example, Greenberg et al. (1990) found that MS led Christians to derogate Jews and Americans to react similarly to critics of the United States.

Finally, we must question A&N's intriguing claim that their finding (reported in sect. 5) that MS increases Christian participants' beliefs in the efficacy of the prayers of Buddhists, demonstrates a function of supernatural beliefs independent of worldview bolstering. From our perspective, evidence of the effectiveness of prayer directed toward any deity can be taken as validation of the existence of one's preferred deity. Their findings do not imply that the participants believed that Buddha, as opposed to Jesus, answered the prayers. In addition, substantial research (Greenberg et al., in press) shows that MS-induced increases in religion-consistent supernatural beliefs (prayer, spirits, deities, afterlife) are limited to individuals who subscribe to a religious worldview. If supernatural beliefs served a terror management function independent of the individual's worldview, such effects would not be moderated by whether or not the individual subscribes to a religious worldview.

Despite our reservations, we welcome work such as the target article as a new addition to the study of the evolutionary and psychological sources and functions of religion. We believe the target article will stimulate more good work on these issues, and we hope that our commentary will have a similarly stimulating impact.

Toward a new scientific study of religion

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Abstract: Atran & Norenzayan (A&N) have proposed a study of religion based in the cognitive sciences. Their final conclusions, however, incorporate functionalist definitions. Further, key features by which they characterize religion are not instantiated by some historical evidence. Nevertheless, the foci of their arguments are central to any study of religion and should provoke further research and experimentation along the lines suggested.

When an academic study of religion (*Religionswissenschaft*) was first envisioned towards the end of the nineteenth century, it arose from the scientific impulse then dominant among many European intellectuals (e.g., Müller 1870). By the first decade of the twentieth century, some heretofore reticent scholars of religion even formulated this nascent study of religion in the context of Darwinism, including prescient proposals for research on the evolution of human mental capacities (Harrison 1909).[1] With the disillusion of optimistic notions of progress, including those of scientific advances in knowledge, following upon the ravages of World War I, prospects for a scientific study of religion became eclipsed by theological-phenomenological-hermeneutical quests for "meaning" that continue to characterize the study of religion to the present day (Kippenberg 2002; Wiebe 1999, pp. 141–62). In contrast to these contemporary currents in the study of religion, Atran & Norenzayan (A&N) have proposed an explanatory theory of religion as an evolutionary by-product of ordinary cognitive processes formulated in ways that can be experimentally and evidentially assessed.

A&N's definition of religion connects the classic "Tylorian" view, whereby "religious" practices, events, beliefs, and the like, are stipulated to be those legitimated or authorized by claims to some notion of "superhuman" or "counterintuitive" agency (Tylor 1871/1958, p. 8),[2] with a more "Durkheimian" orientation, whereby those practices, events, and beliefs necessarily involve costly social commitments.[3] Culturally postulated claims to superhuman agency can differentiate religion from ideologies such as Marxism or Freudianism, whereas the nonrecuperable costliness associated with those claims can differentiate them from those postulated of such ubiquitous counterintuitive agents as ghosts or popular ones like superheroes. "Religious" agency, then, is effectively differentiated from a larger domain of culturally distributed representations of superhuman agents without affirming for it any *sui generis* autonomy.

The question that remains is not *how* counterintuitive beliefs might be formed – there is wide consensus among cognitive scientists about the generation of such beliefs by ordinary processes of cognition and, consequently, their naturalness – but *why* such beliefs, once introduced, are selected for costly recognition and reproduction from among the numerous counterintuitive alternatives also generated by human mental activity. This is a debated issue among cognitive scientists generally. A&N seem to suggest that the selection of such agents and ideas is not a consequence of natural cognitive processes at all but is quite intentional, a *purposeful divorce* "from the default state of 'automatic' human cognition" (sect. 1.1, para. 3), though the intentional mechanism for that separation remains unclear.

A&N finally revert to the functionalist arguments they initially criticize as nonexplanatory (sect. 1.3). For example, they contend that "religious" agents are those that function "to ease existential anxieties such as death and deception" (sect. 7). But to paraphrase their earlier critique, such existential anxieties "are not evolutionarily responsible for the cognitive structure and cultural recurrence of religion" (sect. 1.5), and any assuaging of such anxieties is not unique to religion but is also available from other cultural phenomena (sect. 1.3).

Although initial experimental results offered by A&N are promising, key functions they attribute to religion can be questioned in light of the evidential record. Whereas it may be the case that all religions accept some view of a "minimally counterfactual afterlife," it is not the case that such views always constitute a "resolution" to existential anxieties (sect. 1, note 3), as the inconsequential views about an afterlife among the ancient Greeks instantiates (e.g., Garland 1985, pp. 48–76) – a not insignificant historical exception. Similarly, the same Greek case calls into question A&N's generalization that religion functions to validate "moral truths" or a "moral consensus" (sects. 1 and 1.3). For the Greeks, however, morality was the purview of the philosophers who criticized Greek religion precisely for its lack of concern with morality (Attridge 1978; Price 1999, pp. 126–42). Does Greek religion then not really count, for A&N, as religion at all? Greek religion nevertheless *did* posit a considerable pantheon of superhuman agents; and it did support a complex system of sacrifice – though the costs of these sacrifices seem to have been recoupable by providing their participants a portion of meat otherwise absent from their diet (Rundin 1996). On the other hand, Greek religious formations do provide solid historical evidence for A&N's contention that fictive kinship groups can account for the existence of altruistic behavior and for solidarity among groups of non-kin (Martin 1997; 2001), though, again, such fictive kin groups were not exclusively religious.

A&N clearly disclosed the reason why the contemporary study of religion continues to be dominated by theological-phenomenological-hermeneutical traditions, for, as they conclude, the "potentially endless, open-textured evocation of possible meanings and inferences" pursued by these tradition is not a characteristic of scientific inquiry but of *religious practice* (sect. 3), even if those evocations continue to be practiced in the context of the academy. For those who still strive to realize a scientific approach to the study of religion, the present contribution to the recent but burgeoning field of cognitive science of religion is a most welcome and innovative addition,[4] and should provoke further research and experimentation along the lines suggested.

NOTES

1. On this point, see the letter from Charles Darwin to the anthropologist E. B. Tylor (Darwin 1888, p. 151).

2. Tylor's "minimum definition of Religion" is "the Belief in Spiritual Beings" (Tylor 1871/1958, p. 8), a modified version of which is followed

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by a majority of those researching religion from a cognitive approach, e.g., Lawson and McCauley (1990, pp. 5, 61), Guthrie (1993, p. 3), Boyer (2001, p. 144); Atran (2002a, p. 15) and Pyysiäinen (2001, p. 23).

3. For Durkheim (1915), religion "always presupposes that the worshipper gives some of his substance or his goods to the gods" (p. 385); see Atran (2002a, pp. 4, 264) and Whitehouse (2004).

4. In addition to Atran (2002a), see Barrett (2000), Boyer (1994; 2001), Guthrie (1980; 1993), Lawson and McCauley (1990), McCauley and Lawson (2002), Pyysiäinen (2001), Whitehouse (1995; 2000; 2004), and a series – *Cognitive Science of Religion* – recently announced by AltaMira Press <www.altamirapress.com>.

Who is mind blind?

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Abstract: The authors attempt to explain the ubiquity and persistence of human religion by invoking innate, domain-specific cognitive furniture, while dismissing the potential of other approaches, such as memetics, to produce "mindful" understandings of religion. This commentary challenges the explanatory adequacy of cognitive nativism, suggesting that memetics has as much claim to utility and "mindfulness" as innate mental modules do.

> *And why beholdest thou the mote that is in thy brother's eye, but considerest not the beam that is in thine own eye?*
> – Matthew 7:3

Most of the easy explanations for religion's ubiquity and persistence in human societies are inadequate (Boyer 2001). Religion does not clearly rationalize the universe, nor consistently assuage existential anxieties, nor ensure the survival of committed groups in any way distinct from secular collectivities. (In the words of authors Atran & Norenzayan [A&N], such explanations fail to differentiate "Moses from Mickey Mouse"). Any satisfying account of religion will need to have the command of both the relevant cognitive and cultural data the authors impressively display.

A&N do not consider religion to be an adaptation. Instead, they view it as a consistent by-product of interaction between the world and "modularized (*innate and universal*) conceptual and mnemonic processing" (target article, sect. 7, last para., emphasis added). An example might be humans' penchant to attribute intentionalities to the world around them, even in circumstances where such agency may be implausible. Religion, A&N suggest, may function to help us self-stimulate behavioral responses that were adaptive in our evolutionary past – the pervasiveness of gods, demons, spirits, and the like, is a consequence of the hair-triggering of innate intentionality-detection faculties by cultural constructs that might be collectively understood as *agency porn* (my phrase, not theirs!). On the way to arguing this innate modularist view, A&N explicitly question the utility of what they call functional approaches such as memetics, group selection, and connectionism, asserting that the latter cannot explain the "cognitive peculiarities of religion" (sect. 1.5). This perceived shortcoming leads the authors to call such approaches "mind-blind."

A&N do little justice to these alternatives. Indeed, the empirical evidence they present is entirely consistent with the memetic model. Moreover, they fail to acknowledge long-standing objections to the kind of cognitive science that purports to explain anything by positing innate, isolated mental faculties, which, according to their most widely recognized theorizer (Fodor 1983), are largely impenetrable. Just who is "mind blind" here?

To be sure, approaches that lean on the slender reeds of memes or group selection still have far to go in explaining much of interest to social scientists or humanists (Runciman 1999). Yet the empirical bases for the innate mental modules are also in dispute (e.g., Berthier et al. 2000; Elman et al. 1996; Karmiloff-Smith 1992;Wakeley et al. 2000). Simply put, although it is widely accepted that modularized functions emerge in brain development, that these functions are prespecified is not. Though a few have tried (e.g., Marcus & Fisher 2003), no one has convincingly accounted for the genetic preformation of specific knowledge, whether it be universal grammar, "folkbiology," or "folkmechanics." Assertions of the existence of what in the developmental literature goes as "core knowledge" or "central origins" (Spelke 1988; 1992) seems to occupy a similar status in cognitive science as "instinct" used to in ethology – a term that stands for explanation more than it actually explains.

This is not the place to rehearse the ongoing dispute between proponents of domain-specific innate knowledge and general learning mechanisms in development (Nicastro, under review). What should be acknowledged, however, is that explaining religion by positing innate releasing mechanisms rooted in ancient adaptive imperatives hardly seems like a cognitively rich, *mindful* alternative to the so-called mind-blind approaches A&N decry.

With respect to memetics, the authors are bothered by the lack of a clear definition of a meme. Establishing the nature of the replicator in memetic evolution has indeed been a matter of great dispute in this nascent field. Some argue, however, that the discipline no more requires a strict definition of the meme than the gene did at the dawn of evolutionary biology (Blackmore 1999; Hull 2000). In any case, A&N seem unfamiliar with developments that help define memes in more empirically useful ways (Aunger 2002; Dawkins 1982). Dawkins's view of the meme has substantially evolved since his original, somewhat loose conception (Dawkins 1976). As early as 20 years ago he took to calling a meme "a unit of information residing in a brain" (Dawkins 1982). That view has been subsequently developed by Aunger, who limits what he calls a neuromeme to "a configuration in one node of a neuronal network that is able to induce the replication of its state in other nodes" (Aunger 2002; cf. Heylighen 1991, who likens memes to simple "*if condition, then action*" production rules in artificial intelligence). If we follow A&N in making no conceptual distinction between "mind" and "brain," then exactly what is so "mind-blind" about the meme, so defined?

A&N supply empirical evidence of the mnemonic advantages of "minimally impossible" stories. This material nicely complements a number of Boyer's observations about how religious beliefs tend to violate normal conceptual categories in consistent ways. Yet mnemonic advantage can also be adduced to support a memetic model of religion – that is, a model that posits a "selfish" cultural replicator that propagates from mind to mind. Obviously, belief sets that are easier to recall are more likely to persist for retransmission between individuals. Indeed, depending on where one lays the emphasis, A&N's conclusion that "the way natural and non-natural beliefs are combined is crucial to the survival of a cultural ensemble of beliefs, such as those that form the core of any religious tradition" (sect. 4, para. 11) could be a statement right out of Susan Blackmore's (1999) *The Meme Machine.*

Although the authors endeavor to bring a new perspective to bear on the question of religion, in at least one sense their account is just the same old vintage in a new wineskin. Speculations on how fictive kinship or omniscient beings function to protect committed groups against cheaters and freeloaders surely match our intuitive (dare we say "folkpsychological"?) feelings for how religions work. But they are still vulnerable to a fundamental objection: The more successful such tricks might be in subordinating the individual's fitness to the common cause (e.g. modern suicide terrorism), the more profound the (genetic) selective pressure ought to be against the kind of sociality that makes people likely to join such groups in the first place (Krebs & Dawkins 1984). One response A&N might have made to this point is that ideologies that provoke religious commitment can usually override asocial proclivities rooted in genes because they can evolve much faster. Another might be that adaptations necessary to produce humans resistant to religious ideologies are either developmentally implausible (because genes have little direct influence on relative degrees of sociality, religious or otherwise) or func-

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