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.

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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

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