fact that the youngest children answered "no" in reference to the dead animal, but "yes" in reference to the sleeping animal, is hardly *prima facie* evidence against my argument that belief in the afterlife is a cognitive default. In fact, if belief in the afterlife is a cognitive default, then we would actually predict the pattern of findings reported by Barrett and Behne (2005). That is, preschoolers is should answer "no" to questions about the *bodies* of dead animals (notice the key word "it" in the questions posed to children) if indeed they view the mind as being liberated from the body at death.

R4.3. Methodological concerns presently limit theoretical inferences

Like **Evans & Wellman**, **Harris & Astuti** state that their own research programme on the development of afterlife beliefs reveals a set of findings that in many ways contradicts the developmental trajectory reported by Bering and Bjorklund (2004), or at least tells a more complicated story, with religious testimony and cultural exposure encouraging such beliefs. Again, however, it is difficult to compare findings across these studies. We deliberately avoided eschatological language in our research design because we were wary of biasing children's answers through the experimenters' language and behaviours, and in fact our empirical reports list many of the safeguards we used to protect against such biases (**Hughes**). In contrast, such language was an important manipulated variable for both Harris and Giménez (2005) and Astuti and Harris (submitted).

Furthermore, the coding procedures used to determine whether children attributed continued psychological functioning to a dead agent meaningfully differed between our studies and those described by **Harris & Astuti**. Our data were coded on the basis of children's follow-up answers to the questions rather than their initial yes or no response. We reasoned that a "no" response is inherently ambiguous and should not be seen as clear evidence for non-continuity judgements after death. Young children in our study often answered "no" to the initial questions about the dead agent's continued capacities ("Can Brown Mouse still see?"), but upon further questioning it became clear that they were nevertheless reasoning in terms of an afterlife (e.g., "because it's too dark in the alligator's belly"). Harris and Giménez (as well as Astuti & Harris [submitted] and Barrett & Behne [2005]) failed to operationalize children's "no" answers in this way; instead they took them at face value as evidence of an understanding of the non-functionality of the capacity in question. It is therefore impossible to know whether the findings these authors report is a product of the religious context of the story, as they argue, or is in fact an artefact of their coding procedure. Finally, the youngest children in the Harris and Giménez study were seven-year-olds, whereas our most robust findings for afterlife beliefs came from the three- and four-year-olds we tested, providing the basis of our nativist claims.

R5. Cognitive processes underlying the folk psychology of souls

Several of the commentaries focused on the precise mechanisms by which existential illusions are generated. **Bullot**, for example, provides a distinction between two types of agent-tracking mechanisms that he believes weighs heavily on the theoretical integrity of an evolved folk psychology of souls. In *perceptual tracking*, Bullot reasons, "a target individual is directly tracked by a sensory-motor system." In contrast, *epistemic tracking* occurs when an agent "is spatio-temporally pursued by indirect epistemic means such as communication and reasoning."

According to **Bullot**, because both types of tracking require empirical or material traces of the agents' ontological existence, such as behavioural residue (e.g., fingerprints), the present case of souls, gods, and ghosts poses an important problem for the evolutionary model. Bullot reasons that ghosts and gods should therefore be characterized as *fictionally grounded* referents, "which rest on descriptive resources and individual/collective imagination," rather than *empirically grounded* referents. Presumably this would be evidence of the cultural origins of supernatural agents. I have argued, however, that our species has an innate predisposition to see natural events as *actual* empirical traces of *real* supernatural agents. It follows from this that natural events serve the same function as tractable social behaviours, activating similar epistemic tracking mechanisms. An infinite array of life's vicissitudes strewn throughout personal biographies is represented as God's "behaviours." It is unclear to me how Sherlock Holmes, a fictional character that Bullot compares to gods and ghosts, could leave similar empirical and perceptible traces that are capable of confirming peoples' intuitive hypotheses of his ontological existence.

R5.1. Individuation equals ensoulment

In a related commentary, **Newman, Blok, & Rips** [**Newman et al.**] describe their fascinating research programme on identity tracking, concluding that my argument for a specialized cognitive system dedicated to reasoning about souls lacks parsimony. This conclusion hinges on a series of studies revealing that participants

believe in the continued psychological existence of not only individual people after dramatic transformations (such as someone who has died or whose memories are placed in a robotic body), but also the continued identity of individual objects that have undergone similarly dramatic transformations (e.g., a specific car, "Rustbucket" is still identified as "Rustbucket" after going through a "particle pipeline" and reconfigured into a boat). "Thus," argue Newman et al., "belief in the persistence of individuals through radical changes in kind is not restricted to persons and need not include the notion of a soul" (para 8).

I interpret these findings very differently from these commentators, however, and see them as generally supportive of my evolutionary model rather than as falsifying my hypotheses about the folk psychology of souls (see also **Nichols**). **Newman et al.** miss the critical fact that by individuating the target objects in this manner (e.g., through proper naming) they may be doing something akin to ensouling inanimate objects. Through the experimental individuation of objects, participants may be reasoning about such objects through an animistic lens. As a consequence of this, they are likely to tacitly endow these objects with psychological states, in effect viewing them as possessing souls. **Bloch's** sardonic comments about the ecological validity of the mouse puppet show paradigm (i.e., Bering & Bjorklund 2004; Bering et al. 2005a) similarly dismisses the animating effects of individuating target "characters" in an experimental context.

R5.2. The simulation constraint hypothesis

Several commentaries focused on the simulation constraint hypothesis (**Antony; Cohen & Consoli; Robbins & Jack; Kemmerer & Gupta; Preston, Gray, & Wegner** [**Preston et al.**]). To revisit the central thesis of this hypothesis, I claimed that a delimiting phenomenological boundary prevents people from experiencing the absence of certain categories of mental states, such as emotions, desires, and various episteme (the most "ethereal" qualia). Because we can never know what it feels like to be without such states, these natural representational borders encourage afterlife beliefs. When we attempt to reason about what it will be "like" after death – and what it is "like" for those who have already died – we inevitably get ensnared by simulation constraints and reason in terms of a continued consciousness.

Preston et al. reason that belief in the soul stems in large part from the illusion of conscious will, the feeling that the self is a sort of abstract homunculus that consciously wills the body to act (when in fact this feeling of authorship of our own actions is epiphenomenal). I agree that this is an important component of the folk psychology of souls, but I see it as a refinement to the present model, rather than an alternative account. **Cohen & Consoli**'s description of Cotard's syndrome as being characterized by the delusion that one is already dead, as well as **Kemmerer & Gupta**'s discussion of the neurobiological basis of out-of-body-experiences, do seem to provide at least indirect support for the simulation constraint hypothesis.

In his thoughtful commentary, **Antony** reasons that in order to "run a simulation" of a dead person's mind, one must already have a belief in the afterlife, which runs contrary to this nativist position on the illusion of immortality. "Prior to simulating a dead agent's mind," he argues, "it must be assumed there is a mind to simulate. But that *already* is to assume an afterlife." He then writes, "It follows that nothing about a simulation itself can explain our belief in an afterlife, since some such belief or assumption is a precondition for the planning and running of any such simulation." There is probably some truth to Antony's chicken-and-egg reasoning, but it is unclear to me why he sees this as a problem for my nativist arguments concerning the origins of afterlife beliefs. If children are confronted with someone who has died, they need not "assume an afterlife" – at least in any meaningful conceptual sense, and certainly not in terms of a propositional belief about an afterlife – to attempt to reason about the dead person's current state of mind through appeal to their own mental states.

R6. Concluding remarks

The commentaries in response to the target article are all that a *Behavioral and Brain Sciences* author could wish for. They are filled with incisive criticisms, counterarguments, and references to important work of which I was unaware. All of these undoubtedly will add to a more informed cognitive analysis of the subtle strands that bind together morality, souls, and meaning.

NOTES

1. This is the literary device behind Nathaniel Hawthorne's *The Scarlet Letter*. Hester Prynne, an otherwise virtuous woman, is publicly labelled an "adulteress" (literally, with a capital "A") and shunned by her small Puritan community.

2. In Sartre's famous play "No Exit" (1946/1989), in which three strangers find themselves uncomfortably together in a drawing-room of Hell, there are no mirrors or windows in the room, sleep is not permitted, and the light is always on. The characters' eyelids are paralyzed, disallowing them even the luxury of blinking. One of the characters, Garcin, reacts with muted horror to the prospect of being constantly observed by the others for all eternity. He is also convinced that he is under surveillance by demons, "*all those eyes intent on me. Devouring me*." It is not hard to see why this would be such an exquisite torture.

3. Interestingly, after a long historical period when people may have been able to emigrate to new social groups and to "start over" if they spoilt their reputation, the present media age, in some ways, more accurately reflects the conditions faced by our ancestors. With newspapers, telephones, cameras, television, and the Internet at our disposal, personal details about medical problems, spending activities, criminal and financial history, and divorce records (to name just a few potentially sundry tidbits), are not only permanently archived, but can be distributed in microseconds to, literally, billions of other people. The old adage "Wherever you go, there you are" takes on new meaning in light of the evolution of information technology. The Internet, in particular, is an active microcosm of human sociality that has not yet been properly analyzed in Darwinian terms. From background checks to match making services, from anonymous web site browsing to piracy and identity theft, from "Googling" ourselves and peers to flaming bad professors (e.g., www.ratemyprofessor.com) and stingy customers (e.g., www.bitterwaitress.com), the Internet is ancient social psychology meeting new information technology.

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References

Letters "a" and "r" appearing before authors' initials refer to target article and response, respectively.

Aarts, H., Custers, R. & Wegner, D. M. (2005) On the inference of personal authorship: Enhancing experienced agency by priming effect information. *Consciousness and Cognition* 14:439–58. [JP]

Abramowitz, J., Huppert, J., Cohen, A. B., Cahill, S. P. & Tolin, D. F. (2002) Religious obsessions and compulsions in a non-clinical sample: The Penn Inventory of Scrupulosity. *Behaviour Research and Therapy* 40:825–38. [ABC]

Aichhorn, M., Perner, J., Kronbichler, M., Staffen, W. & Ladurner, G. (2006) Do visual perspective tasks need theory of mind? *NeuroImage* 30:1059–68. [DK]

Alcorta, C. & Sosis, R. (2005) Ritual, emotion, and sacred symbols: The evolution of religion as an adaptive complex. *Human Nature* 16:323–59. [aJMB]

Alexander, R. (1987) *The biology of moral systems*. Aldine de Gruyter. [aJMB]

Alvarado, C. S. (1992) The psychological approach to out-of-body experiences: A review of early and modern developments. *Journal of Psychology* 126:237–50. [DK]

(2000) Out-of-body experiences. In: *Varieties of anomalous experiences*, ed. E. Cardena, S. J. Lynn & S. Krippner, pp. 183–218. American Psychological Association. [DK]

Alvarado, K. A., Templer, D. I., Bresler, C. & Thomas-Dobson, S. (1995) The relationship of religious variables to death depression and death anxiety. *Journal of Clinical Psychology* 51:202–04. [aJMB]

Angell, J. R. (1911) Philosophical and psychological usages of the terms mind, consciousness, and soul. *Psychological Bulletin* 8:846–47. [MF]

Anonymous (1939) *Wolanda Hindia: Zendingstijdschrift voor jongeren, vol. 13.* Liebenswürdige Wilden. [aJMB]

Argyle, M. (2000) *Psychology and religion: An introduction*. Routledge. [MF]

Arzy, S., Idel, M., Landis, T. & Blanke, O. (2005) Speaking with oneself: Autoscopic phenomena in writings from the ecstatic Kabbalah. *Journal of Consciousness Studies* 12:4–29. [DK]

Astuti, R. (forthcoming a) Ancestors and the afterlife. In: *The salvaged mind: Social anthropology, religion, and the cognitive sciences*, ed. H. Whitehouse & J. Laidlaw. Carolina Academic Press. [aJMB, PLH, HW]

(forthcoming b) What happens after death? In: *Questions of Anthropology*, eds. R. Astuti, J. P. Parry & C. Stafford. Berg. [PLH]

Astuti, R. & Harris, P. L. (submitted) Understanding mortality and the life of the ancestors in rural Madagascar. [rJMB, PLH]

Atran, S. (2002) *In gods we trust: The evolutionary landscape of religion*. Oxford University Press. [aJMB, IP, LES]

(2003) Genesis of suicide terrorism. *Science* 299:1534–39. [aJMB]

Atran, S. & Norenzayan, A. (2004) Religion's evolutionary landscape: Counterintuition, commitment, compassion, communion. *Behavioral and Brain Sciences* 27(6):713–70. [arJMB, ABC, GEN]

Axelrod, R. (1984/1990) *The evolution of co-operation*. Penguin. [IP]

Bainbridge, W. S. (1992) Crime, delinquency, and religion. In: *Religion and mental health*, ed. J. F. Schumaker, pp. 199–210. Oxford University Press. [WSB]

(2002) *The endtime family: Children of God*. State University of New York Press. [WSB]

(2006) *God from the machine: Artificial intelligence models of religious cognition*. AltaMira. [WSB]

(in press) *The secular abyss*. Lexington. [WSB]

Baldwin, D. A. & Moses, L. S. (1996) The ontogeny of social information gathering. *Child Development* 67:1915–39. [aJMB]

Baldwin, J. M. (1903) Mind and body, from the genetic point of view. *Psychological Review* 10:225–47. [MF]

Baron-Cohen, S. (1999) The evolution of a theory of mind. In: *The descent of mind: Psychological perspectives on hominid evolution*, ed. M. C. Corballis & S. E. G. Lea. Oxford University Press. [aJMB]

(2000) Theory of mind and autism: A fifteen-year review. In: *Understanding other minds: Perspectives from developmental cognitive neuroscience*, ed. S. Baron-Cohen, H. Tager-Flusberg & D. J. Cohen, pp. 3–20. Oxford University Press. [SF]

Baron-Cohen, S., Tager-Flusberg, H. & Cohen, D. J., eds. (2000) *Understanding other minds: Perspectives from developmental cognitive neuroscience*, 2nd edition. Oxford University Press. [SF]

Baron-Cohen, S., Wheelwright, S. & Joliffe, T. (1997) Is there a "language of the eyes"? Evidence from normal adults and adults with autism or Asperger syndrome. *Visual Cognition* 4:311–41. [aJMB]

Barrett, D. B., Johnson, T. M. & Crossing, P. F. (2006) In: *Britannica book of the year, 2006.* Retrieved June 4, 2006, from Encyclopædia Britannica Online: http://search.eb.com/eb/article-9432655 [KRL]

Barrett, H. C. & Behne, T. (2005) Children's understanding of death as the cessation of agency: A test using sleep versus death. *Cognition* 96:93–108. [arJMB, EME]

Barrett, J. L. (2000) Exploring the natural foundations of religion. *Trends in Cognitive Sciences* 4:29–34. [arJMB, GEN]

(2003) Epidemiological and nativist accounts in the cognitive study of culture: A commentary on Pyysiäinen's innate fear of Bering's ghosts. *Journal of Cognition and Culture* 3(3):226–32. [IP]

(2004) *Why would anyone believe in God*? AltaMira Press. [aJMB, HW]

Barrett, J. L. & Johnson, A. H. (2003) The role of control in attributing intentional agency to inanimate objects. *Journal of Cognition and Culture* 3:208–17. [BMH]

Barrett, J. L. & Keil, F. (1996) Conceptualizing a nonnatural entity: Anthropomorphism in God concepts. *Cognitive Psychology* 31:219–47. [rJMB]

Barrett, J. L., Richert, R. & Driesenga, A. (2001) God's beliefs versus mother's: The development of nonhuman agent concepts. *Child Development* 72:50–65. [aJMB, EME]

Bartsch, K. & Wellman, H. M. (1995) *Children talk about the mind*. Oxford University Press. [DE]

Bateson, M., Nettle, D. & Roberts, G. (2006) Cues of being watched enhance cooperation in a real-world setting. *Biology Letters* (Online publication: DOI:10.1098/rsbl.2006.0509). [rJMB]

Baumeister, R. F., Bratslavsky, E., Finkenhauer, C. & Vohs, K. D. (2001) Bad is stronger than good. *Review of General Psychology* 5:323–70. [aJMB]

Becker, E. (1971) *The birth and death of meaning*. Free Press. [JG]

(1973) *The denial of death*. Free Press. [JG]

Beit-Hallahmi, B. (2006) Atheists: A psychological profile. In: *Cambridge companion to atheism*, ed. M. Martin. Cambridge University Press. [BB-H]

Beit-Hallahmi, B. & Argyle, M. (1997) *The psychology of religious behaviour, belief and experience*. Routledge. [BB-H]

Bemmer, J. M. (2002) *The rise and fall of the afterlife*. Routledge. [MF]

Bering, J. M. (2002a) Intuitive conceptions of dead agents' minds: The natural foundations of afterlife beliefs as phenomenological boundary. *Journal of Cognition and Culture* 2(4):263–308. [arJMB, BMH, KRL, IP]

(2002b) The existential theory of mind. *Review of General Psychology* 6:3–24. [arJMB]

(2003a) Religious concepts are probably epiphenomena: A reply to Pyysiäinen, Boyer, and Barrett. *Journal of Cognition and Culture* 3(3):244–54. [IP]

(2003b) Towards a cognitive theory of existential meaning. *New Ideas in Psychology* 21:101–20. [aJMB]

(2005) The evolutionary history of an illusion: Religious causal beliefs in children and adults. In: *Origins of the social mind: Evolutionary psychology and child development*, ed. B. Ellis & D. Bjorklund. Guilford Press. [aJMB]

Bering, J. M. & Bjorklund, D. F. (2004) The natural emergence of reasoning about the afterlife as a developmental regularity. *Developmental Psychology* 40:217–33. [arJMB, EME, BMH, SN, PR]

(in press) The serpent's gift: Evolutionary psychology and consciousness. In: *Cambridge handbook of consciousness*, ed. P. D. Zelazo, M. Moscovitch, & E. Thompson. Cambridge University Press. [aJMB]

Bering, J. M., Hernández-Blasi, C. & Bjorklund, D. F. (2005a) The development of 'afterlife' beliefs in secularly and religiously schooled children. *British Journal of Developmental Psychology* 23:587–607. [aJMB]

Bering, J. M., McLeod, K. A. & Shackelford, T. K. (2005b) Reasoning about dead agents reveals possible adaptive trends. *Human Nature* 16:360–81. [arJMB]

Bering, J. M. & Johnson, D. D. P. (2005) "O Lord . . . you perceive my thoughts from afar": Recursiveness and the evolution of supernatural agency. *Journal of Cognition and Culture* 5:118–42. [arJMB]

Bering, J. M. & Parker, B. D. (in press) Children's attributions of intentions to an invisible agent. *Developmental Psychology*. [aJMB]

Bering, J. M. & Shackelford, T. K. (2004) The causal role of consciousness: A conceptual addendum to human evolutionary psychology. *Review of General Psychology* 8:227–48. [aJMB]

Berrios, G. E. & Luque, R. (1995) Cotard's syndrome: Analysis of 100 cases. *Acta Psychiatrica Scandinavica* 91:185–88. [DC]

Bjorklund, D. F. & Pellegrini, A. D. (2002) *The origins of human nature: Evolutionary developmental psychology.* American Psychological Association. [aJMB]

Blackmore, S. J. (1982) *Beyond the body: An investigation of out-of-body experiences*. Heinemann. [DK]

Blanchard, E. (n.d.) Thunder gods and kamikazes: The suicide air offenses of World War II. *The War Times Journal*. Retrieved November 8, 2004, from http://www.wtj.com/articles/kamikaze/. [aJMB]

Blanke, O. & Arzy, S. (2005) The out-of-body experience: Disturbed self-processing at the temporo-parietal junction. *Neuroscientist* 11:16–24. [DK]

Blanke, O., Landis, T., Spinelli, L. & Seeck, M. (2004) Out-of-body experience and autoscopy of neurological origin. *Brain* 127:243–58. [DK]

Blanke, O. & Mohr, C. (2005) Out-of-body experience, heautoscopy, and autoscopic hallucination of neurological origin: Implications for neurocognitive mechanisms of corporeal awareness and self-consciousness. *Brain Research Reviews* 50:184–99. [DK]

Blanke, O., Mohr, C., Michel, C. M., Pascual-Leon, A., Brugger, P., Seeck, M., Landis, T. & Thut, G. (2005) Linking out-of-body experience and self processing to mental own-body imagery at the temporoparietal junction. *Journal of Neuroscience* 25:550–57. [DK]

Blanke, O., Ortigue, S., Landis, T. & Seeck, M. (2002) Stimulating illusory own-body perceptions. *Nature* 419:269–70. [DK]

Bloch, M. (2002) Are religious beliefs counter intuitive? In: *Radical interpretation in religion*, ed. N. Frankenberry. Cambridge University Press. [MB]

Blok, S., Newman, G. & Rips, L. J. (2005) Individuals and their concepts. In: *Categorization inside and outside the lab*, ed. W.-K. Ahn, R. L. Goldstone, B. C. Love, A. B. Markman & P. Wolff, pp. 127–49. American Psychological Association. [GEN]

Bloom, P. (2004) *Descartes' baby: How the science of child development explains what makes us human.* Basic Books. [aJMB, NJB, KRL, PR]

Blumer, H. (1969) *Symbolic interactionism*. Prentice-Hall. [WSB]

Bourgeois, M. (1969) Le syndrome de Cotard aujourd'hui. *Annales Médico-Psychologiques* 127:534–44. [DC]

Bowlby, J. (1973) *Attachment and loss*. Hogarth. [BB-H]

Boyer, P. (2000) Functional origins of religious concepts: Conceptual and strategic selection in evolved minds. *Journal of the Royal Anthropological Institute* 6:195–214. [aJMB]

(2001) *Religion explained: The evolutionary origins of religious thought*. Basic Books. [arJMB, PB, IP, HW]

(2003a) Are ghost concepts "intuitive," "endemic," and "innate?" *Journal of Cognition and Culture* 3(3):233–43. [aJMB, IP]

(2003b) Religious thought and behaviour as by-products of brain function. *Trends in Cognitive Sciences* 7(3):119–24. [PB, IP]

(2004) Religion, evolution, and cognition. A review of S. Atran's *In gods we trust*, and D. S. Wilson's *Darwin's Cathedral. Current Anthropology* 45(3):430–33. [IP]

(2005) A reductionistic model of distinct modes of religious transmission. In: *Mind and religion: Psychological and cognitive foundations of religiosity*, ed. H. Whitehouse & R. N. McCauley. AltaMira Press. [IP]

Boyer, P. & Barrett, H. C. (2005) Domain-specificity and intuitive ontology. In: *The handbook of evolutionary psychology*, ed. J. Buss. Wiley. [IP]

Brugger, P. (2006) From phantom limb to phantom body: Varieties of extracorporeal awareness. In: *Human body perception from the inside out*, ed. G. Knoblich, I. M. Thornton, M. Grosjean & M. Shiffrar, pp. 171–210. Oxford University Press. [DK]

Bruner, J. (1990) *Acts of meaning*. Harvard University Press. [aJMB]

(2001) Self-making and world-making. In: *Narrative and identity: Studies in autobiography, self, and culture*, ed. J. Brockmeier & D. Carbaugh. John Benjamins. [aJMB]

Bulbulia, J. (2004) Area review: The cognitive and evolutionary psychology of religion. *Biology and Philosophy* 19:655–86. [aJMB, IP]

(2005) Are there any religions? *Method and Theory in the Study of Religion* 17:71–100. [aJMB]

Bullot, N. J. & Rysiew, P. (2005) Tracking objects, tracking agents. *Interdisciplines*, "Referring to Objects." Available at: http://www.interdisciplines.org/objects/papers/5. [NJB]

Burnham, T. & Hare, B. (in press) Engineering human cooperation: Does involuntary neural activation increase public goods contributions? *Human Nature*. [arJMB]

Campbell, J. (2002) *Reference and consciousness*. Clarendon Press. [NJB]

Camus, A. (1943/1991) *The myth of Sisyphus, and other essays*. Vintage. [aJMB]

Carey, S. & Xu, F. (2001) Infant's knowledge of objects: Beyond object files and object tracking. *Cognition* 80:179–213. [NJB]

Carroll, S. B. (2006) *Endless forms most beautiful: The new science of Evo Devo and the making of the animal kingdom*. Norton. [EME]

Castelli, F., Frith, C., Happž, F. & Frith, U. (2002) Autism, Asperger syndrome and brain mechanisms for the attribution of mental states to animated shapes. *Brain* 125:1839–49. [SF]

Childers, P. & Wimmer, M. (1971) The concept of death in early childhood. *Child Development* 42:1293–1301. [KRL]

Clark, A. (2000) *A theory of sentience*. Clarendon Press. [NJB]

Clark, T. W. (1994) Death, nothingness, and subjectivity. *The Humanist* 54:15–20. [aJMB]

CNN March 1997 interview with Osama bin Laden. Retrieved November 7, 2004 from http://news.findlaw.com/hdocs/docs/binladen/binladenintvw-cnn.pdf. [aJMB]

Cohen, A. B. & Hall, D. E. (submitted) Social support, existential beliefs, and well-being among Catholic, Jewish, and Protestant older adults. [ABC]

Cohen, A. B., Malka, A., Rozin, P. & Cherfas, L. (2006) Religion and unforgivable offenses. *Journal of Personality* 74:85–118. [ABC]

Cohen, A. B., Pierce, J. D., Jr., Meade, R., Chambers, J., Gorvine, B. J. & Koenig, H. G. (2005) Intrinsic and extrinsic religiosity, belief in the afterlife, death anxiety, and life satisfaction in young Catholic and Protestant adults. *Journal of Research in Personality* 39:307–24. [ABC]

Cohen, A. B., Siegel, J. I. & Rozin, P. (2003) Faith versus practice: Different bases for religiosity judgments by Jews and Protestants. *European Journal of Social Psychology* 33:287–95. [ABC]

Cohen, D., Cottias, C. & Basquin, M. (1997) Cotard's syndrome in a 15-year-old girl. *Acta Psychiatrica Scandinavica* 95:164–65. [DC]

Colwell, J., Schröder. S. & Sladen, D. (2000) The ability to detect unseen staring: A literature review and empirical tests. *British Journal of Psychology* 91:71–85. [rJMB]

Consoli, A., Soultanian, C., Tanguy, M. L., Laurent, C., Perisse, D., Luque, R., Berrios, G. & Cohen, D. (in press) Cotard's syndrome in adolescents and young adults is associated with an increased risk of bipolar disorder. *Bipolar Disorders*. [DC]

Crick, F. (1994) *The astonishing hypothesis: The scientific search for the soul*. Charles Scribner's. [DE]

Crook, J. H. & Crook, S. J. (1988) Tibetan polyandry: Problems of adaptation and fitness. In: *Human reproductive behavior: A Darwinian perspective*, ed. L. Betzig, M. Borgerhoff-Mulder & P. Turke, pp. 97–114. Cambridge University Press. [ABC]

Daly, M. & Wilson, M. (1994). Evolutionary psychology of male violence. In: *Male violence*, ed. J. Archer. Routledge. [aJMB]

Davis, D. G. & Nolen-Hoeksema, S. (2001) Loss and meaning: How do people make sense of loss? *American Behavioral Scientist* 44:726–41. [aJMB]

Davis, N. Z. (1977) Ghosts, kin, and progeny: Some features of family life in early modern France. *Daedalus* 106:87–114. [aJMB]

Dawkins, R. (2003) Viruses of the mind. In: *A devil's chaplain: Selected essays by Richard Dawkins*, ed. L. Menon, pp. 128–45. Weidenfeld and Nicolson. [BMH]

de Unamuno, M. (1912/1954) *Tragic sense of life.* Dover. [aJMB]

Dechesne, M., Pyszczynski, T., Arndt, J., Ransom, S., Sheldon, K. M., van Knippenberg, A., & Janssen, J. (2003) Literal and symbolic immortality: The effect of evidence of literal immortality on self-esteem striving in response to mortality salience. *Journal of Personality and Social Psychology* 84:722–37. [aJMB, JG]

Defeyter, M. A. & German, T. P. (2003) Acquiring an understanding of design: Evidence from children's insight problem solving. *Cognition* 89:133–55. [aJMB, EME]

Dennett, D. C. (1991) *Consciousness explained*. Little, Brown. [aJMB]

(1995) *Darwin's dangerous idea: Evolution and the meanings of life*. Simon & Schuster. [aJMB]

(1996) *Kinds of minds*. Weidenfeld and Nicolson. [aJMB]

(2006) *Breaking the spell: Religion as a natural phenomenon*. Viking. [DK]

Deridder, R., Hendriks, E., Zani, B., Pepitone, A. & Saffioti, L. (1999) Additional cross-cultural evidence on the selective usage of nonmaterial beliefs in explaining life events. *European Journal of Social Psychology* 29:435–42. [aJMB]

Diener, E., Fraser, S., Beaman, A. & Kelman, R. (1976) Effects of deindividuation variables on stealing among Halloween trick-or-treaters. *Journal of Personality and Social Psychology* 33:178–83. [rJMB]

Dijksterhuis, A., Preston, J., Wegner, D. M. & Aarts, H. (under review) Effects of subliminal priming of natural and supernatural agents on judgments of authorship. [JP]

Dobzhansky, T. (1967) *The biology of ultimate concern.* New American Library. [DE]

Donnellan, K. S. (1974) Speaking of nothing. *The Philosophical Review* 83(1):3–31. [NJB]

Dostoyevsky, F. (1877/1949) *Diary of a writer*. Charles Scribner's. [aJMB]

Dunbar, R. I. M. (1993) Coevolution of neocortical size, group size and language in humans. *Behavioral and Brain Sciences* 16:681–735. [aJMB]

(2004) *The human story: A new history of mankind's evolution*. Faber and Faber. [aJMB]

Dunbar, R. I. M. & Spoors, M. (1995) Social networks, support cliques, and kinship. *Human Nature* 6:273–90. [rJMB]

Durant, W. & Durant, A. (1968) *Lessons of history*. Simon & Schuster. [ABC]

Ellison, C. (1991) Religious involvement and subjective well-being. *Journal of Health and Social Behavior* 32:80–99. [KRL]

Ellison, P., Govern, J., Petri, H. & Figler, M. (1995) Anonymity and aggressive driving behaviour: A field study. *Journal of Social Behavior and Personality* 10:265–72. [rJMB]

Emler, N. (1994) Gossip, reputation, and social adaptation. In: *Good gossip*, ed. A. Ben-Ze'ev. University of Kansas Press. [aJMB]

Epley, N., Morewedge, C. K. & Keysar, B. (2004) Perspective taking in children and adults: Equivalent egocentrism but differential correction. *Journal of Experimental Social Psychology* 40:760–68. [aJMB]
Estes, D. (1994) Young children's understanding of the mind: Imagery, introspection, and some implications. *Journal of Applied Developmental Psychology* 15:529–48. [DE]
(1998) Young children's awareness of their mental activity. *Child Development* 69:1345–60. [DE]
Estes, D., Wellman, H. M. & Woolley, J. D. (1989) Children's understanding of mental phenomena. In: *Advances in child development and behavior, vol. 22*, ed. H. W. Reese, pp. 41–87. Academic Press. [DE]
Evans, E. M. (2000) The emergence of beliefs about the origins of species in school-age children. *Merrill-Palmer Quarterly* 46:221–54. [EME]
(2001) Cognitive and contextual factors in the emergence of diverse belief systems: Creation versus evolution. *Cognitive Psychology* 42:217–66. [aJMB, EME]
(2005) Teaching and learning about evolution. In: *The virus and the whale: Explore evolution in creatures small and large*, ed. J. Diamond. NSTA Press. [EME]
Evans, E. M., Poling, D. & Mull, M. (2001) Confronting the existential questions: Children's understanding of death and origins. Biennial Meeting of the Society for Research In Child Development, Minneapolis, MN, April 19–22, 2001. [EME]
Evans, G. (1982) *The varieties of reference*, pp. 143–203. Oxford University Press. [NJB]
Fehr, E. & Fischbacher, U. (2004) Third-party punishment and social norms. *Evolution and Human Behavior* 25:63–87. [rJMB]
Ferrari, M. (2003) Baldwin's two developmental resolutions to the mind-body problem. *Developmental Review* 23:79–108. [MF]
Fessler, D. M. T. & Haley, K. J. (2003) The strategy of affect: Emotions in human cooperation. In: *The genetic and cultural evolution of cooperation*, ed. P. Hammerstein. MIT Press. [rJMB]
Festinger, L., Pepitone, A. & Newcomb, T. (1952) Some consequences of deindividuation in a group. *Journal of Abnormal & Social Psychology* 47:382–89. [rJMB]
Flavell, J. H., Green, F. L. & Flavell, E. R. (2000) Development of children's awareness of their own thoughts. *Journal of Cognition and Development* 1:97–112. [EME, PLH]
Florian, V. & Kpavetz, S. (1985) Children's concept of death: A cross-cultural comparison among Muslims, Druze, Christians, and Jews in Israel. *Journal of Cross-Cultural Psychology* 16:174–89. [KRL]
Forde, D., ed. (1954) *African worlds*. Oxford University Press. [MB]
Fortes, M. (1959) *Oedipus and Job in West African religion*. Cambridge University Press. [MB]
Fowles, J. (1978) *The Magus*. Dell. [aJMB]
Frank, R. (1988) *Passions within reason: The strategic role of emotions*. Norton. [aJMB, PB]
Franks, L. (1994) The return of the fugitive. *The New Yorker*, June 13, pp. 40–59. [aJMB]
Freud, S. (1915) Thoughts for the times on war and death. In: *The standard edition of the complete psychological works of Sigmund Freud, vol. 14*, pp. 274–301. Hogarth. [BB-H]
Futuyma, D. J. (1998) *Evolutionary biology*. Sinauer. [JH]
Gallup Organization (1999) Americans remain very religious, but not necessarily in conventional ways. Retrieved from http://www.gallup.com/poll/content/login.aspx?ci = 3385. [aJMB]
Gardner, M. (1999) *The whys of a philosophical scrivener*, 2nd edition. St. Martin's Press. [DE]
Geertz, C. (1960) *The religion of Java*. Free Press. [BB-H]
Gergely, G. & Csibra, G. (2003) Teleological reasoning in infancy: The naïve theory of rational action. *Trends in Cognitive Sciences* 7:287–92. [aJMB]
German, T. P. & Barrett, H. C. (2005) Functional fixedness in a technologically sparse culture. *Psychological Science* 16:1–5. [aJMB]
Gilbert, D. T. (2001) Why economists are not afraid to die. Paper presented at the First International Conference on Experimental Existential Psychology, Amsterdam, The Netherlands. August 2–4, 2001. [aJMB]
Gilbert, P. & McGuire, M. T. (1998) Shame, status, and social roles: Psychobiology and evolution. In: *Shame, interpersonal behavior, psychopathology, and culture*, ed. P. Gilbert & B. Andrews. Oxford University Press. [rJMB]
Gintis, H. (2000) Strong reciprocity and human sociality. *Journal of Theoretical Biology* 206(2):169–79. [PB]
Goffman, E. (1959) *The presentation of self in everyday life*. Penguin. [aJMB]
(1963) *Stigma: Notes on the management of spoiled identity*. Simon & Schuster. [arJMB]
Gold, G. J. & Weiner, B. (2000) Remorse, confession, group identity, and expectancies about repeating a transgression. *Basic and Applied Social Psychology* 22:291–300. [rJMB]
Goldenberg, J. L., McCoy, S. K., Pyszczynski, T., Greenberg, J. & Solomon, S. (2000) The body as a source of self-esteem: The effect of mortality salience on identification with one's body, interest in sex, and appearance monitoring. *Journal of Personality and Social Psychology* 79:118–30. [BMH]
Golsworthy, R. & Coyle, A. (1999) Spiritual beliefs and the search for meaning among older adults following partner loss. *Mortality* 4:21–40. [aJMB]
Gottfried, G. M. & Jow, E. E. (2003) "I just talk with my heart": The mind-body problem, linguistic input, and the acquisition of folk psychological beliefs. *Cognitive Development* 18:79–90. [aJMB]
Greeley, A. M. & Hout, M. (1999) Americans' increasing belief in life after death: Religious competition and acculturation. *American Sociological Review* 64:813–35. [aJMB]
Green, C. E. (1968) *Out-of-body experiences*. Institute of Psychophysical Research. [DK]
Greenberg, J., Landau, M. J., Solomon, S. & Pyszczynski, T. (in press) What is the primary psychological function of religion? In: *Handbook of the psychology of religion*, ed. D. Wurff. Oxford University Press. [JG]
Greyson, B. (2000) Dissociation in people who have near-death experiences: Out of their bodies or out of their minds? *Lancet* 355:460–63. [DK]
Guthrie, S. (1993) *Faces in the clouds*. Oxford University Press. [aJMB]
Habermas, J. (1971) *Knowledge and human interests*. Beacon Press. [WSB]
Hafer, C. L. & Bègue, L. (2005) Experimental research on just-world theory: Problems, developments, and future challenges. *Psychological Bulletin* 131:128–67. [aJMB]
Haidt, J., Björklund, F. & Murphy, S. (2004) Moral dumbfounding: When intuition finds no reason. Unpublished manuscript, University of Virginia. [rJMB]
Haley, K. J. & Fessler, D. M. T. (2005) Nobody's watching? Subtle cues affect generosity in an anonymous economic game. *Evolution and Human Behavior* 26:245–56. [arJMB]
Hansen, G., Jensen, S. B., Chandresh, L. & Hilden, T. (1988) The psychotropic effect of ketamine. *Journal of Psychoactive Drugs* 20:419–25. [DK]
Harcourt, A. H. & de Waal, F. B., eds. (1992) *Coalitions and alliances in humans and other animals*. Oxford University Press. [PB]
Harris, P. L., Brown, E., Marriott, C., Whittall, S. & Harmer, S. (1991) Monsters, ghosts and witches: Testing the limits of the fantasy-reality distinction in young children. *British Journal of Developmental Psychology* 9:105–23. [rJMB]
Harris, P. L. & Giménez, M. (2005) Children's acceptance of conflicting testimony: The case of death. *Journal of Cognition and Culture* 5:143–64. [arJMB, PLH, HW]
Harris, P. L. & Koenig, M. A. (2006) Trust in testimony: How children learn about science and religion. *Child Development* 77:505–24. [EME]
Harrison, S. (1993) *The mask of war: Violence, ritual, and the self in Melanesia*. Manchester University Press. [HW]
Haselton, M. G. & Buss, D. M. (2003) Biases in social judgment: Design flaws or design features? In: *Responding to the social world: Implicit and explicit processes in social judgments and decisions*, ed. J. Forgas, K. Williams, & B. von Hippel. Cambridge University Press. [aJMB]
Hassan, N. (2001) Talking to the "human bombs." *The New Yorker*, November 19, 2001. Retrieved November 7, 2004, from http://www.newyorker.com/fact/content/?011119fa_FACT1. [aJMB]
Henrich, J. (2006) Cooperation, punishment, and the evolution of human institutions. *Science* 312:60–61. [BB-H]
Hiadt, J. (2005) *The happiness hypothesis*. Basic Books. [KRL]
Hilton, D. J. (1995) The social context of reasoning: Conversational inference and rational judgment. *Psychological Bulletin* 118:248–71. [BMH]
Hilton, J. L., Fein, S. & Miller, D. T. (1993) Suspicion and dispositional inference. *Personality and Social Psychology Bulletin* 19:501–12. [aJMB]
Hinde, R. A. (1999) *Why gods persist: A scientific approach to religion*. Routledge. [aJMB]
Hirsch, E. (1982) *The concept of identity*. Oxford University Press. [NJB]
Homans, G. C. (1974) *Social behavior: Its elementary forms*. Harcourt, Brace, Jovanovich. [WSB]
Humphrey, N. (2006) *Seeing red: A study in consciousness*, pp. 124–29. Belknap. [DK]
Irwin, H. J. (1985) *Flight of mind: A psychological study of the out-of-body experience*. Scarecrow Press. [DK]
James, W. (1902/1961) *The varieties of religious experience: A study in human nature*. (The Gifford Lectures on Natural Religion delivered at Edinburgh in 1901–1902). Longman's Green/Collier. [BB-H, MF]
Jansen, V. A. A. & van Baalen, M. (2006) Altruism through beard chromodynamics. *Nature* 440:663–66. [BMH]
Johnson, C. N. (2000) Putting different things together: The development of metaphysical thinking. In: *Imagining the impossible: Magical, scientific, and religious thinking in children*, ed. K. Rosengren, C. N. Johnson & P. Harris. Cambridge University Press. [CNJ]
Johnson, C. N. & Wellman, H. M. (1982) Children's developing conceptions of the mind and brain. *Child Development* 53:222–34. [aJMB]

Johnson, D. D. P. (2005) God's punishment and public goods: A test of the supernatural punishment hypothesis in 186 world cultures. *Human Nature* 16:410–46. [rJMB]

Johnson, D. D. P. & Bering, J. M. (2006) Hand of God, mind of man: Punishment and cognition in the evolution of cooperation. *Evolutionary Psychology* 4:219–33. [rJMB]

Johnson, D. D. P. & Krüger, O. (2004) The good of wrath: Supernatural punishment and the evolution of cooperation. *Political Theology* 5:159–76. [aJMB]

Jonas, E. & Fischer, P. (in press) Terror management and religion – Evidence that intrinsic religiousness mitigates worldview defense following mortality salience. *Journal of Personality and Social Psychology*. [JG]

Jung, C. G. (1934) Archetypes of the collective unconscious. In: *The archetype and the collective unconscious. Collected works, 9 I*. Princeton University Press. [DC]

Kanazawa, S. (2004) General intelligence as a domain-specific adaptation. *Psychological Review* 111:512–23. [KRL]

Kelemen, D. (2004) Are children "intuitive theists"? Reasoning about purpose and design in nature. *Psychological Science* 15:295–301. [aJMB]

Kelemen, D. & DiYanni, C. (2005) Intuitions about origins: Purpose and intelligence in children's reasoning about nature. *Journal of Cognition and Development* 6:3–31. [aJMB]

Kenrick, D. T. (2006) Evolutionary psychology: Resistance is futile. *Psychological Inquiry* 17:102–108. [ABC]

Kenrick, D. T., Maner, J. K., Butner, J., Li, N. P., Becker, D. V. & Schaller, M. (2002) Dynamic evolutionary psychology: Mapping the domains of the new interactionist paradigm. *Personality and Social Psychology Review* 6:347–56. [ABC]

Koenig, H. G. & Cohen, H. J., eds. (2002) *The link between religion and health: Psychoneuroimmunology and the faith factor.* Oxford University Press. [KRL]

Koocher, G. (1973) Childhood, death, and cognitive development. *Developmental Psychology* 9:369–75. [aJMB]

Kripke, S. (1980) *Naming and necessity*. Harvard University Press. [NJB]

Kriwaczek, P. (2002) *In search of Zarathustra.* Weidenfeld and Nicolson. [JG]

Kuhlmeier, V. A., Bloom, P. & Wynn, K. (2004) Do 5-month-old infants see humans as material objects? *Cognition* 94:95–103. [aJMB, KRL]

Kuran, T. (1998) Ethnic norms and their transformation through reputational cascades. *Journal of Legal Studies* 27(2):623–59. [PB]

Kurzban, R. & Leary, M. R. (2001) Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin* 127(2):187–208. [PB]

Lackner, J. R. (1992) Sense of body position in parabolic flight. *Annals of the New York Academy of Sciences* 656:329–39. [DK]

Lakoff, G. & Johnson, M. (1999) *Philosophy in the flesh: The embodied mind and its challenge to Western thought.* Basic Books. [SF]

Landman, J. (2001) The crime, punishment, and ethical transformation of two radicals: Or how Katherine Power improves on Dostoyevsky. In: *Turns in the road: Narrative studies of lives in transition*, ed. D. P. McAdams, R. Josselson, & A. Lieblich. American Psychological Association. [aJMB]

Lerner, M. J. (1980) *The belief in a just world: A fundamental delusion*. Plenum. [aJMB]

Lerner, M. J. & Miller, D. T. (1978) Just world research and the attribution process: Looking back and ahead. *Psychological Bulletin* 85:1030–51. [aJMB]

Lester, D., Aldridge, M., Aspenberg, C., Boyle, K., Radsniak, P. & Waldon, C. (2002) What is the afterlife like? Undergraduate beliefs about the afterlife. *Omega: Journal of Death and Dying* 44:113–26. [aJMB]

Levy-Bruhl, L. (1910) *Les fonctions mentales dans les sociétés inférieures*. Presses Universitaires de France. [DC]

(1935) *La mythologie primitive*. Presses Universitaires de France. [DC]

Livingston, K. (2002) Reason, faith, and the good life. *Free Inquiry* 22:42–47. [KRL]

(2005) Religious practice, brain, and belief. *Journal of Cognition and Culture* 5:75–117. [KRL]

Locke, J. (1689/1975) *An essay concerning human understanding*. Oxford University Press. [NJB]

Luria, L. K. (2001) Separated by death? Burials, cemeteries, and confessional boundaries in seventeenth-century France. *French Historical Studies* 24:185–222. [aJMB]

MacIntyre, F. (2004) Was religion a kinship surrogate? *Journal of the American Academy of Religion* 72(3):653–94. [IP]

Malinowski, B. (1916) Baloma: The spirits of the dead in the Trobriand Islands. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 46:353–430. [MB]

(1935) *The foundations of faith and morals: An anthropological analysis of primitive belief and conduct with special reference to the fundamental problem of religion and ethics.* Oxford University Press. [rJMB]

May, H. (2000) "Murderers' relatives": Managing stigma, negotiating identity. *Journal of Contemporary Ethnography* 29:198–221. [rJMB]

McAdams, D. P. (2001) The psychology of life stories. *Review of General Psychology* 5:100–22. [arJMB]

McCauley, R. N. (2000) The naturalness of religion and the unnaturalness of science. In: *Explanation and cognition*, ed. F. C. Keil & R. W. Wilson. MIT Press. [aJMB]

McClosky, M., Caramazza, A. & Green, B. (1980) Curvilinear motion in the absence of external forces: Naïve beliefs about the motion of objects. *Science* 210:1139–41. [NLG]

McCulloch, W. H. (1992) A certain archway: Autoscopy and its companions seen in Western writing. *History of Psychiatry* 3:59–78. [DK]

McGarrigle, J., Grieve, R. & Hughes, M. (1978) Interpreting inclusion: A contribution to the study of the child's cognitive and linguistic development. *Journal of Experimental Child Psychology* 26:528–50. [BMH]

McGinn, C. (1991) *The problem of consciousness*. Blackwell. [aJMB]

Mealey, L. (1995) The sociobiology of sociopathology: An integrated evolutionary model. *Behavioral and Brain Sciences* 20:523–99. [rJMB]

Melser, D. (2004) *The act of thinking.* MIT Press. [SF]

Merricks, T. (2001) *Objects and persons*. Oxford University Press. [NJB]

Mesoudi, A., Whiten, A. & Laland, K. N. (in press) Towards a unified science of cultural evolution. *Behavioral and Brain Sciences* 29(4):329–47. [JH]

Metzinger, T. (2003) *Being no one: The self-model theory of subjectivity*. MIT Press. [DK]

(2005) Out-of-body experiences as the origin of the concept of a "soul." *Mind and Matter* 3:57–84. [DK]

Milinski, M., Semmann, D. & Krambeck, H. J. (2002) Donors to charity gain in both indirect reciprocity and political reputation. *Proceedings of the Royal Society B: Biological Sciences* 269:881–83. [rJMB]

Mithen, S. (1996) *The prehistory of the mind*. Thames and Hudson. [aJMB]

Mittelstaedt, H. & Glasauer, S. (1993) Illusions of verticality in weightlessness. *Clinical Investigations* 71:732–39. [DK]

Mohr, C. & Blanke, O. (2005) The demystification of autoscopic phenomena: Experimental propositions. *Current Psychiatry Reports* 7:189–95. [DK]

Mohr, D. (1978) Development of attributes of personal identity. *Developmental Psychology* 14:427–28. [SN]

Montemayor, R. & Eisen, M. (1977) The development of self-conceptions from childhood to adolescence. *Developmental Psychology* 13:314–19. [SN]

Nagel, T. (1974) What is it like to be a bat? *Philosophical Review* 82:435–50. [PR]

Neiman, S. (2004) *Evil in modern thought*. Princeton University Press. [BB-H]

Nemeroff, C. & Rozin, P. (1994) The contagion concept in adult thinking in the United States: Transmission of germs and interpersonal influence. *Ethos* 22:158–86. [rJMB, NLG]

Nesse, R. M. (2000) Strategic subjective commitment. *Journal of Consciousness Studies* 7(1-2):326–30. [PB]

Nettle, D. (2004) Adaptive illusions: Optimism, control and human rationality. In: *Emotion, evolution and rationality*, ed. D. Evans & P. Cruse. Oxford University Press. [aJMB]

Nichols, S. (in press) Imagination and immortality. *Synthèse*. [aJMB]

Nowak, M. A., Sasaki, A., Taylor, C. & Fudenberg, D. (2004) Emergence of cooperation and evolutionary stability in finite populations. *Nature* 428(6983):646–50. [IP]

Nowak, M. A. & Sigmund, K. (1994) The alternating prisoner's dilemma. *Journal of Theoretical Biology* 168:219–26. [IP]

(1998) Evolution of indirect reciprocity by image scoring. *Nature* 393:573–77. [rJMB]

(2005) Evolution of indirect reciprocity. *Nature* 437(7063):1291–98. [IP]

Nozick, R. (1981) *Philosophical explanations.* Harvard University Press. [GEN]

Nunn, C. Z. (1964) Child control through a "coalition with God." *Child Development* 35:417–32. [BB-H]

Ohtsuki, H., Hauert, C., Lieberman, E. & Nowak, M. A. (2006) A simple rule for the evolution of cooperation on graphs and social networks. *Nature* 441:502–505. [BB-H]

Olson, E. T. (1997) *The human animal: Personal identity without psychology*. Oxford University Press. [NJB]

O'Neill, D. K. & Chong, S. C. F. (2001) Preschool children's difficulty understanding the types of information obtained through the five senses. *Child Development* 72:803–15. [aJMB]

Orians, G. H. (1969) On the evolution of mating systems in birds and mammals. *American Naturalist* 103:589–603. [ABC]

Ottenberg, P. (1958/1980) *Marriage relationships in the double descent system of the Afikpo Igbo of southeastern Nigeria*. University Microfilms. [aJMB]

Owen, P. (2002) Soldier leaves behind wife, 4 children. *The Oklahoman*, May 30, 2002, p. 3-A. [aJMB]

Papineau, D. (2002) *Thinking about consciousness.* Oxford University Press. [SF]

Parfit, D. (1971) Personal identity. *The Philosophical Review* 80(1):3–27. [NJB]

(1984) *Reasons and persons*. Oxford University Press. [NJB, GEN]

Parker, S. T. (1998) A social selection model for the evolution and adaptive significance of self-conscious emotions. In: *Self-awareness: Its nature and development*, ed. M. Ferrari & R. J. Sternberg, pp. 108–34. Guilford Press. [MF]
Pargament, K. I. (1997) *The psychology of religion and coping: Theory, research, practice*. Guilford Press. [JG]
Parsons, T., Shils, E. A. & Tolman, E. C., eds. (1951) *Toward a general theory of action*. Harvard University Press. [WSB]
Pepitone, A. & Saffioti, L. (1997) The selectivity of nonmaterial beliefs in interpreting life events. *European Journal of Social Psychology* 27:23–35. [aJMB]
Perry, J. (2001) *Reference and reflexivity*. CSLI Publications. [NJB]
Pettazzoni, R. (1955) On the attributes of God. *Numen* 2:1–27. [rJMB]
Piaget, J. (1923) La psychologie et les valeurs religieuses. In: *Sainte-Croix 1922*, ed. L'association chrétienne d'étudiants de la Suisse Romande. La Concorde. [MF]
(1928) L'Immanence. In: *Deux types d'attitudes religieuses: Immanence et transcendance*, ed. J. Piaget & J. de la Harpe. Editions de L'Association Chretienne d'Etudiants de la Suisse Romande. Dépôt Central. [MF]
(1930) *Immanentisme et foi religieuse*. Librarie H. Robert. [MF]
(1932/1965/1978) *The moral judgment of the child*. Free Press. (1932/1978 French edition, *Le jugement moral chez l'enfant*. Presses Universitaires de France.) [aJMB, MF]
Plato (c.350 bce/1997) *Phaedo*. In: *Plato: Complete works*, ed. J. M. Cooper & D. S. Hutchinson. Hackett. [MF]
Poling, D. A. & Evans, E. M. (2004) Are dinosaurs the rule or the exception? Developing concepts of death and extinction. *Cognitive Development* 19:363–83. [EME]
Povinelli, D. J. & Bering, J. M. (2002) The mentality of apes revisited. *Current Directions in Psychological Science* 11:115–19. [aJMB]
Previc, F. H. (in press) The role of the extrapersonal brain systems in religious activity. *Consciousness and Cognition*. [DK]
Pronin, E., Wegner, D. M., McCarthy, K. & Rodriguez, S. (2006) Everyday magical powers: The role of apparent mental causation in the overestimation of personal influence. *Journal of Personality and Social Psychology* 91:218–31. [JP]
Pylyshyn, Z. W. (1989) The role of location indexes in spatial perception: A sketch of the FINST spatial-index model. *Cognition* 32(1):65–97. [NJB]
(2003) *Seeing and visualizing: It's not what you think*. MIT Press. [NJB]
Pyszczynski, T., Greenberg, J., Solomon, S., Cather, C. & Gat, I. (1995) Defensive distancing from victims of serious illness: The role of delay. *Personality and Social Psychology Bulletin* 21:13–20. [aJMB]
Pyysiäinen, I. (2001) *How religion works: Towards a new cognitive science of religion. Cognition and Culture Book Series, vol. 1.* Brill. [aJMB, IP]
(2003) On the "innateness" of religion: A comment on Bering. *Journal of Cognition and Culture* 3(3):218–25. [IP]
(2006) Amazing grace: Religion and the evolution of the human mind. In: *Where God and science meet: How brain and evolutionary studies alter our understanding of religion, I–III. Vol. I: The evolutionary psychology of religion: How evolution shaped the religious brain*, ed. P. McNamara, Ch. 10. Greenwood. [IP]
Quine, W. V. O. (1960) *Word and object*. MIT Press. [NJB]
Rank, O. (1931/1961) *Psychology and the soul* (Perpetua Edition). Ed. A. S. Barnes. [JG]
Rehm, J., Steinleitner, M. & Lilli, W. (1987) Wearing uniforms and aggression: A field experiment. *European Journal of Social Psychology* 17:357–60. [rJMB]
Reid, T. (1785/1969) *Essays on the intellectual powers of man*, ed. B. Brody. MIT Press. [SN]
Reynolds, V. & Tanner, R. (1995) *The social ecology of religion*. Oxford University Press. [arJMB]
Richerson, P. J. & Boyd, R. (2005) *Not by genes alone, how culture transformed human evolution*. The University of Chicago Press. [NJB, JH, IP]
Riggs, K. J. & Peterson, D. M. (2000) Counterfactual thinking in pre-school children: Mental state and causal inferences. In: *Children's reasoning and the mind*, ed. P. Mitchell & K. J. Riggs, pp. 87–99. Psychology Press. [BMH]
Rimbaud, A. (1873/1999) *A Season in Hell and The Illuminations*. Trafalgar Square Publishing. [aJMB]
Rips, L. J., Blok, S. & Newman, G. (2006) Tracing the identity of objects. *Psychological Review* 113:1–30. [GEN]
Roach, M. (2006) *Spook: Science tackles the afterlife*. Norton. [DK]
Robbins, P. & Jack, A. I. (2006) The phenomenal stance. *Philosophical Studies* 127:59–85. [PR]
Roehlkepartain, E. C., King, P. E., Wagener, L. & Benson, P. L., eds. (2006) *The handbook of spiritual development in childhood and adolescence.* Sage. [CNJ]
Roes, F. L. & Raymond, M. (2003) Belief in moralizing gods. *Evolution and Human Behavior* 24:126–35. [aJMB]
Rorty, A. O., ed. (1976) *The identities of persons*. University of California Press. [NJB]
Ross, L. T. & Kaplan, K. J. (1994) Life ownership orientation and attitudes toward abortion, suicide, doctor-assisted suicide, and capital punishment. *Omega: Journal of Death and Dying* 28:17–30. [aJMB]
Rosse, R. B., Collins, J. P., Jr., Fay-McCarthy, M., Alim, T. M., Wyatt, R. J. & Deutsch, S. I. (1994) Phenomenologic comparison of the idiopathic psychosis of schizophrenia and drug-induced cocaine and phencyclidine psychoses: A retrospective study. *Clinical Neuropharmacology* 17:359–69. [DK]
Rozin, P., Haidt, J. & McCauley, C. R. (1993) Disgust. In: *Handbook of emotions*, ed. M. Lewis & J. M. Haviland. Guilford Press. [aJMB]
Russell, B. (1912) *Problems of philosophy*. Williams and Norgate. [NJB]
(1918) Knowledge by acquaintance and knowledge by description, *Mysticism and logic and other essays*. Longmans, Green. [NJB]
(1956) *Logic and knowledge; essays 1901–1950*, ed. R. C. Marsh. George Allen & Unwin. [NJB]
Rutgers, A., Bakermans-Kranenburg, M., van Ijzendoorn, M. & van Berckelaer-Onnes, I. (2004) Autism and attachment: A meta-analytic review. *Journal of Child Psychology and Psychiatry* 45:1123–34. [SF]
Ryle, G. (1949) *The concept of mind*. Hutchinson. [SF]
Sandelands, L. E. (2005) *Man and nature in God*. Transaction. [LES]
Sandin, B. & Sather, G. (1980) *Iban adat and augury*. Penerbit Universiti Sains Malaysia for School of Comparative Social Sciences. [rJMB]
Sartre, J.-P. (1937/1969) *The Wall: And other stories*. New Directions. [aJMB]
(1946/1989) *No Exit and other plays*. Vintage. [rJMB]
(1957) *Existentialism and human emotions*. Philosophical Library. [aJMB]
Saxe, R., Jamal, N. & Powell, L. (2006) My body or yours? The effect of visual perspective on cortical body representation. *Cerebral Cortex* 16:178–82. [DK]
Schelling, T. C. (1960) *The strategy of conflict*. Harvard University Press. [aJMB, PB]
Scholl, B. J. (2001) Objects and attention: The state of the art. *Cognition* 80:1–46. [GEN]
Schutz, A. (1967) *The phenomenology of the social world*. Northwestern University Press. [WSB]
(1971) On multiple realities. In: *Collected papers, vol. 1*, pp. 207–59. Nijhoff. [WSB]
Selman, R. (1980) *The growth of interpersonal understanding: Developmental and clinical analyses*. Academic Press. [SN]
Shaver, P., Lenauer, M. & Sadd, S. (1980) Religiousness, conversion, and subjective well-being: The "healthy-minded" religion of modern American women. *American Journal of Psychiatry* 137:1563–68. [KRL]
Shiels, D. (1978) A cross-cultural study in out-of-body experiences, waking and sleeping. *Journal of Social Psychological Research* 49:697–741. [DK]
Shoemaker, S. (1959) Personal identity and memory. *The Journal of Philosophy* 56(22):868–82. [NJB]
(1999) Self, body, and coincidence. *Supplement to the Proceedings of the Aristotelian Society* 73(1):287–306. [NJB]
Sierra, M. & Berrios, G. E. (1998) Depersonalization: Neurobiological perspectives. *Biological Psychiatry* 44:898–908. [DK]
Silke, A. (2003) Deindividuation, anonymity and violence: Findings from Northern Ireland. *Journal of Social Psychology* 143:493–99. [rJMB]
Slaughter, V., Jaakkola, K. & Carey, S. (1999) Constructing a coherent theory: Children's biological understanding of life and death. In: *Children's understanding of biology, health, and ethics*, ed. M. Siegal & C. Peterson. Cambridge University Press. [aJMB]
Slaughter, V. & Lyons, M. (2003) Learning about life and death in early childhood. *Cognitive Psychology* 46:1–30. [aJMB]
Slone, D. J. (2004) *Theological incorrectness: Why religious people believe what they shouldn't*. Oxford University Press. [aJMB]
Smith, P. C., Range, L. M. & Ulmer, A. (1992) Belief in afterlife as a buffer in suicidal and other bereavement. *Omega: Journal of Death and Dying* 24:217–25. [aJMB]
Solomon, S., Greenberg, J. & Pyszczynski, T. (1991) A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. In: *Advances in experimental social psychology, vol. 24*, ed. M. Zanna, pp. 91–159. Academic Press. [JG]
Sosis, R. & Alcorta, C. (2003) Signaling, solidarity, and the sacred: The evolution of religious behavior. *Evolutionary Anthropology* 12:264–74. [aJMB]
Soultanian, C., Perisse, D., Revah-Levy, A., Luque, R., Mazet, P. & Cohen, D. (2005) Cotard's syndrome in adolescents and young adults: A possible onset of bipolar disorder requiring a mood stabilizer? *Journal of Child and Adolescent Psychopharmacology* 15:706–11. [DC]
Sperber, D. & Hirschfeld, L. A. (2004) The cognitive foundations of cultural stability and diversity. *Trends in Cognitive Sciences* 8(1):40–46. [aJMB, GEN, IP]
Stark, R. (1996) Religion as context: Hellfire and delinquency one more time. *Sociology of Religion* 57:163–73. [WSB]
Sterelny, K. (2003) *Thought in a hostile world: The evolution of human cognition*. Blackwell. [IP]

Stone, V. E. & Gerrans, P. (2006) Does the normal brain have a theory of mind? *Trends in Cognitive Sciences* 10(1):3–4. [IP]
Strawson, P. F. (1959) *Individuals: An essay in descriptive metaphysics*, pp. 18–20. Methuen. [NJB]
Subbotsky, E. V. (1997) Explanations of unusual events: Phenomenalistic causal judgments in children and adults. *British Journal of Developmental Psychology* 15:13–36. [aJMB]
(2001) Causal explanations of events by children and adults: Can alternative causal modes coexist in one mind? *British Journal of Developmental Psychology* 19:23–46. [arJMB]
Suddendorf, T. & Whiten, A. (2001) Mental evolution and development: Evidence for secondary representation in children, great apes and other animals. *Psychological Bulletin* 127:629–50. [aJMB]
Suzuki, D. T. (1962/1972) *What is Zen*? Harper & Row/Perennial Library. [MF]
Tager-Flusberg, H. & Joseph, R. M. (2005) How language facilitates the acquisition of false belief understanding in children with autism. In: *Why language matters for theory of mind*, ed. J. Astington & J. Baird. Oxford University Press. [SF]
Tangney, J. P. (2003) Self-relevant emotions. In: *Handbook of self and identity*, ed. M. R. Leary & J. P. Tangney. Guilford Press. [rJMB]
Thalbourne, M. A. (1996) Belief in life after death: Psychological origins and influences. *Personality and Individual Differences* 21:1043–45. [aJMB]
Thomson, J. J. (1997) People and their bodies. In: *Reading Parfit*, ed. J. Dancy. Blackwell. [NJB]
Titchener, E. B. (1898) The feeling of being stared at. *Science* 8:895–97. [NLG]
Tomasello, M. & Call, J. (1997) *Primate cognition*. Oxford University Press. [aJMB]
Tooby, J. & Cosmides, L. (1992) The psychological foundations of culture. In: *The adapted mind, Evolutionary psychology and the generation of culture*, ed. J. H. Barkow, L. Cosmides, & J. Tooby. Oxford University Press. [arJMB]
Vidal, F. (1994a) *Piaget before Piaget*. Harvard University Press. [MF]
(1994b) Les mystères de la douleur divine. Une prière du Jean Piaget pour l'année 1916. *Revue De Théologie et de Philosophie* 126:97–118. [MF]
Viennot, L. (1979) Spontaneous reasoning in elementary dynamics. *European Journal of Science Education* 1:205–21. [NLG]
Wall, P. D. (1999) The placebo and the placebo response. In: *Textbook of pain*, 4th edition, ed. P. D. Wall, pp. 1419–30. Churchill. [BMH]
Watson, P. (2005) *Ideas: A history of thought and invention from fire to Freud.* Harper Collins. [JG]
Watson, R. I. (1973) Investigation into deindividuation using a cross-cultural survey technique. *Journal of Personality and Social Psychology* 25:342–45. [rJMB]
Wedekind, C. & Braithwaite, V. A. (2002) The long-term benefits of human generosity in indirect reciprocity. *Current Biology* 12:1012–15. [rJMB]
Weeks, M. & Lupfer, M. B. (2000). Religious attributions and proximity of influence: An investigation of direct interventions and distal explanations. *Journal for the Scientific Study of Religion* 39:348–62. [arJMB]
Wegner, D. M. (2005) Who is the controller of controlled processes? In: *The new unconscious*, ed. R. Hassin, J. S. Uleman & J. A. Bargh, pp. 19–36. Oxford University Press. [JP]
Wegner, D. M. & Sparrow, B. (2004) Authorship processing. In: *The cognitive neurosciences*, 3rd edition, ed. M. Gazzaniga, pp. 1201–209. MIT Press. [JP]
Wegner, D. M., Sparrow, B. & Winerman, L. (2004) Vicarious agency: Experiencing control over the movements of others. *Journal of Personality and Social Psychology* 86:838–48. [JP]
Wegner, D. M. & Wheatley, T. P. (1999) Apparent mental causation: Sources of the experience of will. *American Psychologist* 54:480–92. [JP]
Wellman, H. M. & Estes, D. (1986) Early understanding of mental entities: A reexamination of childhood realism. *Child Development* 57:910–23. [DE]
Whitehouse, H. (2004) *Modes of religiosity: A cognitive theory of religious transmission*. AltaMira Press. [rJMB]
Wiesel, E. (1961). *Legends of our time*. Holt, Rinehart, Winston. [aJMB]
(1966) *The gates of the forest.* Holt, Rinehart, Winston. [aJMB]
Wiggins, D. (1997) Sortal concepts: A reply to Xu. *Mind and Language* 12(3/4):413–21. [NJB]
(2001) *Sameness and substance renewed*. Cambridge University Press. [NJB]
Wilder, T. (1927/1955) *The bridge of San Luis Rey*. Washington Square Press. [aJMB]
Wilkes, K. V. (1992) Psuché versus the mind. In: *Essays on Aristotle's De Anima*, ed. M. C. Nussbaum & A. O. Rorty, pp. 109–27. Oxford University Press. [MF]
Williams, B. (1970) The self and the future. *The Philosophical Review* 79(2):161–80. [NJB]
Williams, G. C. (1966) *Adaptation and natural selection*. Princeton University Press. [JH]
Wittgenstein, L. (1953) *Philosophical investigations*. Blackwell. [SF]
Wojciszke, B., Bazinska, R. & Jaworski, M. (1998) On the dominance of moral categories in impression formation. *Personality and Social Psychology Bulletin* 24(12):1251–63. [PB]
Worthen, L. T. & Yeatts, D. E. (2001) Assisted suicide: Factors assessing public attitudes. *Omega: Journal of Death and Dying* 42:115–35. [aJMB]
Wright, R. (1994) *The moral animal. Why we are the way we are: The new science of evolutionary psychology*. Pantheon. [aJMB]
Yalom, I. D. (1980) *Existential psychotherapy*. Basic Books. [aJMB]
Yang, S. C. & Chen, S.-F. (2006) Content analysis of free-response narratives to personal meanings of death among Chinese children and adolescents. *Death Studies* 30:217–41. [KRL]
Zilboorg, G. (1943) Fear of death. *Psychoanalytic Quarterly* 12:465–75. [JG]
Zimbardo, P. G. (1969) The human choice: Individuation, reason and order, versus deindividuation, impulse and chaos. In: *Nebraska Symposium on Motivation, vol. 17*, ed. W. J. Arnold & D. Levine. University of Nebraska Press. [rJMB]