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