

of ordinary people are not concerned with the morality of their descendants, 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 fetuses 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

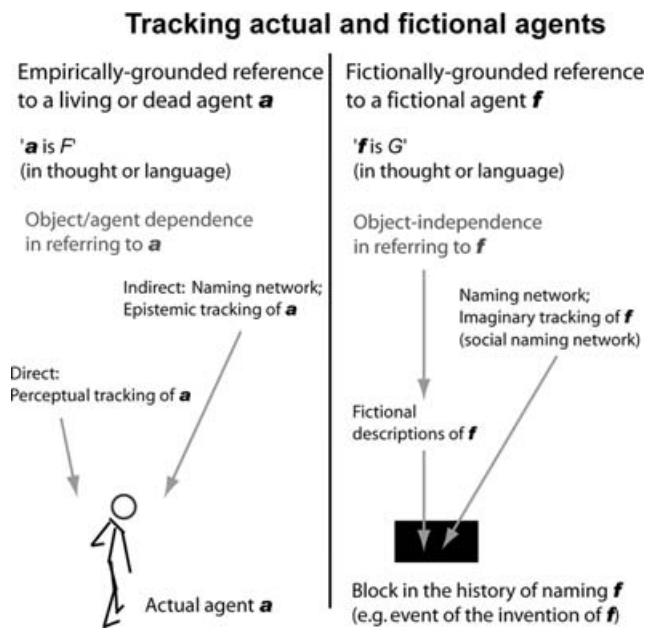


Figure 1 (Bullot). Fundamental differences between tracking actual and fictional agents.

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 pair up 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

# 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 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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(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 **Hegd  & 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.<sup>1</sup>

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 unsewn 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.<sup>2</sup>

### **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 & Spoons 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 spoiled their reputation in their natal group (a strategy of sociopaths in modern societies; Mealey 1995).<sup>3</sup>

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 conceptions 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 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. **Bulot**, 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*, Bulot 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 **Bulot**, 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. Bulot 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 Bulot 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 spoil 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](http://www.ratemyprofessor.com)) and stingy customers (e.g., [www.bitterwaitress.com](http://www.bitterwaitress.com)), the Internet is ancient social psychology meeting new information technology.

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Letters “a” and “r” appearing before authors’ initials refer to target article and response, respectively.

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