Defining religion

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Identifying the problem

How could a sensible animal like modern Homo sapiens, equipped by natural selection with efficient core knowledge (or modular predispositions), i.e., knowledge well suited for dealing with the world as it is, hold such ridiculous ideas as: there are ghosts that go through walls; there exist omniscients; and there are deceased people active after death? (Bloch, 2008, p. 2055)

One puzzling feature of human social life is our commitment to activities that are, at first glance, non-functional. Three examples are music, story-telling, and religion. These activities seem not to contribute to the basic business of living and reproducing. Moreover, they seem both costly and pervasive in human life. Not everyone is a story-teller; not everyone is a musician; not everyone embraces religious belief, or takes part in religious practices. But most participate in the narrative, musical, and religious life of their community, and having such lives is a typical feature, perhaps a universal feature, of human communities. This suggests that music, story-telling, and religion are ancient features of human social life, and that there is something about their effects on us that ensures that they persist in our lives, largely independently of the specific environmental contexts in which humans have found themselves, and largely independently of variations in human social organization. Hunting and stone tool making were ancient and important features of human social and cognitive lives, but unlike music, story-telling, and religion they are now absent from many human cultures.

So, unless there has been quite extraordinary convergence in human social evolution, these aspects of our social life have both ancient origins (i.e., before the out-of-Africa dispersal of sapiens) and they are stable, once they have originated. That said, there is no evidence that religion, the focus of this article, is very ancient. Of course, much of the material symbolism associated with religious practice is not durable, and so would not leave traces, even were such symbols part of ancient
practices. But some material expressions of religious practice are durable: physically reshaping places of special significance; figurines made from hard materials; rituals associated with the dead (some grave goods; some forms of ritual alteration of the corpse); material symbols made from enduring materials like shell, bone, ivory, stone. Paleoanthropologists and archaeologists talk of a transition to behavioral modernity in the hominin lineage sometime around 100 kya, perhaps associated with sapiens expansion out of Africa; a transition in which technology became more elaborate and regionally differentiated, in which hominins expanded their ecological reach, in which material symbols played a more overt role in hominin social life (see Nowell, 2010).

There is (at most) just a little evidence of religion-like activities before this time. There are reports of cannibalism from remains in China and Spain going back 800,000 years (Hayden, 2003, pp. 95–97). But even if the fragments we see are the traces of social signals rather than the remains of mundane meals, not all social signals are associated with anything like religion. Māori cannibalism was stylized rather than nutritional, but as an expression of triumph over, and perhaps contempt for, one’s enemies. The most persuasive example of the older finds is a skull 600,000 years old, with many stone cut marks, apparently to facilitate the removal from the skull of facial skin (White, 1986).1 This is unlikely to be mundane processing of a body as a mere physical resource, and so could be evidence of some kind of proto-religious mortuary practice. But equally it could be in the lineage of scalping or Dayak head-hunting; trophy collecting, advertising success in conflict. Ocher is another candidate signal of very early proto-religious practice, for it is a potential marker of the use of material symbols, and appears episodically in the material traces of human life perhaps back to 250 kya (McBrearty & Brooks, 2000). But not all material symbols are used in ritual; many signal collective identity (“we are the Maasai”) or social role. Moreover, ocher has mundane uses (for example, as a component of early adhesives; Wadley, 2010). It is around 100 kya that we see the first signs of deliberate burials (Pettitt, 2011, 2013, 2015) and even this is by no means a clear signal of a religious life.2

Of course, it is difficult to interpret the absence of evidence. Hayden begins his chapter on Paleolithic religion by remarking on how archaeologically invisible much forager ritual would be (Hayden, 2003). But if the ceremonial disposal of the dead and the making of religious artifacts (transhuman figurines, for example) were a central feature of early sapiens cultural life, we would expect to see some historical trace of such practices. We do see them in Upper Paleolithic Europe, with the wide distribution of Venus figurines (Mussi, 2015). We do not see them before, roughly, 100 kya. That said, this article aims to explain religion through changes in hominin social life, not through changes in the intrinsic, genetically canalized capacities of hominin minds. Religion is a social technology, or set of related social technologies. The archaeological record suggests that ancient physical technologies initially flicker in and out of hominin life. Innovations are made, and taken up, but are not sufficiently entrenched and widely distributed to survive local disturbances; that seems to be true, say, of fire (Gowlett & Wrangham, 2013). The same is likely to be true of social technologies. So, the “origin of religion” is not a single event or moment. It is a set of local practices acquiring a robust, widely distributed, resilient role in human social life. Very likely, that process was preceded by earlier, qualitatively similar experiments that did not fully establish.

So, an evolutionary account of the origins of religion in hominin lives needs to explain its ancient origins, but without predicting too ancient an origin. I do not think this claim is radically at odds with the existing literature. Maurice Bloch, for example, suggests that religious thinking3 originates with behavioral modernity (Bloch, 2008). Others suggest modestly earlier dates (about 150 kya; Alcorta & Sosis, 2005; Rossano, 2006; Sosis & Alcorta, 2003). But the constraint is not trivial. For example, “existential terror” or “terror management” accounts of the origin of religion suggest that religious belief manages the fear of death once agents have knowledge of mortality, and manages anxiety in the face of the random violence of the world (see, for example, Scott Atran and the “tragedy of cognition” [Atran, 2005, pp. 66–67]; Solomon, Greenberg, & Pyszczynski, 1991; Vail et al., 2010). If that were the root of religion, it should be very ancient indeed. Half a million years ago, there were very large brained hominins, the Heidelbergensians. They were technically sophisticated. They used fire, and
made fine, late Acheulian hand axes. They were successful cooperative foragers, probable large-game specialists, cooperating through teamwork. Since their lives depended on planned hunting (ambush hunting depends on planning), they did not live in the moment. They were exposed to the random violence of the world, and were very likely aware of their own mortality. Yet there is no trace of religion in their record. Existential terror seems to have a much deeper history than religion, and hence does not explain religion. If we take the material record of hominin life as a guide, religion is explained by some change of the last 100,000 years (perhaps 150,000 years), not some change half a million years ago.

So, one constraint on an evolutionary model of the emergence of religion is to give an explanation of why it emerged when it did. A second is that the explanation of the origins of religion cannot rely on a single, low-probability event. Religion is a pervasive feature of human societies; that is one reason why we need an evolutionary model of its origin and stability. Yet there seems to be too much cross-cultural variation for religion to be widespread because all human cultures have it by cultural inheritance from a single common origin. Moreover, religious traditions seem either to be sustained through demographic bottlenecks which can stress a group’s capacity to transmit extensive informational resources to the next generation (Powell, Shennan, & Thomas, 2009), or to be rebuilt after such bottlenecks. For there do not seem to be religious Tasmanias, where the locals have lost religion, despite religion’s apparent reliance on quite extensive and high investment social teaching and learning. There are examples of very rapid transformation in religious beliefs, often as the result of very stressful encounters with other cultures. Peter Hiscock details dramatic and rapid changes in aboriginal belief systems in south-east Australia in the nineteenth century, very likely the result of the shock of white invasion (Hiscock, 2013). But there do not seem to be examples where a group as a whole has just forgotten to be religious, as a result of intergenerational transmission failure, whereas there are such examples of technological loss (Henrich, 2004, 2016). An explanation of religion must explain its resilience.

A third constraint is that an explanation of religion must make intelligible its variety, as well as its persistence and ubiquity. Religions, of course, are so variable from culture to culture that one might reasonably wonder whether there really is a unitary phenomenon to be explained. Religions are complexes of institutional factors, social, often collective practices, and cognitive attitudes. These all vary markedly from culture to culture. There tends to be some specialization to ritual roles in many small world cultures; shamans are often a small subset of the adult population (Hayden, 2003). But they do not form a priesthood; small world religions tend not to have priesthoods or an organized and cohesive theology. Despite the wide variation, I take it that there is enough family resemblance between religious traditions to make it plausible that there is an explanatory target. In particular, I take the following features to be diagnostic: (i) a belief in powerful hidden agents or forces; (ii) the actions of these agents or forces sometimes impact on human affairs; (iii) these hidden agents are not indifferent to human action (what we do can make a difference to what they do; in some religions they punish or reward); (iv) these hidden agents are to some extent under positive human influence: they can be begged, cajoled, communicated with, bribed, their affection can be won by devotion, by obedience to apparently arbitrary prohibitions, and so forth; (v) these beliefs (or public expressions of commitment) tend to be fairly homogenous within small world communities, taught quite systematically to the next generation, and are linked to public displays and practices of various kinds. That said, we should not overstate this homogeneity. Hayden, writing informally about his own field experiences in small world environments, remarks that there are always some individuals in those worlds who are just not interested. Joseph Bulbulia, likewise, documents quite significant ideological heterogeneity that is independent of formal religious self-identification, though admittedly in a large world context (Wilson, Bulbulia, & Sibley, 2014); and (vi) perhaps most fundamentally of all, religion involves ritual and communal activities. So understood, religious practice might not be a universal feature of human groups, but it is certainly a very typical feature.
I began by noting that religion is one of a number of ancient but apparently functionless features of human culture; arguably, it is the most puzzling of these. The puzzle is typically put like this (see, for example, Bloch, 2008; Powell & Clarke, 2012). Religious belief systems are:

- More or less ubiquitous in human cultures.
- Obviously not veridical, at least to the eyes of outsiders. Indeed, many who are religious find the religious commitments of others utterly incredible.
- Expensive: endorsing and acting on these beliefs has significant costs.

So, when and why did these belief systems originate, and why do they persist? There is an emerging consensus on this issue, which synthesizes ideas from cognitive anthropology with those from cultural evolutionary theory. I am skeptical of this consensus, and the main aim of this article is to explain that skepticism and sketch an alternative. But before doing so, I shall zero in on the explanatory puzzle religion poses. For my main complaint against the consensus model is that it fails to explain exactly what is most puzzling.

In my view, the persistence of religious belief in cultures in which religion is established is no mystery. As many have pointed out, the development of religiosity, the individual cognitive and behavioral profile, is scaffolded by religion, the persisting social institution (Whitehouse, 2016). The adult generation invests heavily in inducing and encouraging their children’s acquisition of religiosity. Moreover, as Sosis (2006) points out, participation in the public, ritual life of the community tends to induce belief, even among those initially skeptical. Sosis suggests that participation in ritual induces cognitive dissonance if the agent’s individual ideology is grossly incongruent with the expressed public ideology, because ritual activity tends to be public, repeated, and requiring explicit commitment to that ideology. All this increases dissonance. Agents can escape from dissonance by gradually letting go of their skepticism. In some cultures, rituals can have powerful experiential effects, and these come to be linked to, and validate and entrench, the ideologies that are expressed as part of the rituals; powerful associative effects link ideology and experience, reinforcing belief. If Sosis is right that participation in the ritual life of the community can reinforce belief and erode skepticism in adults, these effects are likely to be still more powerful among the young. In addition, as Joseph Henrich has noted, the social transmission of religion is supported not just by adult teaching and encouragement (and in some cultures by severe penalties for deviance) but by the adults’ obvious and expensive commitment to these beliefs and practices (Henrich, 2009). The costs of religious observation enhance the credibility of the adult teachers, for they would pay these costs only if they really believed their own teachings. These are, in his words, “credibility-enhancing displays” of sincerity. Participation in religious rituals can plausibly be seen as “credibility-enhancing displays”: learning the rituals and participating in them involves, at least, sacrifice of time and energy, and often more, since material sacrifice and risk are often involved, especially in the more intense rituals. Hayden’s chapter on shaman-based religions includes some very dramatic photos showing just how intense and painful rituals involving entry to trance states can be (see chapter 3 of Hayden, 2003). Given that young humans are (fairly) trusting social learners (arguably an adaption to the complexity of our social and material technologies) (Harris, 2007; Harris & Koenig, 2006), it is no surprise that highly committed belief in the parental generation secures belief in the offspring generation, though the mechanisms which support transmission probably vary considerably from case to case.

That is especially true given the constraints on individual learning. As Dan Sperber and Hugo Mercier have argued, we have the tools – our folk logic – that enable us to skeptically assess the ideas of our social partners. We need those to balance the rewards of social learning against their risks (Mercier & Sperber, 2011; Sperber et al., 2010). But employing those tools requires focus and attention, limited cognitive resources. We can be at most selectively skeptical, and it would be no surprise if our resources for skepticism were targeted at views that were salient because they contrasted with the cognitive background, rather than targeted on the generally accepted
consensus of our social world. Explicit skepticism about everything we hear is not the human default. Our more automatic mechanisms are unlikely to be very effective filters either. In an earlier publication (Sterelny, 2007), I contrasted hunter and gatherer foraging techniques with small world folk medicine. By and large, small world folk medicine is appalling. In contrast, foragers make highly effective use of local materials, and the opportunities provided by their environment, to meet their economic needs. That is not surprising, as both social and individual learning are much more efficient in the domain of foraging than medicine. The medical environment is often informationally opaque. Most patients recover from most illnesses, but some will die whatever intervention is attempted. So, the relationship between intervention and outcome is often far from transparent. In addition, given the social and cultural salience of interventions (in many traditional cultures, folk medicine is deeply entwined with norms and with religion), and given the life-or-death stakes, we would expect agents to be disinclined to experimentally vary culturally sanctified treatments. Observation learning is further constrained by the fact that medical practices are typically uniform within the group, in part because of the links between the medical and the normative life of the community. So, agents rarely have the opportunity to compare the success rate of their own practices with the success rate of other practices. In virtue of all these factors, in the medical domain, both trial and error learning and cultural learning are often very blunt instruments.

That is much less true of foraging practices. Agents are typically much more free to vary their own practice and to repeatedly trial techniques. Foragers forage most days, with immediate success or failure. They get feedback on their own techniques. In many circumstances, foragers also get feedback about the success of their foraging partners and, more generally, the success rate of those in their band. Learning is much better at optimizing foraging techniques than medical techniques. Much religious practice and ritual is, of course, not instrumental at all. But much is: curing rituals; rituals connected with the hunt; with weather; with fertility; and with much else. These are like medicine. For the most part, they are attempts to intervene in temporally extended, causally complex, causally opaque systems. Informal experimental variation on interventions is not encouraged, and opportunities to compare the outcome of distinct natural experiments – the differing ritual practices of other groups – are limited. As noted above, children probably have somewhat trusting defaults with respect to social learning from their parents and in any case are intensively exposed to the religious thought and practice of their group. These social inputs occur in an informational environment in which such skeptical resources as they have are hobbled. The problem, then, is not to explain why religion persists once the institutional scaffolds, religious practices, religious teaching, and credibility-enhancing displays are in place. The problem, rather, is to explain the origin and construction of these cultural practices.

The road ahead is as follows. In the next two sections, I outline the consensus model, and explain my skepticism about it. The two sections that follow present an alternative. The key idea is to show how the institutional and ritual framework of religion emerges before its belief commitments. The environmental scaffolding of religion is erected before it becomes a transmitting system for the supernaturalism of religion and before its high individual costs. The core idea I defend, the centrality of ritual to religion, is well known in the literature, but it is defended here in an evolutionary rather than an ethnographic framework. A final introductory remark. Those familiar with this literature will note that I do not develop an explanation of religion in terms of the adaptation/by-product debate. Religion is a dynamic mosaic of coevolving individual and social factors, and the adaptation/by-product dichotomy is quite unhelpful in understanding such coevolutionary dynamics.

**A wedding: cognitive anthropology and cultural evolutionary theory**

About two decades ago, Pascal Boyer, Justin Barrett, and Scott Atran (with a few allies) began to develop a very deflationary view of the “explaining religion” project (Atran, 2005; Barrett, 2000; Boyer, 1994, 2002, 2008). They argued that religious belief was a natural, if perhaps not quite inevitable, side-effect of the normal workings of the human mind. One of the aims of the account was to
explain why religious thinking is so common, without invoking a "religion module." One version of the idea goes like this. It is critical for humans to be aware of the presence of agents – humans and animals – in their environment. That is important as a hunter. It is still more important as the hunted. For those who might be a victim of attack or ambush, it is critical to recognize the significance of a rustle in the bushes, of vegetation that looks unusual or different, of traces in the sand or mud. It is most important to recognize the signs that someone is watching. Moreover, there is a cost asymmetry between failing to detect an agent who is actually there and mistakenly supposing an agent to be there. False negatives can be fatal; false positives are mostly harmless.

Thus, we have a hyper-active agency detection device (a "HADD"). This explains familiar facts about human psychology, our tendency to anthropomorphize not just animals but artifacts (Barrett, 2000), our tendency to interpret even interactions between abstract shapes in agentive terms (a famous and much-cited study is Heider & Simmel, 1944). In virtue of this cost asymmetry, we have a natural tendency to over-generalize agentive explanations of events in our environment. Religious ideas are a particularly salient and memorable special case of agentive interpretations of our environment, because they are "minimally counter-intuitive." So religion emerges as a side-effect of two more general features of our mind: an input bias in favor of agentive interpretations, and a salience bias that favors minimally counter-intuitive ideas. A sacred mountain – a mountain that listens and intervenes – is enough like a mundane mountain to be cognitively intelligible. It has the same appearance as a mundane mountain; it presents similar difficulties of access and terrain; it is capped with snow like a mundane mountain. But sacred mountains are different enough to be salient and memorable. So, religious ideas are particularly salient instances of a broader class of agentive hypotheses. One important insight in this line of thought is that religious thoughts are just thoughts about agents, albeit somewhat unusual agents with unusual powers. No special cognitive or conceptual apparatus needed to evolve for us to conceive of the supernatural.

Perhaps with the exception of Justin Barrett, cognitive anthropologists no longer think of this cognitive by-product model as a near-complete explanation of religion. It does not explain religious belief. It is one thing to find an idea salient and memorable, or even credible. It is another to be committed to that idea, to invest in it, to organize much of one's social life around it, to ensure that your children acquire the same beliefs, to be more suspicious and less trusting of those that do not share your ideas. This is known as the "Mickey Mouse" problem: a talking mouse is salient and memorable, but not thereby an object of veneration (Atran & Henrich, 2010; Boyer, 2002).

Moreover, as remarked above, religion seems to emerge sometime in the last 100,000 years, and an evolutionary model of religion ought to explain why religion emerged then but no earlier (or explain why the physical record is misleading). The side-effect model fails this test. It predicts that religion emerged in human societies when, or shortly after, the distinctive cognitive apparatus of the human mind evolved. Given the adaptive scenario that supposedly explains our tendency to see agency and design everywhere, we might expect a hyper-active agency detection device to be very ancient indeed. Notice that you do not need theory of mind, and certainly not sophisticated, recursive theory of mind, to have a HADD. If sapiens minds come equipped with a HADD, perhaps we inherited it from those who lived 500 kya. As already noted, the Heidelbergenians were large-brained, social, technically skilled foragers. If our immediate forager ancestors were under selection to be ultra-cautious about noticing agency in their environment, so too were our still more ancient Heidelbergenian ancestors. Perhaps more so: the further back in time you go, the more our ancestors were under threat from predators (Sussman, 2005). But even if ultra-cautious, no-false-negative, agency detection evolved only as part of the sapiens cognitive design, we would expect religion to date back to about 200 kya. However, there is little sign of religious activity even at 100 kya. Religion does not seem to be ancient enough for it to be a routine by-product of the standard equipment of the human mind.

Cultural evolutionary theory, the idea goes, offers a solution to the Mickey Mouse problem, and perhaps to the timing problem. One version of the proposal goes like this (from Atran & Henrich, 2010).
Innate cognitive biases do indeed make religious ideas and narratives initially salient and credible. If and when one of those religious narratives gets some kind of cognitive foothold in the population, a variety of cultural learning biases facilitate intergenerational transmission. That is especially true once a significant fraction of the adult population invest in their beliefs through collective and expensive rituals. Costly signaling theory offers one model of why such investments might take hold, though these costs have their effects in quite different ways. Thus, these investments signal to other adults in the local community an agent’s commitments to that community. The investment is rational only if the agent envisages long-term membership of that community (Bulbulia, 2004). But once made, these investments have cognitive ramifications for both adults and the next generation. Religious ritual and religious practice reinforce the beliefs and commitments of that local community, through the psychological impacts of taking part and/or being part of the audience (Baumard & Boyer, 2013b). And religious ritual and practice enhances the credibility of religious belief to the incoming generation, because they are expensive signals of sincerity, needed because of the default implausibility of religious narratives (Henrich, 2009).

Cultural group selection then favors those religions which happen to promote collective action and joint success through some version of (a) endorsing norms that promote social cohesion and cooperation (e.g., norms of monogamy; (b) increasing the credibility and authority of norms, by investing them with divine authorship; (c) increasing norm compliance (e.g., through beliefs about supernatural observation and enforcement); (d) through greater social solidarity (e.g., through the bonding effects of joint participation noted above; perhaps also by amplifying the effects of more ancient prosocial emotions); (e) through the fusion of religious belief with religious practice, creating a public practice which serves as a credible signal of social solidarity, both internally and externally. That is important internally, as people are more willing to cooperate if they expect others to also cooperate (Fehr, Fischbacher, & Gächter, 2002; Gächter & Herrmann, 2009). It is important externally, by functioning as a credible signal that the community would be a good ally and a dangerous enemy.

According to this picture, in the initial stages of human social life, many very different ideas of hidden agency were probably in play, including ideas about talking animals (still a feature of many forager mythologies). But these were transformed and sorted both through cultural group selection and through the various context and content biases of human social learning. Justin Barrett has painted the following portrait of plausible god concepts: (i) they are minimally counter-intuitive, making the concepts salient, memorable, interesting; (ii) they are concepts of agents who have relevant information about the social/physical environment; (iii) the agents are not inert; they interact with the world; (iv) they are concepts of agents who are potentially responsive to human activity (e.g., prayer, sacrifice, ritual) (Barrett, 2008). To the extent that, cross-culturally, religions fit this template (and some seem not to), the consensus model suggests that these broad, family-resemblance similarities between religions are the result of the transformation and selection of ideas about hidden forces and agents. They are not just the result of innate constraints or innate biases imposed by the organization of our minds. Perhaps it is not surprising that this distillation process took 100,000 years or more; it took that long for these beliefs to become locally systematic enough, and uniform enough, to begin to leave a mark in the traces of our past.

**Trouble at the feast**

The critical problem for this analysis is the transition from the first to the second step. As noted in the introduction, it is not difficult to explain the stable transmission of religious belief, once it is established. But how is it established? First, the idea of a “minimally counter-intuitive” concept does not get off the ground as an explanation. The category of the minimally counter-intuitive is entirely post hoc; we are offered nothing like a metric of intuitiveness. Perhaps we do not need a metric. But we need and do not have some reason to think that these judgments are cross-culturally
robust and were so in deep time. Instead, we are offered after-the-fact descriptions of what experimental subjects have in fact found salient and memorable. Purzycki and Willard (2015) press these internal problems in the model hard. Thus, they see a serious ambiguity in the theoretical and empirical structure of the minimally counter-intuitive picture of the emergence of religion. As they see it, the theoretical assumptions of that picture identify the counter-intuitive character of religious agents as the result of violation of the fundamental categories of innate, intuitive ontology. Yet actual religious belief is not formulated using those abstract categories; they are richer, more specific, and yet often fail to fit those categories. Christ, for example, is not a person, despite having some person-like categories. They argue that defenders of the minimally counter-intuitive model of the emergence of religious ideas need, but do not have, an account of how the universal tacit system of universal ontology (object, agent, person) interacts with our system of explicit and culturally mediated belief, and of the role of violations of intuitive expectation in that interaction. In particular, in my view, we need an explanation of why such violations do not cause our cognitive system to crash. Why do we find a statue that listens salient and interesting rather than unintelligible and unprocessable? For the minimal violation picture to be genuinely explanatory of the emergence of religion, this cannot be just a brute fact.10

Most critically, even if we can rely on a pre-theoretic conception of the mundane and the counter-intuitive, it seems just false that religious narratives are typically minimally counter-intuitive. Pre-theoretically, they are often much stranger than talking mice. The mythological lore of many small world cultures is often both profoundly alien and elaborately intricate. In reading about (for example) Australian aboriginal understandings of The Dreaming, I struggle to understand the mythology, let alone remember it.11 And no wonder: this body of narrative takes years to learn by the initiates, and years to study and interpret by professional ethnographers. Likewise, Hayden’s discussion of shamanistic conceptions of the spirit world shows them to be (at least sometimes) extremely complex, with an intricate geography and politics of their own (Hayden, 2003). Very often, religious belief and practice systems are not easily remembered, in part because of the size and intricacy of traditional lore, and also because the practitioners themselves demand a high standard of accuracy of memory. Transmission is intended to be high fidelity transmission, and acquisition takes serious investment, even in many small world preliterate cultures. Perhaps the original seed from which religions grew was a minimally counter-intuitive, agentive story, but even small world religions have been massively culturally elaborated from such beginnings, if those were indeed the beginnings.

I am not alone in being skeptical about the intuitive nature of religious belief. Henrich, in his other work, has argued that there is nothing like a quasi-automatic formation of religious belief from the routine workings of the sapient mind in ordinary circumstances. There is experimental work claiming to show that religious ideas are a natural default of human thinking. But Henrich and his colleagues argue that they show no such thing (Gervais, Willard, Norenzayan, & Henrich, 2011). They discuss three supposed pieces of experimental evidence for the spontaneous emergence of religious belief: children’s default creationism; children’s reasoning about death (default dualism); and the supposed difficulty of being an implicit as well as explicit atheist. They point out that even if we interpret these results naively, they are not actually all that impressive. For example, children continue to endorse evolutionary explanations of animal origins at quite high levels; some atheists do not respond to religious priming in social contexts; many children seem to understand that death involves the cessation of all mental life. But more importantly, these subjects are drawn from a social environment saturated with religion. For example, the “default creationism” experimental subjects were children drawn from a very religious area of the USA. So even where these subjects are thinking religiously, they are by no means examples of the emergence of religious thinking in an environment without rich cultural scaffolds. The experimental evidence of genuinely spontaneous theism is very unpersuasive.

More problematically still, there is a tension in the consensus model. For the model accepts that the features of religious narrative that make them memorable also make them less plausible. It is for
that reason that special investment is required to make religious doctrine credible. Ordinary social learning does not require the teacher to pay special credibility costs. Indeed, teaching utilitarian life skills in forager societies is so unobtrusive that it has sometimes been claimed that forager adults do no teaching (these issues are incisively reviewed in Morin, 2015, pp. 77–83). But if religious ideas are intrinsically implausible, and agents will not commit to these implausible ideas unless others do, and unless those others show their sincerity through costly practice, how do the first generations of believers appear? So, there is a tension in the marriage. The by-product model of the origination of religious belief requires us to treat religious narratives as akin to ordinary belief, emerging from our default psychology: through our theory of mind; through our pattern-seeking with teleology as an explanatory default. But the consensus account, highlighting the importance of displays of commitment in securing belief, depends on the fact that religious narratives are intrinsically implausible. Likewise, the imperviousness of religious belief to reconsideration once an agent “buys in” treats religious beliefs as radically unlike ordinary beliefs. I take up this tension, and its implications for the nature of religious cognition, in the next section.

**Religious practice; religious thinking**

The consensus model suggests that religious commitments arise out of relatively mundane forms of thinking about the world, through social processes in which these mundane ideas acquire special cultural salience and status. The model is something like this: Religious beliefs originate as fairly ordinary suppositions or beliefs via our ordinary forms of reasoning, though forms of reasoning in which our cognitive defaults about the prevalence of agency and design typically play an important initial role. Once they secure some form of initial acceptance, and perhaps local consensus, they are then incrementally elaborated, rigidified, and connected to distinctive forms of action and experience, as they come to play a special social role. But at least initially the representational vehicles and the inferences in which these representations figure are not distinctive; there is no special form of religious cognition. Religion arises when ordinary agentive narratives, explanations and beliefs drift to a local consensus and acquire a distinctive social and emotional role.

Anthropologists working on religion, especially those with an ethnographic orientation, suggest an alternative picture, in which practice and experience play a much more central and earlier role (see, for example, Baumard & Boyer, 2013b; Bellah, 2011; Hayden, 2003; Rossano, 2006; Whitehouse, 2016). Hayden, for example, begins his monograph by contrasting traditional religions with “Big Book” religions, insisting that “traditional religion is experiential, not ideological” (p. 4). Their alternative pathway to the emergence of belief-like states looks like this: Religious beliefs begin from shared activities: verbal displays, stories, and narratives. These are part of multimodal performances of music, ritual, dance, often combined with experience-altering technologies. Psychoactive drug use was not the invention of the hippie counter-culture; such drugs quite often play a role in small world ritual and ceremonies (Sullivan & Hagen, 2002). So, for example, Peter Watson argues that these were especially important in the New World, equipped as it was with a splendid supply of psychoactive drugs, some extremely strong and dangerous, but the old world was not depauperate. The effects of experience-altering drugs were mimicked, supplemented or amplified by stressing the cognitive system through sleep deprivation, extremes of heat or cold (for example Indian sweat lodges); sensory overload, exhaustion, and through emotionally charged, intense experience (Baumard & Boyer, 2013b). Mythic narratives play a central role in ethnographically documented small world religious traditions, but these narratives are typically encountered as part of collective, socially bonding, socially marked, mixed modality performance, and sometimes in altered states of consciousness. Agents experience far from mundane and sometimes very intense visual and acoustic inputs, often while engaged in coordinated, entrained ritual or dance. These narratives subsequently and gradually acquire both a belief-like cognitive role (where the stories and narratives are linked, systematized, and believed as true), and, in doctrinal rather than imagistic religions, these narratives become decoupled from ritual as free-standing doctrine. The role of experience, and especially of
altered states of consciousness, might help explain the family resemblances between small world mythologies. The thought is that these might begin as an attempt to make sense of the intense, and sometimes extremely strange experiences encountered in altered states of consciousness. As Ron Planer has pointed out to me, there is evidence from Capgras and other delusions of identity and recognition that humans have some tendency to explain anomalous experiences by building confabulating narratives (Gerrans, 2014), even when there is no social support for doing so. In the ancient origins of proto-religion, it is unlikely that there were social penalties for constructing a confabulation, and there is some ethnographic suggestion that these confabulatory narratives might have been constructed collectively, as the actors attempted to figure out what had happened to them (Watson, 2012, p. 208).

The idea that religion began as these sorts of shared and intense activities has three important advantages. Most importantly, if correct, the social transmission and cultural scaffolding of (what will become) religion is established before the verbal and narrative aspects of these rituals of peace-making and affiliation crystallize out as beliefs. In section 1, I argued that the transmission of religious commitment to the incoming generation is readily explained, once the cultural machinery of religion is in place. For that machinery organizes the developmental environment of the children in the community in ways that both facilitate and incentivize taking on these commitments. At the same time, these practices reduce the likelihood that individual exploration learning will fuel skepticism. On the ethnographic model, much of the collective and institutional structure of (proto-)religion is assembled before the emergence of religion as a system of belief, and certainly before it crystallizes into a coherent, compulsory ideology. The pressure for uniformity across the group, and for high fidelity transmission to the incoming generation, is not driven by an insistence on doctrinal purity, but through the demands of coordination in dance, song, chants, or their precursors. Rhythmic coordination or congruence in movement and voice depends on all the participants representing their joint activity in compatible ways and in fine-grained detail. Practice – highly structured, rich, mesmeric, experientially powerful, motivationally salient, reliably transmitted – precedes doctrine, and makes doctrine possible (Whitehouse, 2016). Full participation in the ritual life of small world communities, as Hayden and others show, is often demanding, sometimes requiring material sacrifice, while the rituals themselves can be physically stressful, occasionally very stressful. Participating in these practices signals commitment through willingness to pay their costs, and builds trust through shared powerful experiences. Participation both builds and signals commitment (Bulbulia, 2004, 2012; Bulbulia & Sosis, 2011). Adult commitment, in turn, as Henrich notes, signals the importance of these collective activities to the next generation. None of this depends on taking the narrative elements of the rituals to be literally true.

Second, it helps explain the rather anomalous cognitive character of religious belief. It is tempting to suggest that religious belief is not really belief at all. An agent’s explicit religious commitments tend to be insensitive, once made, to new experience, and yet are typically only partially integrated with one another, with mundane beliefs, with an agent’s evaluative, motivational, and emotional life. Even committed Christians rarely rejoice at the death of their children. Likewise, cognitive anthropologists have noted that when agents reason about supernatural agents, there is often a mismatch between explicit doctrinal commitments and their default reasoning habits (Morin, 2015, pp. 157–159). In some ways, religious commitments seem rather like phobias: highly salient and motivationally powerful in a few, marked contexts, but largely inert and disconnected to the rest of the cognitive system in others. However, while this is true, it is also true that the picture of our belief system as integrated, responsive to evidence, and shaping action in tandem with our preferences, is highly idealized. We idealize very significantly, when we think of human belief systems as internally coherent, rationally integrated with perceptual and testimonial evidence; as rationally updated in response to new evidence; and when we think of human action as controlled from an integrated, organized, and stable model of the agent’s environment, and an integrated and stable preference order. Some aspects of agency roughly and usefully correspond to this model. Religious commitments probably do not.
However, while religious commitments are not paradigmatically belief-like in inferential integration, they are more typical in their being displayed. One feature of human belief and preference is that we advertise our intentional states to one another, though of course not always honestly, and never with full disclosure. We do so in part to inform, but also to commit. By making our beliefs and preferences public, we increase their stability, and that matters for coordinated interaction over time. So, in a recent work (Sterelny, 2015b), I argued that as our lives came to depend on coordinated, planned activities with delayed returns, our inner control states acquired extra roles as displays and commitments. Religious beliefs are extreme cases of beliefs as displays rather than beliefs as inner control states. That is not surprising, as their origins are “outside in.” Both in the historical emergence of religion and in individual ontogeny, public commitment precedes rather than follows cognitive integration, to the extent that there is cognitive integration at all.

Third, this alternate picture of the emergence of proto-religion avoids any dependence on the supposed existence of a HADD. That is good news, for the evolutionary case for a HADD is unpersuasive. Here is a fairly typical version of the argument:

Agent concepts may be hair-trigger in our cognitive processing, allowing us to readily respond under uncertainty to potential threats by intelligent predators (Guthrie, 1993). From this evolutionary vantage, an agent’s proper evolutionary domain encompasses animate species, but its actual domain inadvertently extends to moving dots on computer screens, voices in the wind, faces in clouds, complicated contrivances like eyes, and virtually any complex design or uncertain circumstance of unknown origin … Young children spontaneously over-attribute agency to all sorts of entities (clouds, computers), and may thus be predisposed to construct agent-based representations of many phenomena … Such reliably developing programs provide efficient reactions to a wide – but not unlimited – range of stimuli that would have been statistically associated with the presence of dangerous agents in ancestral environments. Mistakes, or “false positives,” would usually carry little cost, whereas a true response could provide the margin of survival. This reactive bias was likely adaptive, at least until supernatural agents were harnessed by cultural evolution to begin demanding costly actions and cooperation, under threat of divine punishment or offers of sublime rewards. (Atran & Henrich, 2010, p. 25)

It may be true that the fast, online systems of the human mind are set up to search for agency on the basis of minimal cues. But the argument sketched above (and it is typical) sees the HADD as generating beliefs about agency, or something close to beliefs. For religious belief is offline, not online: it is part of the slow, reflective system, and it is simply false that our forager ancestors were under selection to over-attribute agency as a settled belief, let alone settled belief essentially immune to revision (as religious belief often seems to be). Despite the suggestions often made about the HADD, the accumulated costs of false positives would be very serious. Foragers need to exploit and move through their territories efficiently: they cannot afford baseless dreads. Their alert mechanisms may be hair-trigger (and perhaps that is all some HADD theorists intend to say), but foragers have responded to the agency detection problem by becoming expert readers of their environment (e.g., reading traces and tracks; Shaw-Williams, 2014). The intuitive case for the HADD imagines our ancestors as timid, anxious victims tip-toeing through their terrifying environment, rather than as the efficient apex predators that they were. Predators, especially stalking and ambush predators, cannot afford to give away their presence by responding to false positives. A belief bias in favor of false positives would be, if anything, even more costly in the social environment. Those who see agency in their social world when it is not there are paranoid, or morbidly suspicious. There is no reason to think paranoia is now, or ever was, inexpensive. In short, agency detection was indeed very important in forager environments. Even on the basis of minimal cues, a forager should indeed ask himself or herself “Is someone there?” and become more alert. But there is no reason to think selection would tolerate cognitive designs biased in favor of false positive beliefs about agency.

Managing social complexity

In section 1, I suggested that an account of the emergence of religion should explain why religion has become part of human social life over the last 100,000 years; not dramatically earlier, and probably
not in the last band of that period – not, say, since the last glacial maximum, 22,000 years ago. This timing suggests that religion is a consequence of changes in human social life, not of intrinsic structures of the human mind. On the picture suggested in the last section, with religious commitment and practice emerging out of shared proto-musical life and out of shared mime and narrative, these social changes may have had a long lead time. Over the last 500,000 years, hominin social life has become more complex, stressful, and demanding. In particular, Robin Dunbar has argued that large-brained humans faced a time budget squeeze, a squeeze that in turn forced a change in the pattern of their social interactions (Dunbar, 2003; Gamble, Gowlett, & Dunbar, 2011, 2014).

Dunbar points out that social life is always stressful and conflicted, as agents squabble over food, resting places, sex, and as they take out their endogenous irritations on one another. Conflict management becomes more difficult in larger groups, for the more agents in the group, the more stress points, and the more difficult and time consuming conflict management becomes. In typical primate societies, conflicts are managed and repaired by one-on-one grooming; as groups become larger, stress management becomes increasingly time consuming. Dunbar argues (largely on the basis of neocortex size/group size correlations) that hominin social groups increased in size over their evolutionary history, and so traditional forms of conflict management stressed our ancestors’ time budgets.

As Dunbar reconstructs hominin history, the Heidelbergensians crossed a threshold where one-on-one grooming was simply too time consuming to maintain bonds of affiliation, cooperation, and peace. These latter hominins, living in larger groups, needed more time-efficient peacemaking social technologies. Dunbar suggested that vocal grooming supplemented and partially replaced physical grooming (Dunbar, 1996). He initially saw vocal grooming as a precursor to language, but it is more plausible to take it as a precursor to song and music instead, or as well (Mithen, 2009). For shared music and movement seems to be uniquely human, and is still an important social technology of affiliation and bonding (McNeill, 1997; Reddish, Fischer, Bulbulia, & Szolnoki, 2013). If Dunbar and his colleagues are on the right track, some forms of proto-musicality may have very deep roots, as part of a package of affiliative practices that supplemented social bonding and conflict resolution by grooming and direct physical contact. Sharing food, for example, has evolved from scramble competition and tolerated theft to shared, affiliation-building feasting (Jones, 2007).

Importantly, Dunbar’s argument does not depend on group size alone. Peacemaking and conflict resolution were especially important in these ancient hominin groups, for (unlike the great apes) they were committed to a more intensively cooperative and collective life. Their technical and ecological skills (fire, skilled lithics, bushcraft) probably depended on quite extensive social learning (Hiscock, 2014). They were large-game hunters with short-range weapons (Bunn & Pickering, 2010; Pickering, 2013), and that is a lifeway that requires planning, cooperation, and mutual trust. Collective action produces a collective profit. That profit must be divided, creating a source of tension over who gets what. So even if we are cautious about Dunbar’s claims about hominin group size, Heidelbergensian groups might face larger pressures on their abilities to manage conflict and to build trust. The suggestion, then, is that the elementary capacities from which religion eventually emerged had deep roots. These capacities were the use of, and sensitivity to, shared rhythmical movement, sound, and voice, and perhaps even the earliest precursors to story-telling as proto-language supplemented mime. These ancient precursors of religion evolved with the evolution of very large-brained, obligatorily cooperative, social-learning-dependent hominins. The Heidelbergensians were such hominins, but some of these capacities might originate even more deeply in time.

However, through the period 100 kya to 50 kya, there was a very significant increase in the complexity and the social challenge of forager lives. First, in this period, cooperation became rather more based on reciprocation over time, and rather less on mutualist collective action at a time. In this period, spear-throwers and the bow and arrow were added to the human toolkit, and this projectile revolution led to small hunting parties. Bow-equipped foragers hunt in groups of two or three, and so a single band will support several hunting teams. While this reduces variance at the band level, the success of individual teams will vary, and so a team will sometimes depend on others, sometimes
provide for others. At approximately the same time, the resource base expanded to include more small game, more riverine, estuarine, and seashore resources. Perhaps as well there was more intense exploitation of plants. The benefits of cooperation became less immediate, with less obvious comparability between what you gave and what you got. Reciprocation based on delayed and indirect reciprocation can still be mutually beneficial for all concerned. But it is more cognitively and motivationally demanding, as agents must keep track of less commensurable resources, over longer time periods, and manage temptations to indulge in short-term gain at longer-term costs (Sterelny, 2014).

Second, groups became more dispersed over space and time. Clive Gamble, in particular, argues that there was a release from proximity around this time. He interprets the “out of Africa” dispersal as deliberate, planned movement, and hence argues that these humans maintained relationships, membership, and identity without having to depend on daily interaction to stabilize their social networks (Gamble, 2008; Gamble et al., 2011; Gwollett, Gamble, & Dunbar, 2012). The same is true if (as is likely) this period saw a shift from residential to logistic mobility (Binford, 1980). When forager bands begin to harvest a wider range of resources, they face a new time management challenge. Resources peak and exhaust at different times, rates, and places. Those who harvest more abundant or less rapidly depleted resources – small game and plants – will want to stay put when others want to move on. The costs of movement are contained by shifting base camp less often, but combining this with a strategy in which work parties travel from base camp, establish a temporary work base, harvest a locally abundant resource, and return. Such trips can last days or weeks. Foragers with logistic movement patterns maintain cooperative motivations and their place in their local network without daily reinforcement.

Third, human sociality is very different from great ape sociality, in that humans do not just live in groups. They identify with their group, and typically display that identity in styles of dress, adornment, and language, and with material symbols. However, the social tools – kinship systems, exchange networks, initiation groups, clans and moieties – that allowed social groups to expand in time and space also led to multiple identities, and hence incongruence within bands. Our ancestors came to have individual horizontal connections to other groups via kinship networks and individualized reciprocation networks (e.g., Hxaro exchange). So, social networks expanded both in space and time, and were no longer congruent within a foraging band. Within a three-person hunting team, each hunter might well have distinct kinship connections and reciprocation commitments. I therefore suggest that:

- Until about 100 kya, human cooperation was mostly mutualist. Its center of gravity then shifted towards reciprocation.
- Reciprocation-based cooperation imposes much more stress on cooperative motivation, and is much more cognitively demanding.
- The social effects of this economic change were exacerbated by greater dispersal over space and time, and hence less reliance on face-to-face mechanisms of affiliation and trust.
- It was further exacerbated by multiple and incongruent social identities within the foraging band. The band is not homogenous (or is less homogenous) in its rights, obligations, and interests.

In my view, then, there was a late Pleistocene social crisis, and that crisis was managed by the elaboration of social tools that already had something of a foothold in the social lives of even more ancient hominins.

- Heidelbergensian social life was much more demanding than great ape social life. Even if Heidelbergensian social groups were no larger than great ape bands, they relied on sustained collective action, and, probably, assisted social learning. At some stage in the evolution of very large-brained hominins, shared synchronized and multimodal activity had become part of social life, easing conflicts and cementing social bonds, perhaps mediated by fire and its effect of expanding the
usable day. This was the social and behavioral foundation for the expansion of norms and rituals, to manage the more cognitively complex and motivationally demanding social life that emerged between 100 kya and 50 kya.

- These social changes explain, for example, an expanding role for norms about the division of hunting spoils; norms about mutual obligations within extended kinship systems and through individual, horizontal connections across ethnolinguistic groups. Very likely, too, there were norms and rituals about sex and partnering up, again to limit conflict flashpoints. In these more complex times, foragers needed cognitive tools – norms – to establish widely recognized, easily understood, and mutually satisficing defaults for dealing with their regular exchange, partner formation, and interaction problems. They needed motivational tools (ritual, ceremony) to secure reasonable levels of mutual commitment to these defaults.

So, borrowing from and tweaking the ideas of Whitehouse, Hayden, Bellah, and others, an ethnographically and evolutionarily plausible picture of the emergence of religion looks something like this: early, embodied religion transitioned into articulated religion, which in turn, in some cultures and contexts, transitioned into ideological religion. The suggestion is that with ancient embodied religion, religious identity was not expressed via distinctive rituals, ceremony, collective activity, and material symbolism. Religion was nothing but a distinctive, locally specific package of these activities. This package was a mechanism of internal affiliation and identity. As the forager landscape became more socially complex and interaction above the band level became increasingly important, articulated religion emerged out of embodied religion through the addition of an increasingly consistent, reliably transmitted, mytho-poetic narrative. Articulated religion is a package of collective activities plus an increasingly connected and coherent story or set of linked stories, typically about who we are, why we are here, and why we have a right to be here, plus various recipes for intervention in their causally complex world. This more articulated narrative becomes increasingly important as the ritual packet becomes not just a mechanism of internal affiliation and membership, but also signals collective identity, commitment, and rights of place to others. Articulated religion becomes ideological religion, as the narrative becomes (a) elaborated, (b) compulsorily believed as true, (c) moralized, and (d) increasingly central in its role. The transition to ideological religion is when religion (i) becomes very expensive, (ii) is late in human evolutionary history, probably Neolithic, and (iii) is associated with the establishment of complex hierarchical social worlds. This conception of religion’s latter elaboration is relatively uncontroversial; the defenders of the connection between Big Gods and Big Societies have a similar picture in mind (Norenzayan et al., 2016), though in a different evolutionary framework.

On the view defended here, proto-religion establishes and gradually transforms into ethnographically recognizable religion in response to the greater economic and social complexity of forager lives, as they came to be organized around indirect reciprocation and complex social identity.

Alcorta, Sosis, and Rossano all posit a somewhat similar trajectory, with material symbols in the archaeological record indicating increasing dependence on ritual (Alcorta & Sosis, 2013; Rossano, 2015; Sosis & Alcorta, 2003). But on their view, ritual investment is a response to conflict (especially intergroup conflict) and conflict is the result of resource stress. Alcorta and Sosis think resource stress is the result of population expansion; Rossano thinks it is the result of mega-droughts and population decline. It would be a mistake to dismiss these ideas, given our fallible access to the hominin past. But I am skeptical. There is no direct evidence of population growth in this period; no evidence from middens or from skeletal pathologies of resource stress. There is no evidence of epidemics of intergroup conflict. Until the late Pleistocene, there are very few signs of violent death from skeletal remains; there is little sign of specialist weapons (clubs, for example), or of campsites chosen for defense rather than access to resources. Moreover, their picture of the role of ritual rests heavily on the idea that rituals are honest signals of commitment to group life; honest because rituals are costly. However, while I agree that the great increase from 150 kya to 20 kya of material symbol production is indeed good evidence of a great increase in the role of ritual in human life, it is
much less compelling as evidence of costly rituals. In short, I think the evidence for complexity is more persuasive than the evidence for resource stress and conflict, though, of course, one effect of complexity is the increased risk of conflict.

I suggest that this picture has the following advantages. As argued in section 4, it explains how the social environment of the transmission of commitment was constructed before belief, before agents had to sign on to apparently implausible and intricate claims about how the world works. Second, it is plausible given what we know of the proximate features of human psychology. The status of a narrative can change through a transmission chain. Many of us will know micro-variants of this effect in our own family histories. Anecdotes become embellished, ritualized, part of family identity, and established as true through many tellings. Those who know of the embellishments as embellishments choose not to pay the social costs of revealing the fictional aspects of these iconic stories, and the incoming generation suppress their skepticism. Thus, the story about what happened when grandmother found the snake in the laundry basket becomes part of family lore. These family narratives often are a version in miniature of the social role attributed to embodied and articulated religion above: part of a group’s sense of who they are and why they belong where they are. I see the origins of embodied religion and its transformation into articulated religion as a scaled up, socially elaborated, and more temporally extended version of this domestic myth making. A narrative is initially chosen for its emotional and persuasive power (perhaps initially formulated to make sense of trance-like out-of-body experiences). At first, it is somewhat like a ghost story being told around a camp fire at night, told for immediate effect, and memorable in virtue of its emotional impact, but it turns into myth, a set of linked, connected stories, believed as true, part of local social identity and moral economy. To the extent that the narrative encodes practically useful information in a highly memorable form, it would be further stabilized (Norris & Harney, 2014; Whallon, Lovis, & Hitchcock, 2011).

Third, the picture makes the costs of religion intelligible. The commitment signaling model of Bulbulia and others provides a plausible account of why agents would pay the costs of participating in embodied and articulated religion. In participating, agents build their own reputation as reliable partners in their social world, and can assess the reliability of others. However, in many cases, the costs of doctrinal religion seem to be far greater. In some cases, the material investment and the cost of supporting a priestly cadre can be very large indeed. Sterelny and Watkins (2015) argue that the Neolithic transition, like the transition to a reciprocation-based economy, imposed new stresses on the social contract in the early Holocene, and this selected for further investment in commitment mechanisms. Early sedentary societies lost an important tool of social peace, the freedom to costlessly just move away, and cooperative motivations were further stressed by the increasing time depth of collective action, and by increasing temptations to shirk and free-ride. Their paper sees the initial expansion of investment in ritual activities and public, non-utilitarian structures as an individually adaptive response to increased pressure on the social contract. Given the even greater importance of cooperation, and of being able to trust and be trusted, it was adaptive for individuals to pay those costs, and to monitor the payments of others.

I very much doubt that the massive costs of early state religions have a similar explanation. This expansion of the costs of religion is both cause and consequence of the rise of elites and their escape from social control. It is part of the collapse of the egalitarian social contract of the Pleistocene. We do not have a full explanation of that collapse, but I have offered a partial explanation, arguing that as sedentary societies became larger, as individuals invested increasingly heavily in land and its improvement, and as competition between sedentary groups became increasingly intense and prone to violence, collective control of would-be aggrandizers became an increasingly difficult collective action problem (Sterelny, 2015a). In different ways, and to different degrees, aggrandizing bullies established themselves as elites. The high cost of religion in early agrarian states is part of that escape. The priestly caste were both aggrandizers themselves and shills for their secular allies.

If this overall picture is right, the archaeological signal of ideological religion is clear. A sharp increase in costs; evidence of a priestly caste and evidence that they are part of a social elite; a
correlation between increased costs of religion and increased social inequality. However, a major
challenge for the view defended here is to distinguish archaeologically between embodied and articu-
lated religion, and to align these different signatures to different social worlds. Articulated religion
should align with a social world with more elaborated vertical structure (with, for example, forager
bands being part of a local tribe and an ethnolinguistic group) and with wider and more important
horizontal connections to other groups. Increasing local differentiation in material symbolism (cave
art styles, funerary practices, figurines, jewelry), as groups assert their distinctiveness to their neigh-
bors, might be one signature. There might be a signature of this kind in very late Pleistocene Europe.

There is a suggestion that Aurignacian Europe saw the emergence of distinctive regional styles, with
15 fairly distinctive groupings. These may index relatively cohesive cultural identities. In itself, that
could just be a mark of isolation and drift (rather than differentiation as a signal of cohesive collective
identity to the neighbors) but (admittedly, from a slightly later time, the Gravettian) Venus figurines
were distributed across the whole area, so there was some form of direct or indirect long distance
contact (see chapters 2 and 4 of Coward, Hosfield, Pope, & Wenban-Smith, 2015).

There remains, then, the problem of developing explicit tests of the general framework presented
here. That issue acknowledged, let me end by returning to the three criteria I noted at the beginning
of the article: (i) timing; (ii) avoiding reliance on low-probability fluke events; (iii) an account of the
diversity of religion. First, the account on offer explains why religion began to be visible sometime
after 100 kya, and then had a much larger footprint through the Holocene. For that period saw
increased stress on the social contract, stresses that were managed in part by increased investment
in mytho-ritual practice and linking those practices to the normative life of the community. Second,
there is no reliance on a one-off event: the analysis is grounded on critical, pervasive, and continuing
features of life in the latter Pleistocene and early Holocene. Third, the variety of religious traditions
depends, of course, to a great extent on historical contingency (just as do the domestic myths above),
and perhaps as well on the extent and degree to which religious narratives encode important secular
information (and misinformation). But it derives as well from the relative importance of the different
functional demands: internal versus external signaling, to the extent to which in a given tradition the
agents are signaling their collective identity to others, rather than signaling their individual identity,
role, and commitments to each other.

Notes
1. There is a more recent one, dated at about 160 kya, somewhat before the earliest plausible burials (see Clark
et al., 2003).
2. See Rossano (2015) for a thoughtful and user-friendly review of material symbols in the hominin record, and a
careful comparison of their salient role in the sapiens and Neanderthal lineages. He places the onset of religion
somewhat earlier than the dates suggested here (at about 150 kya), mostly because he is confident that ocher use
is a marker of symbolic, and hence ritual, behavior. There is evidence that ocher was selected for color, and
hence it was a technology of visual appearance. But that in itself does not show that ocher was used to
make material symbols; both camouflage and signal amplification (think of the value of very intimidating visual
displays in stampede hunting). Moreover, Rossano’s analysis of the social role of ritual rests heavily on the idea
that rituals were costly signals, and it is one thing to think that material symbol production is a symptom of
ritual activity (though material symbols also display individual and collective identity), another to think that
they are a symptom of costly rituals. In sum, we are on safer ground when we rely on multiple traces of ritual
activity, and these seem mostly to be more recent than 100 kya.
3. More exactly, the form of imaginative thinking of which religion is a special case.
4. See, for example, Atran and Henrich (2010), Baumard and Boyer (2013a, 2013b) and Gervais et al. (2011).
5. For many gruesome examples, see chapter 5 of Edgerton (1992).
6. Alcorta and Sosis (2005) and Sosis and Alcorta (2003) also shape this idea into an evolutionary model of reli-
gion. But their model is an equilibrium model: if successful, it explains the stability of religion as a system of
costly signals, but they do not offer a picture of the incremental transition from a hominin world without reli-
gion to one in which religion is ubiquitous and expensive.
7. Somewhat puzzlingly, much of the evolution of religion literature is still framed through the adaptation versus
by-product debate, despite the quite wide recognition that religion very likely emerged through some form of
coevolutionary dynamics (see, for example, Atran & Henrich, 2010). Anton Killin has pointed out that the same is true of the analogous case of music (Killin, 2014).

8. There is a near-consensus that there is no such module, even among those who endorse an adaptationist view of the evolution of religion. An exception may be Bering (2006).

9. He seems to be hanging on in Barrett (2008).

10. Guthrie (1980, 2014) defends a somewhat similar view. As he sees it, religion is an outgrowth of our pervasive anthropomorphism; pervasive because of the great cost of failing to recognize the presence of an agent who is actually around. But for Guthrie, religious belief in hidden or invisible agents is not counter-intuitive, for he thinks we are intuitive dualists. We do not tacitly or automatically think of minds as embodied in, and as parts of, physical organic systems. I am skeptical of Guthrie’s analysis for the reasons given at the end of section 4: I am very skeptical about the supposed cost asymmetry and its effects.

11. See, for example, Bellah’s (2011) account of Walbiri mythology (pp. 146–159). Stanner’s much longer and more elaborate account of northern Australian ritual practices and beliefs gives a lot more detail, and shows how beliefs and practices can disassociate, but does nothing to make these conceptions of the world seem more intuitive (Stanner, 2014). There is a suggestion that this elaborate complexity of these mythological systems is itself a signal (see Mahoney, 2008).

12. Notice that the costs of religious practice are real and significant, even if the religious beliefs are true; even if, for example, a healing ritual genuinely cures. Overcoming a child’s neophobia by eating a novel food in front of them is not a cost; it would only be a cost if that novel item had not really been food.


14. And so it is no surprise that very simple primes – a picture of eyes above a coffee dispenser – can provoke enhanced vigilance. But vigilance is one thing; a settled and inelastic belief that the eyes are watching is another.

15. For the distinction and its importance, see Kahneman, 2011.

16. Let me emphasize, in my view, this was a change in the center of gravity of the economics of cooperation: almost certainly, some reciprocation was ancient; some immediate return mutualism continued.

17. In Ian Keen’s survey of aboriginal society through the period of contact with settler society, one of the constant themes that comes through the great variation in aboriginal life is the ubiquity of individual connections to neighboring groups. This surely makes sense as a system of risk management in such an unpredictable environment with such striking annual variation (Keen, 2004).

18. Whitehouse (2016) distinguishes between naive, imagistic, and doctrinal religion (with his main focus on the last two). In thinking of the first and simplest forms, he buys into the cognitive anthropologist’s picture: “The first is species-typical and more or less invariable, consisting of naturally ‘catchy’ concepts” (p. 43). Bellah’s views on the early evolution of religion are shaped by Merlin Donald’s views on cognitive evolution in general (Donald, 2001), and so Bellah distinguishes between mimetic, mythic, and theoretical forms of religion, again thinking of mimetic as an early, proto-religious form. Hayden has a more dichotomized conception, distinguishing between early, small world, traditional experiential religions and latter, large world institutional and doctrinal religions.

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**COMMENTARIES**

**Some common misunderstandings about cognitive approaches to the study of religion: a reply to Sterelny**

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Welcome back, Professor Sterelny, to the discussion! Those of us taking cognitive and evolutionary approaches to the study of religion should do more to better identify the requisite social conditions and dynamics under which ideas about gods, souls, afterlives, and others might have taken hold and propagated, and to more carefully engage with paleoanthropology in order to better explain why it is that the signs of “religion” seem to arise when they do in prehistory. One strength of the area is the way that contributions from many different disciplines and perspectives continue to be evaluated.
and incorporated. The development of empirically testable causal accounts for all of the various forms of human thought and expression that fall into the heuristic category “religion” requires a diversity of players and approaches. Nevertheless, such a broad multi- and inter-disciplinary project also easily generates misunderstanding that can undermine progress. I offer correction on a small number of the misunderstandings that Sterelny has stumbled into that are common enough that they deserve comment.

A key misunderstanding that underwrites many of Sterelny’s criticisms appears to be a false dichotomy between what is intuitive or developmentally natural and what is socially influenced. As articulated by McCauley (2011), the sort of naturalness (or intuitiveness) that many cognitive science of religion (CSR) scholars have appealed to in order to argue for the largely natural character of beliefs in gods, souls, an afterlife, and the like is not hermetically sealed from social input or influences. It is not necessarily innate (a term I try to avoid). Some combination of human natural propensities and the ordinary environments in which humans develop leads to a fairly predictable package of domain-specific ways of thinking about and interacting with the world around them, and this naturalness (McCauley’s maturational naturalness) may inform and constrain musical expression, language, disgust, and even social learning itself, to take but a few examples. Though these natural cognitive systems are importantly formed by social context, as in how the particulars of one’s language acquisition are molded by those with whom one interacts early in life, the developmental course of these cognitive systems is not entirely plastic or so cross-culturally variable as to not have some general pan-human parameters. Over the course of human social evolution between 500,000 years ago (500 kya) and the present, we should not be surprised if some of the natural cognitive systems changed in their parameters or characteristic expression. It follows that one should not assume that somehow the natural cognition that CSR often evokes has been fixed since 500 kya, or perhaps even 200 kya. A relatively minor change in basic conceptual equipment (e.g., from the ability to represent that another person might be thinking about what I am thinking, to the ability to represent that another person might be thinking about what I am thinking about the thoughts of a third party, such as a god) could have made the difference between individuals entertaining ideas about superhuman beings and groups sharing common beliefs about a god that might motivate collective action (see Barrett, 2011b; Barrett & Jarvinen, 2015). Hence, it is not obvious that the consensus model gets the timing of religion’s emergence wrong.

Sterelny’s misplaced concerns about intuitive cognition extend to his critique of the role minimally counter-intuitive (MCI) concepts might play in explaining the spread of ideas about gods, etc. We read that “the category of the minimally counter-intuitive is entirely post hoc; we are offered nothing like a metric of intuitiveness,” and that “we need and do not have some reason to think that these judgments are cross-culturally robust and were so in deep time.” Unless Sterelny means to make the inconsequential observation that explicitly judging whether or not something is counter-intuitive is not easily and reliably done, these criticisms are misplaced. The intuitive ontologies thought to underwrite intuitiveness are derived from experimental and developmental psychology (conducted cross-culturally) and species-comparative cognitive studies with non-human primates. Such data ground the theory and provide reason to think that the cognition is both ancient and cross-culturally robust. For some citations from this ever-changing literature and a method to quantify counter-intuitiveness, I refer readers to Barrett (2008). Note, too, that the relative memorability of MCI concepts has been found through multiple methods in young people (but not older adults) in both British and Chinese samples (Gregory & Greenway, 2016a, 2016b; Hornbeck & Barrett, 2013).

In the target article, another common confusion seems to be in play: collapsing individual and group-level dynamics. Given the dynamics of human communication, biases in a cognitive system may only need to be slight on the individual level to render something common and even “natural” on the group level. For instance, if we want to account for why it is that a group may have a common belief in something like a ghost that haunts the house at the end of the street, the occasional detection of peculiar agency by some members of the group seems to have an important role. It is hard to believe in the action of a minded being if no one ever detects evidence of its action. It does not follow,
however, that what is required is an agency detection device (ADD) that is producing false positives routinely in most individuals in every group. An individual may become a believer in the ghost only having heard about the experience of another, and because of a general receptivity humans have to the idea of disembodied agency (see Bering, 2011), and the general trustworthiness of the source, form a belief. ADD is only posited as tuned in the direction of false positives enough that occasionally agency is detected given ambiguous or scant evidence and when human or animal agency is a poor explanation of the experience.

Is Sterelny correct that “there is no reason to think selection would tolerate cognitive designs biased in favor of false positive beliefs about agency”? If the domain-general aspects of any belief-formation mechanisms have dynamics that generally produce adaptive beliefs, they may tolerate a small number of low-cost false positives derived from a more ancient agency detection system. We have no reason to think that human cognitive evolution will lead to optimal belief formation of every sort in every domain. The strength of the belief-forming faculties (BFFs) overall may lead to tolerance of error in some domains. Nevertheless, even absent a plausible evolutionary account of why ADD has the tuning that it has, experimental, ethnographic, and developmental evidence suggests that ADD is, in fact, touchy in some cases (e.g., Barrett & Johnson, 2003; Csibra, 2008; Guthrie, 1993; Rochat, Striano, & Morgan, 2004; Scholl & Tremoulet, 2000). Sterelny is surely correct, however, that this ADD (whether it is hypersensitive or not) is not a sufficient driver of thought about superhuman agents that lead to actions that leave a material record. Fortunately, it is typically offered only as one factor in the emergence and spread of such concepts and I have certainly never regarded ADD + MCI as a complete explanation of anything approaching “religion” (e.g., Barrett, 2011a; Bering, 2011).

Sterelny’s interest particularly in “costly,” “intrinsically implausible” “beliefs as displays” that “manage social complexity” need not be the interest of all scholars who claim to be studying “religion.” Indeed, one burden of working in this field is that a heuristic folk concept has been co-opted into the service of science. The result is that two scholars can be considering only barely overlapping or even entirely different sets of phenomena while both claiming to study religion (Barrett, in press). No wonder we disagree as to who has a more satisfying explanation and are sometimes at cross-purposes.

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The role of experience in religion: accommodation vs. assimilation

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Sterelny’s “re-explanation” of religion is rich and wide-ranging. In this brief commentary, I offer a gloss on two interrelated aspects: anomalous experience and agency detection.

Sterelny suggests the “family resemblances between small world mythologies” may stem from attempts (perhaps collective attempts) to explain unusual and intense experiences. The idea, I take it, is that the nature of these experiences may have been similar across cultures, owing to shared neurochemistry and similar (albeit independently discovered) consciousness-altering technologies (e.g., psychoactive drugs, emotionally charged rituals). As a result, the explanations for these experiences (eventually coalescing into ideologies) may have taken a similar form in different cultures.

As Sterelny notes, the notion of anomalous experience is also found in the literature on delusions (Gerrans, 2014). Indeed, paralleling the argument above, the cross-cultural and historical recurrence of certain delusional forms may reflect their origin in specific experiential aberrations generated by reliably occurring (if rare) neurocognitive impairments. For example, the dominant neurocognitive account of Capgras delusion (the delusion that a loved one has been replaced by an impostor) invokes dysfunction in brain networks subserving the experience of familiarity (Darby, Laganiere, Pascular-Leone, Prasad, & Fox, 2017; Ellis, Young, Quayle, & de Pauw, 1997). Because of this dysfunction, affected individuals have a discordant experience when they encounter those close to them (who are recognizable but don’t feel familiar), and the notion that those others have been replaced by impostors may make sense of this experience (whether the impostors are construed as doppelgängers or cyborgs may depend on the particular cultural and historical context; Gold & Gold, 2012).

Other delusions yield to similar experience-based accounts: for example, patients who misidentify their own reflection in a mirror (“That’s not me!”; Breen, Caine, Coltheart, Roberts, & Hendy, 2000, p. 83) may be trying to make sense of anomalous experiences of reflected space (mirror agnosia) engendered by underlying neurological damage; and patients with severe tinnitus may come to believe they have bees buzzing about inside their heads (Maher, 1988; Southard, 1912). However, is anomalous experience sufficient to account for delusions? Although some theorists have thought so (e.g., Maher, 1988; 1999), the fact that anomalous experiences do not always generate delusions suggests the need for a second factor in delusion formation (Coltheart, 2005; Coltheart, Langdon, &
McKay, 2011; Coltheart, Menzies, & Sutton, 2010). For example, Turner and Coltheart (2010) discuss a brain surgery patient who reported, post-surgery, that her mother felt different: “[T]he first thing I noticed was Mum, when she walked in the room … Just didn’t feel like her” (pp. 371–372). Nevertheless, this patient did not develop Capgras delusion. Likewise, cases of mirror agnosia have been reported in the absence of the mirror delusion (Binkofski, Buccino, Dohle, Seitz, & Freund, 1999), and of course tinnitus rarely results in delusions about intracranial insects.

But what is the nature of the postulated “second factor” in delusion formation? One possibility is that the second factor involves, or produces, a bias toward accommodating direct sensory experience (Langdon & Coltheart, 2000; McKay, 2012). At the extreme, belief formation would be constrained only by direct experience, with prior expectations wholly disregarded. Bizarre experiences would always engender bizarre beliefs.

A different type of departure from rational belief updating – or a departure in the other direction – would be a bias toward assimilation (McKay, Langdon, & Coltheart, 2005; Piaget, 1952). At the extreme, new experiences would be incorporated seamlessly into pre-existing schemas for making sense of the world, some of which may be shaped by evolution. Thus, males may inherit a bias to interpret ambiguous female responses as signals of sexual interest (Haselton, 2003; Haselton & Buss, 2000; Murray, Murphy, von Hippel, Trivers, & Haselton, 2017; cf. Perilloux & Kurzban, 2015, 2017); healthy humans may share a tendency to selectively integrate evidence that is consistent with their preferences and desires (Tappin, van der Leer, & McKay, In press; Sharot, Korn, & Dolan, 2011; cf. Shah, Harris, Bird, Catmur, & Hahn, 2016); and people may be biologically predisposed to over-infer the presence or activity of agents (Barrett, 2000, 2004, 2012; Bloom, 2007; Guthrie, 1993; Guthrie et al., 1980).

Sterelny, however, critiques the idea that religion emerges partly as a result of an evolved tendency toward agentic interpretations of experiences. In particular, he disputes the evolutionary rationale for “hyperactive” or “hypersensitive” agency detection, whereby asymmetric costs – relatively costly false negatives and relatively cheap false positives – supposedly lead to the evolution of biased agent-detection mechanisms (Barrett, 2000, 2004, 2012; Guthrie, 1993; Guthrie et al., 1980). Sterelny is “very skeptical about the supposed cost asymmetry and its effects.” He argues that false positives in the agency-detection domain are more costly than is usually appreciated – perhaps more costly than false negatives (foragers “cannot afford baseless dreads,” and predators “cannot afford to give away their presence by responding to false positives”). He concludes that although agency detection was critical in forager environments, “there is no reason to think selection would tolerate cognitive designs biased in favor of false positive beliefs about agency.”

I share some of Sterelny’s skepticism here, but for slightly different reasons. Whereas Sterelny doubts that agency-detection false negatives were more costly than false positives in the ancestral past, I question whether considerations of ancestral cost asymmetries – whichever direction the asymmetries go – can ground claims about biased beliefs (McKay & Efferson, 2010). “False negative” behavioral errors in the agency domain (e.g., failing to take evasive action when a predator approaches) may indeed have been costlier in ancestral environments than “false positives” (e.g., running away when a tree rustles in the wind), but it simply doesn’t follow that humans will have evolved a belief bias in favor of false positives. Unbiased beliefs about agency would be just as adaptive (indeed, more so; see McKay, Ross, O’Lone, & Efferson, in press) if coupled with a liberal threshold for action (McKay & Dennett, 2009). In that case, humans would have no bias in beliefs about the presence or absence of agents, but when uncertain should tend to behave as if an agent were present (i.e., they should err on the side of caution).

This point pertains to the theoretical case for hyperactive agency detection. But what about the empirical evidence? Here again there is reason to be cautious. Sterelny references evidence that subtle cues of agency (photographs or stylized images of eyes) affect behavior, and also mentions our tendency to attribute agency to artifacts and abstract shapes. But how compelling are these effects? With regard to agency cues, Northover, Pedersen, Cohen, and Andrews (2017) recently conducted two meta-analyses to investigate the effect of surveillance cues on generosity (the most widely studied
behavior in this literature), and found no evidence of this effect. Consistent with this, Saunders, Taylor, and Atkinson (2016) tested a range of monitoring cues in a large online sample and found no evidence that these cues influenced charitable giving. A second paper by Northover, Pedersen, Cohen, and Andrews (In press) reported that the effect of surveillance cues on a different outcome – moral judgment – is at best inconsistent (but possibly non-existent).\(^1\)

As for the misattribution of intentional agency in ambiguous scenarios, what is needed is not merely evidence that humans make frequent false positive errors in this domain (e.g., attributing agency to the wind or to an abstract shape), but that people make such errors at a higher rate than they make false negative errors. New work by David Maij and colleagues (Maij, van Schie & van Elk, submitted) suggests, if anything, hypactive agency detection – across a range of paradigms, experiments, and conditions, their participants displayed a response bias against detecting agents (e.g., human agents embedded in visual noise; see also Riekki, Lindeman, Aleneff, Halme, & Nuortimo, 2013). As agents were at least as likely to be present as absent on each trial in these paradigms, this response bias should yield a non-uniform distribution of errors across the two error types, with false negatives more frequent than false positives.

Whether this is evidence against an evolved propensity to detect agents hyperactively is unclear, because these experimental conditions may not match those faced by ancestral humans.\(^2\) In view of these findings, however, more work is needed to establish (a) evolved hyperactive agency detection in humans; (b) the contexts in which this bias manifests; and (c) its contribution to religious mythology, whether small world or global. It may be that religion owes less to the agentic assimilation of ambiguous evidence than to the collective accommodation of intense agentic experience.

**Notes**

1. This latter paper by Northover et al. reported a series of attempted replications of a study I was personally involved in (Bourrat, Baumard, & McKay, 2011). None of Northover et al.’s experiments replicated the surveillance cue effect on moral judgment we had reported. Two subsequent meta-analyses, each comprising six experiments investigating the effect of artificial surveillance cues on moral judgment, provided mixed conclusions (the mean effect size was not significantly different from zero for one of the two moral judgment scenarios we had investigated and only just significant for the other).

2. For example, if, in the ancestral past, intentional agents were rare, then a moderate response bias against the attribution of intentional agency could still have produced a bias in favor of false positive agency detection errors (see McKay & Efferson, 2010).

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Re-contextualizing the re-explanation: understanding religion requires accounting for both ecological and social dynamics

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In describing the challenges facing evolutionary theorizing about the early origins of religion, Sterelny identifies modern cross-cultural religious variation as a reason to conclude that religion may not have a singular origin. While this conclusion may be appealing on its face, the complexities of population dynamics are better handled by mathematical modeling to account for non-linear processes that produce evolutionary changes over time. Models that examine effects of social learning in cultural change suggest that learning biases can still produce clusters of like-minded individuals nested within an array of groups that broadly disagree with each other, much like existing variation seen in religion today (Axelrod, 1997; Friedkin, Proskurnikov, Tempo, & Parsegov, 2016; Kempe, Kleinberg, Oren, & Slivkins, 2016). Importantly, these results illustrate how social learners having access to a limited range of the total population of teachers produces limited dispersal of cultural knowledge, which in turn produces cultural groups that can be acted upon by natural selection at both the individual and cultural group levels.

However, in order for the group structuring effects of such limited dispersal social transmission to matter, the model would need to take a second factor into account: the relative intensity of within- vs. between-group competition. Kin selection and group selection can follow the same evolutionary dynamics and act upon populations depending on the scale of competition (West, Griffin, & Gardner, 2007). For example, Pseudomonas aeruginosa bacteria will evolve to be more cooperative in the local group of genetic relatives when competition is higher globally across groups than locally within groups (Griffin, West, & Buckling, 2004; Queller, 2004). Similar processes of parochial altruism also likely influenced early human social evolution (Bernhard, Fischbacher, & Fehr, 2006; Choi & Bowles, 2007). Extrapolating from these kin selection/group selection results, one might hypothesize that more local competition should disfavor grouping, while more global competition should favor cooperative local groups that compete with other groups.

Sterelny emphasizes the adaptive benefits of ritual as a means of solidifying group bonds. This implies that humans are more inclined to disperse and act as autonomous units than to group. Accordingly, the social cohesion provided by rituals becomes the impetus for humans to get the benefits of group cooperation. However, group cooperation can evolve and individuals can gain larger selfish, direct fitness benefits from cooperation than defection if payoffs to the individual from the group outweigh the costs of their contribution (West et al., 2007). For example, suppose that there are three experts in crafting and using obsidian spearheads. One day, instead of going hunting, one donates their time to teach three novice hunters how to make and use spearheads. Now there are six hunters, doubling the group’s capacity to catch meat. Given the group structuring effects of limited dispersal social transmission mentioned above, early human populations may have been forming groups purely for the individual benefits of gaining information from each other. Importantly, individual direct benefit from group cooperation can arise even when groups are non-cohesive. Returning to the hunter example, suppose there is a neighboring group across a ravine. Hunters on the other side of the ravine use a less efficient spearhead technique. The groups are not competing, so the teacher allows a novice from the neighboring group into lessons. This novice takes the teachings to their group, and now both groups use the more efficient technique. Therefore, if between-group competition is low, then more fluid group boundaries allow further dispersal of socially acquired information and reduce across-group cultural variation. However, if the groups were
competing, then the teacher’s group – and by extension the teacher – would benefit by excluding the neighboring novice, thereby withholding knowledge from the other group and gaining greater access to meat. Thus, if early human groups were competing with each other, then fluid group boundaries would be discouraged – providing the selective pressure for cultural practices that boost group commitment and cohesion.

Finally, Sterelny’s ethnographic model hinges on changes in social complexity rather than cognition as the core of early religious evolution. Sterelny’s emphasis on social cohesive effects of ritual without regard to (a) the social transmission and intergroup competition contexts mentioned above and (b) the cognitive demands of increasing group-level cultural knowledge may overlook the importance of cognitive factors. Cumulative cultural learning in humans draws heavily upon the social cognitive mechanisms; indeed, ability to learn based upon intent appears to be a key cognitive feature distinguishing humans from chimpanzees (Shipton & Nielsen, 2015; Whiten, McGi-gan, Marshall-Pescini, & Hopper, 2009). Among human groups, greater social complexity is also associated with wider cultural knowledge (Henrich, 2004; Henrich et al., 2016). I suggest an alternative account that reasserts the importance of cognition by emphasizing the effects ritual has in transmitting cultural knowledge. Certain aspects of ritual behavior can be important to the acquisition of such knowledge. The causal opacity behind acquiring various skills in traditional societies often fosters a normative, ritual-esque cognitive stance that may facilitate long-term, accumulated, group-level information storage (Kline, Boyd, & Henrich, 2013; Lancy & Grove, 2010; Legare & Nielsen, 2015; Rakoczy & Schmidt, 2013). Ritual evokes cognitive states like distributed attention, absorption, and flow (Csikszentmihalyi, 1990; Luhrmann, Nusbaum, & Thisted, 2010; Slingerland, 2000) that enhance hunting, seasonal foraging/cultivation, and navigation in traditional knowledge contexts (Balzer, 1987; Clarke, 2009; Genz et al., 2009; Watson & Huntington, 2008). The expanding social cognitive repertoire of early humans may have evolved along with ritual practice to facilitate the expanding pools of cultural knowledge early human societies needed to survive and thrive in diverse ecological contexts.

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**Praxis and doxa:** what a focus on ritual can offer evolutionary explanations of religion

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Sterelny’s emphasis on *praxis* (practice, ritual) rather than *doxa* (belief) is an important pushback against overly mentalized explanations of the evolution of religion. By focusing on the issue of timing (why did religion emerge when it did, and not sooner or later?), Sterelny finds himself concentrating on changes in human sociality, not in the human mind. Clearly, both belief and practice are crucial elements of religion, as many recent attempts at synthesizing the field make clear (e.g., Atran & Henrich, 2010; Norenzayan et al., 2016; Purzycki & Sosis, 2009). Sterelny makes a convincing...
case for the particular importance of ritual to the origin of religion, though, and it will be rich fodder for further discussion in the field. Here, I comment on what I see as the benefits that this renewed focus on praxis (to accompany the rich body of work on doxa) can hold for the evolutionary study of religion.

First, an emphasis on religious practice may help to correct for a still lingering conception of religion writ large as something like an Abrahamic faith, if not more specifically a Protestant faith (cf. Graham & Haidt, 2010; Henrich, Heine, & Norenzayan, 2010; Norenzayan, 2016). This presumption can lead to important oversights in the literature. For example, most of the studies using religious primes to investigate the relationship between religiosity and prosociality look at the effect of abstract religious concepts and belief propositions, rather than the effect of concrete religious contexts and behaviors. It is telling that in Shariff, Willard, Andersen, & Norenzayan (2016) recent meta-analysis of priming studies, the studies that had the largest effect on prosociality were those with contextual primes. Similarly, field-based studies had the largest effect while the extreme artificiality of MTurk studies the smallest (Shariff et al., 2016). I would suggest that it is not simply the greater realism of these studies that accounts for their larger effect sizes, but also something about the holistic experience that they evoke. Importantly, studies using contextual primes also were fewest in number: only eight of the 92 studies (9%) used such primes. The relative inattention paid to praxis in this body of work may be due at least in part to a presumption that all religions follow Protestantism in giving primacy of place to faith. More contextual studies and more work on religious practice will help correct this myopia.

Second, I see Sterelny’s focus on ritual as an opportunity to bring back into discussion some of the classic works on religion, many of which are surprisingly absent from his manuscript. Sterelny describes religion as a “mechanism of internal affiliation and identity.” This bears a remarkable resemblance to the foundational account of religion put forth by Durkheim, who spoke of how the “collective effervescence” of ritual allows individuals to form into a social group and “reaffirm in common their common sentiments“ (Durkheim, 1995, p. 429). And it is reminiscent of Turner’s (1969) “communitas,” the state of communion between undifferentiated individuals that ultimately both affirms the togetherness of individuals and renews the social order (and divisions therein). Despite these commonalities, Sterelny cites neither of these seminal accounts of religion, nor Rappaport’s assertion that ritual is an element that is crucial and necessary “to allow human sociability to have developed and be maintained” (Rappaport, 1999, p. 15). This oversight is likely a consequence of word limits and a desire to cite more current work, but there are many precursors of Sterelny’s “re-explanation” of religion in earlier works. Sterelny provides us an opportunity to revisit some of the canonical works and crucial insights of the anthropology of religion. It is not merely recent ethnographers who have stressed the importance of ritual practice, but all of sociology and anthropology since their founding. It is worth consulting this rich literature (and likely worth renaming Sterelny’s “ethnographic model of the evolution of religion” something with a bit more precision and clarity).

What these foundational studies suggest is that the salience of belief is driven by practice. The willingness to adhere to the tenets of a religion is built on the active practice of that religion (cf. Sosis, 2003) and the evidence one sees in the course of that practice that others too are striving to adhere to it (cf. Henrich, 2009). In my own fieldwork in South India (Power, 2015), I see ample evidence of these reinforcements. When describing one of his first acts of devotion for a Hindu goddess (rolling prostrated around her temple), one man told me:

I came to know the divine and its nature on that day only. I saw a change within my body. I felt some energy inside, an energy that could not be defined. … Only after doing that I came to know bhakti [ardent love for the divine]. I found a change, a divine power. That is to say, I believed in God.

Praxis and doxa are intertwined, and both become stronger in tandem. It is rare that they can ever be fully separated. In a telling parallel to the priming studies mentioned above, experimental studies investigating whether elements of ritual (singing, synchronous movement,
pain) can foster cohesion have suggested that the physical experience alone may not be enough (e.g., Cohen, Mundry, & Kirschner, 2014; Reddish, Fischer, & Bulbulia, 2013). It is when action is undertaken with a sense of commitment and purpose that it may be most potent. Studying either religious belief or practice in isolation is to risk misunderstanding both. As Sterelny argues, both are crucial to religion’s development and persistence. Clearer theory and empirics on the feedbacks between religious ritual, belief, and sociality is called for (cf. Whitehouse & Lanman, 2014). Such work will help us understand not only the origins of religion, but also its continued salience today.

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Where one stops the car: on the importance of what one takes “religion” to be

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Sterelny’s evolutionary account of religion views its emergence not in terms of crossing an innate cognitive threshold but as the progressive elaboration of “social technologies” that develop as benefits and challenges of social cooperation become more complex. I agree with the import and plausibility of extending to religion his earlier accounts of norms and signaling, which posit the importance of “mindshaping, not just mindreading” as human social structure transitioned from direct mutualism to delayed and indirect reciprocation (Sterelny, 2014, 2015, p. 549). His current proposal might be made more useful by nuancing or clarification in the following ways.

Religion as explanandum

Eminent ecologist G. Evelyn Hutchinson is said to have observed that the most important decision an ecologist makes is where to get out of the car. One of the reasons for divergent explanations in the evolutionary and cognitive sciences of religion is that we’re getting out of the car at different places (Lease, 2000; Schilbrack, 2013). This may reflect both the tendency to view explananda in light of what is in our disciplinary toolkits, but also the intrinsic difficulty of determining – in Sterelny’s apt words – “whether there really is a unitary phenomenon to be explained.” Although I am skeptical about whether “religion” constitutes a coherent class of beliefs and social technologies – and even if it does, whether a general explanation would suffice for the different members of that class – the seven elements of religion that Sterelny proposes as characterizing an explanatory target seem an appropriate starting point. Two issues warrant elaboration.

First, the account of religion he develops emphasizes religion as “a social technology” that elaborates and transmits beliefs, and promotes cooperation in the challenging context of human social complexity. That religious practices do transmit beliefs seems unquestionable; not completely clear is what, if any, social work is done by beliefs with the specifically religious characteristics Sterelny identifies. If none at all, then it’s not clear how the combinations of music, dance, costly rituals, culturally constructed mythic narratives, and perhaps drug-induced altered states in religion differ from fraternity rites. On the other hand, if the beliefs do social work, but they are primarily interpretive or generative of experience and not in themselves motivational, then we still want to understand the salience of the supernatural characteristics of belief. Alternatively, there are varying proposals for how the specific content of beliefs – e.g., moralizing deities – stabilizes cooperation by controlling defection and promoting trust (Johnson & Bering, 2010; Norenzayan et al., 2016; Schloss & Murray, 2011). Both an advantage and ambiguity of Sterelny’s approach is that it is receptive to all of these roles as “religion” is elaborated across human social evolution.

Second, one could go easy on the importance of beliefs (Sosis & Kiper, 2014) if they are viewed as symbolic, culturally arbitrary but resilient vessels for what many scholars across the human behavioral sciences have taken to be a crucial if not definitive general element of religion: the sacred (Alcorta & Sosis, 2005; Anttonen, 2000a; Berger, 1967; Durkheim, 1912; Pargament, Magyar-Russell, & Murray-Swank, 2005; Rappaport, 1999; Ysseldyk, Matheson, & Anisman, 2010). But a sacred component of religion is not considered in Sterelny’s treatment, and in fact the notion is not mentioned at all, save in briefly describing an account of minimally counter-intuitive agency (MCI) for critique. Moreover, although the critique itself has merit, depicting “a sacred mountain” as one “that listens
and intervenes” fails to acknowledge the emotional veneration and social attribution of ultimate and non-negotiable value that are posited to constitute sacralization (Anttonen, 2000a). Without this, a listening mountain may be magic but not sacred (Pyysiäinen, 2004). And importantly, a place may be invested with sacred status in virtue of its culturally ascribed significance, with no special capacities at all (Sosis, 2011). Perhaps Sterelny does not consider a sacred element to beliefs and rituals to be crucial to religion, or takes it to be absent from what he refers to as proto- and embodied religions. But we still need to know what accounts for its arising and what, if any, social work sacralization performs.

**Religious experience**

In addition to considering religious belief and practice, Sterelny seeks to incorporate the significance of religious experience into an evolutionary account (Schloss, 2007). Crucial to developing such an account is what one takes “religious experiences” to entail (if there is any such class at all; c.f. Taves, 2009): whether we consider them normal feelings or awareness granted elevated significance in a religious setting, or whether there is a distinctive, religiously salient quality or intensiveness – either generated by religious practice or intrinsic to the experience itself. Sterelny does propose that religious mythologies might emerge as efforts to make sense of and some religious practices might serve to generate “altered states of consciousness.” I agree, but – back to fraternity rituals – that still leaves open the question of what, if anything, about these experiences makes them memorable, deserving of an interpretation, and amenable to understanding in “religious” ways.

One option is that it may be the very ineffability of such experiences that seems to require mythic language, and a widely attributed if ambiguous distinctive aspect of religious experience is *mysterium tremendum* or the numinous – a feeling or awareness of reverential awe or wondrous amazement at “something larger than ourselves” (Berger, 1980; James, 1902, p. 31; Otto, 1923; Pyysiäinen, 1996; Rappaport, 1999; but see McRoberts, 2004). This has two important implications.

First, such affective experiences are not the same as – i.e., they may lead to or follow from, or even exist entirely independently of, the interpretive social attribution of sacred status that confers normative value (Anttonen, 2000b; Rappaport, 1999). One can believe an icon or place is sacred and treat it so ritualistically, without feeling any special awe; one can be overwhelmed by numinous wonder in the absence of sacralization through an unusual event – earthquake, volcanic eruption, aurora borealis, death or birth of a loved one, drug-taking, even an insight into the mathematical harmony of nature – or no event at all.

Second and therefore, although special states of consciousness may be interpreted and even generated by religious social technologies, religious experience itself may be – and often is – entirely private and individual. James (1902, p. 31) even characterizes this individual dimension as essential to religion, which is “the feelings, acts, and experiences of individual men in their solitude, so far as they apprehend themselves to stand in relation to whatever they may consider the divine.” While this goes too far – nobody constructs an understanding of the divine in solitude – the individual aspects of religious experience and the extent to which they are or are not mediated by social practice have salience for how we understand possible innate dispositions to religion. And the sense of the numinous – not unlike the ostensibly functionless sense of humor – may entail signals of group identity or motivational disposition that, while not costly, are reliable displays in virtue of being hard to fake (Curry & Dunbar, 2013; Gervais & Wilson, 2005; Schloss, 2007).

**Religious innateness**

Sterelny asserts that “religion is a consequence of changes in human social life, not of intrinsic structures of the human mind.” While the importance of changes in human social structure to the development of religion is beyond question, his claim may need nuancing in two ways. First, it appears overly dichotomous in a couple of respects. One is that religion may very much be a consequence
of “intrinsic, genetically canalized capacities of hominin minds” but – as every phenotype is a gene by
environment interaction – these capacities are only realized in more complex social settings. This is
not the same as viewing religion primarily as a cultural construction or “social technology”; rather,
on this account certain distinctive aspects of religion, such as the attribution of the sacred, are genetically
“innate” but emergent properties. Renfrew (2008) proposes precisely this, and therefore, like Sterelny,
argues for the late – but nevertheless innately disposed – emergence of religion. Another
way it may entail a false dichotomy is in its rejection of intrinsic dispositions toward religion on
the basis of skepticism about “the intuitive nature of religious belief” or “genuinely spontaneous the-
ism.” But there may be other native capacities of mind – such as disposition toward numinous
experience or “promiscuous teleology” (Kelemen, 2004) – that are innate, ancient (preceding the
social changes Sterelny describes), distinctively religious or proto-religious, and that generate biased
cognitive receptivity to (but not explicit formulation, much less commitment to) theism or other reli-
gious concepts (Banerjee & Bloom, 2013).

These possibilities need further empirical assessment, which raises a second issue deserving of nuance
in Sterelny’s rejection of innatism. I agree that there are reasons to be skeptical of the explanatory suf-
ficiency of both hypersensitive agency detection (HADD) and MCI (Schloss, 2010), including the expec-
tation that in a social species that shares alarm calls, agency detection might actually be expected to be
biased away from false positives given their reputational and opportunity costs. However, Sterelny argu-
ably mischaracterizes HADD as positing “selection to over-attribute agency as a settled belief” (my
emphasis) and as imagining “our ancestors as timid, anxious victims tip-toeing through their terrifying
environment . . . .” Moreover, there are manifold other theoretical proposals and empirical studies pur-
porting to support innate, religiously salient cognitive dispositions (Bering, 2002; Bloom, 2007; Guthrie,
1995; Heywood & Bering, 2014; Kelemen, 2004). While Sterelny emphasizes one paper (Gervais, Will-
ard, Norenzayan, & Henrich, 2011) that justifiably critiques innateness as an adequate explanation of
religious beliefs, it does not engage the full range of proposals. And as indicated by the sub-title itself
– “why innate intuitions are necessary, but insufficient, to explain religious belief” – it does not support
the proposition that religion is due to social changes, not intrinsic cognitive structures.

In the end, Sterelny rejects innatist accounts because the paleoanthropological record gives no
evidence that the beliefs and rituals characteristic of religion existed prior to the relatively recent
emergence of cultural developments presumed to postdate the fundamental architecture of
human cognition. Indeed, it does not. However, as already pointed out, there are proposals for innat-
ist but recently emerging religious dispositions. And even if one rejects such accounts, the dating of
religion’s emergence by artifacts is intrinsically problematic. On the one hand, the late appearing
“material expressions of religious practice” Sterelny mentions are not clearly religious per his own
seven-element demarcation, and several are not even clearly ritualistic. On the other hand, it is
totally possible that singing, dancing, narrative, other ritual behaviors, and their linkage to reli-
giously salient beliefs and practices existed prior to material symbolism, or were instantiated in
materials that are not preserved. Sterelny’s account provides a plausible alternative to the role of
innate dispositions in the origin of religion, but does not (yet) offer warrant for rejecting it.

**Religious belief**

Sterelny’s proposal for the relationship between religious beliefs and the practices that sustain them
both reflects and explains the qualities he takes to characterize the “anomalous cognitive character”
of religious belief – qualities that are important, credible, but by no means straightforward attributes
of religion. One such quality involves the “imperviousness of religious belief to reconsideration once
an agent ‘buys in’ . . . .’ or the claim that “explicit religious commitments tend to be insensitive, once
made, to new experience.” Belief and commitment are difficult to assess, but observations of some-
thing we can assess – religious profession – are by no means unequivocal in affirming recalcitrance to
change. Religious conversions from one tradition to another, or from no faith, are widespread. Abandonment of belief through crisis counter-conversion or erosion through maturation is also
common, as is significant modification of religious commitments and interpretations across life histories (Brenner, 2014; James, 1902; Uecker, Regnerus, & Vaaler, 2007). Indeed, religious belief may be more volatile than scientific belief across the individual lifespan.

Perhaps Sterelny has in mind not individuals, but the relative continuity of “accumulated” belief within a culture or tradition. But this is no clearer: of the thousands of religions that have existed, only a small handful have endured (Lenfesty & Schloss, 2015; Norenzayan, 2013). And those that have, evidence substantial modification and diversification of beliefs across time. Sosis and Kiper (2014) observe that the core commitment of attributing sacred status to something (like a holy book or place or icon) may, through ritual, be resistant to change. But they point out that this may also confer rather than inhibit malleability of explicit beliefs, by enabling widely ranging interpretations of the text or symbolic significance of the icon. Indeed, Sterelny’s indisputable observation that religious beliefs are less coupled to observational feedback than are, for example, foraging beliefs, can work two ways. As he points out, religious beliefs may be less amenable to correction and modification by experience. But they are also less amenable to validation by observational experience, and therefore less likely to be constrained and sustained by unchanging features of the physical world. The extraordinary variability of religious beliefs testifies to almost unbounded mutability. Yes, as Sterelny points out, there are no “religious Tasmanias” or groups that have “just forgotten to be religious.” But there are myriad groups and individuals who have “forgotten” what they formerly believed in response to a new belief. The “resilience” of religion – the fact that virtually all human groups exhibit some form of religious belief and practice – does not entail the “imperviousness of religious belief” to change.

A related quality of religious belief Sterelny identifies is its seeming lack of integration with other beliefs and the agent’s motivations and emotions: “Even committed Christians rarely rejoice at the death of their children.” There is something important but also over-simplified with this observation. First off, the example he gives fails to recognize the common experience that a sense of personal loss in one’s own life can be simultaneously and often inextricably attended by genuine consolation from and gratitude for what is happening in another. This simultaneity need have nothing to do with the unintegrated nature of beliefs: a dear friend moving across the country for a plum job or a child going off to college may provoke tears and sense of loss, yet in no way reveals lack of belief that the college exists and going there constitutes a genuine good. Of course, the death of a loved one entails a more turbid swirl of both mourning and the possibility of consolation from religious beliefs for many.

Nevertheless, it is surely right that some who are deeply involved in religious practice take little solace from the doctrinal beliefs they profess or the community affirms, and in fact do not order important elements of their lives by such beliefs. Sterelny is onto something important by the observation that such lack of integration makes it “tempting to suggest that religious belief is not really belief at all.” Or that to the extent it is, “religious beliefs are extreme cases of beliefs-as-displays rather than beliefs as inner control states.” However, the import of this observation might be enhanced by recognizing that “religious beliefs” – even those with explicitly shared doctrinal commitments – are by no means a unitary phenomenon. They may vary, perhaps bimodally, in both their social role and existential integration between individuals and over the life history of religious traditions. Literature in the sociology religion distinguishes nominal or routinized from ordering beliefs and commitments (Berger, 1967; Day, 2012; Luckmann, 1970; Weber, 1947). Nominal religious commitment names or identifies an individual as a member of a community (Ysseldyky et al., 2010), and it is the emblematic role – “the act of affirming xxx” – and not necessarily the meaning that is accorded sacred status, often in the absence of numinous experience. This may correspond with Dennett’s “believing in belief” (2006). It is possible to invest significantly in affirming the truth or dignity of the Bible or Declaration of Independence, without actually living by, agreeing on the meaning of, or perhaps ever having read them. Ordering beliefs effectively organize priorities and life decisions under a canopy of shared sacred meanings and values. These may be illuminated or affirmed – oftentimes in opposition to the nominal – by renewal of religious experience or by charismatic or prophetic moral exhortation (James, 1902; Luckmann, 1970; Weber, 1947).
Many religious “awakenings” remain as explicitly doctrinal as the ideological or state religions with which they are co-resident, but contrary to the (often but not always true) claims about ideological religion, they attenuate or eliminate clerical hierarchy, costly institutional structures (while embracing demanding personal disciplines), and social stratification of wealth or power. Although Sterelny’s trajectory of embodied to articulated to ideological religion maps meaningfully to large-grained changes in human social structure, the personal integration of belief, the relationship of belief and ritual, and the social use to which religion is put may be highly divergent even within a given social setting.

We’re back to where to get out of the car. If “religion” is a meaningful behavioral taxon or a coherent set of social technologies, it remains the case that even within comparable social ecologies, religion may reify or erode social stratification, elevate or denigrate religious experience, tightly link or largely uncouple doctrine from ritual, and emphasize the affiliative and/or meaning-making import of the sacred. Like assessing the divergence of life-history strategies within a phylogeny, the next steps in an evolutionary account of religion must address these differences both between contemporaneous religious systems and across the development of a given system.

Notes

1. Sterelny mentions embodied, articulated, ideological, doctrinal, imagistic, state, and proto-religions. Other widely used taxonomic distinctions include nominal, implicit, explicit, invisible, civil, etc. religions (Smith, 1996).
2. E.g., Pentecostalism, the world’s fastest growing religion, has increased by several hundred million in just a few decades – much of it in regions without widespread Christian tradition (Anderson, 2013).
3. David Hull (1978) makes a similar comment about malleability of a scientific theory around a core proposition.
5. E.g., as evident in the origins of Hutterite, Quaker, Mennonite, Wesleyan, and Pentecostal traditions (though not uniformly sustained across all). Renfrew (2001) even argues for the egalitarian foundations of Chaco, the early American devotional center previously thought to reflect the rise of priestly elites.

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Skepticism and manipulation: a comment on Kim Sterelny

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This is not the first time I have commented on a paper in which Kim Sterelny reminds social scientists that one of their favorite types of explanation for observed social phenomena (namely, that they represent an equilibrium of social life) may not be enough to explain how those phenomena originally arose (see Seabright, 2013). Here he points out that much of the received wisdom about the evolution of religion may explain why it might persist once established, but cannot explain how it comes to be established. For instance, how would costly rituals to signal the presence of sincere beliefs in invisible spirits get going in the first place? Something would have had to make the beliefs credible to their first practitioners. And as he points out, many of the beliefs to which the religious subscribe are seriously incredible, not just to twenty-first-century secular humanists but to members of rival religions too. Sterelny’s explanation is that ritual long preceded belief, and the ritual aspects of religion (including costly displays) were in place across a range of human societies long before any of their adherents were required to subscribe to any counter-intuitive metaphysics.

I think the arguments of this paper are correct, and important. Here I will make two qualifications. The first is that it is easy for modern educated people to overestimate the empirical incredibility of folk religion. To take the best-known example, as Richard Dawkins pointed out some time ago in The Blind Watchmaker, prior to Darwin we did not have the intellectual resources to show what is wrong with the argument from design. It was vastly more reasonable to explain the order of the natural world in terms of an omnipotent Creator than to think it had come about through unintentional causal processes.

There is a second example that has received less attention, which is that modern science has given us a radically different view of what happens in dreams. The anatomical science of the human brain has given us an intellectual framework to account for the strangely altered perception of reality that we experience in dreams. Prior to this, it was not unreasonable to think that our spirits could leave our bodies while we slept and fly invisibly through the world, that phenomena observed in dreams (such as talking animals or plants) might be as real as those observed in the waking world, or that one might through dreams have foreknowledge of the future. These beliefs now seem (and are) ridiculous, but they were not always so. Science has raised the bar for credibility.

The second qualification I have is that the process of cultural transmission is more manipulative than Sterelny acknowledges. Many of society’s norms and rules are transmitted to its members (particularly the more inexperienced ones) in ways that are biased towards the interests of those who are responsible for the transmission. At times Sterelny writes as though the empirically implausible aspects of religion were acquired in a fit of absence of mind. He writes that “mythic narratives … are typically encountered as part of a collective … mixed modality performance … [They] gradually acquire … a belief-like cognitive role,” and also that “humans have some tendency to explain anomalous experiences by building confabulating narratives … In the ancient origins of proto-religion, it is unlikely that there were social penalties for constructing a confabulation.”
I don’t think this will do as an explanation. After all, if religion had gotten along fine for a long time without requiring anyone to believe anything much, why did belief in empirically implausible phenomena come eventually to bulk so large in the religious mindset? Of course, many religions are not especially doctrinal, but almost all nevertheless routinely ascribe causal influence to invisible spirits, and many of the rituals are justified in terms of placating those spirits in order to further the interests of the individual or the community. Why did such beliefs come to matter centrally to religion rather than being some kind of optional add-on found in some religions but not in very many?

This is where the role of manipulation comes in. In explaining the development of confabulations, Sterelny writes as though the main challenge these confabulations had to survive was the skepticism of the individual’s own brain, which would be evaluating the plausibility of these beliefs much as it might evaluate any empirical representation of the individual’s environment. If this were all there was, it would be hard to understand why individuals could be so credulous, particularly given the extremely strong adaptive pressures for accurate representations of their foraging environment. Sterelny makes a good point in his comparison of foraging practices with folk medicine, namely that “the medical environment is often informationally opaque,” so not all adaptive pressures do in fact lead easily to accurate representations. However, he accords apparently little importance to the fact that belief transmission in the religious domain is typically strategic. Many of those who foist their confabulations on others have a good deal to gain from their being believed and are very good at finding weaknesses in the skepticism of those with whom they communicate. In particular, they can manipulate the skepticism of others because in many contexts there is a shared interest in their being believed. Unlike predators (say), they do not have interests that are completely opposed to those to whom they signal, so their listeners do not have anything to gain from turning their skepticism up to full strength. But half-strength skepticism is often easy to exploit by experienced manipulators (including by warning their victims to beware of the manipulations of others).

According a more central place to manipulation would in no way weaken Sterelny’s argument. It would even reinforce his criticisms of the arguments appealing to a hyper-active agency detection device, which as he points out give inadequate weight to social rather than purely cognitive pressures for the evolution of a religious mindset.

Reference

The evolution of religious diversity
John H. Shaver and Benjamin Grant Purzycki

Sterelny suggests that economic shifts toward reciprocity-based cooperation and increased human spatial and temporal dispersal during the Pleistocene promoted the recruitment of pre-existing social bonding mechanisms that enabled the stability of increased social complexity. In his model, these bonding mechanisms evolved as local packages of embodied religion, then articulated religion, and in some contexts elaborated ideological religion. Assuming we are focusing on explaining the
long-term evolution of ideological religions, in general we see the author’s evolutionary trajectory as plausible. Further, we commend the author for concluding with predictions that are testable with the archaeological record. Many small-scale societies face selective pressures that are similar to those in Sterelny’s evolutionary model (e.g., Jaeggi, Hooper, Beheim, Kaplan, & Gurven, 2016), and we suggest the ethnographic record provides an additional source of relevant data. We focus our commentary on how the contemporary and historical ethnographic records support the author’s emphasis on ritual, and provide an alternative account of religious diversity.

Sterelny calls his account the “ethnographic model of the evolution of religion” because, like many anthropologists, it recognizes that ritual is central to religion. As anthropologists who have conducted ethnographic research on religion in relatively small-scale societies, the author’s model is consistent with our own impressions of religion. Our informants offer detailed accounts of ritual protocol and its importance, but for the most part do not communicate anything close to the kinds of religious ideological systems found in Western and/or Abrahamic societies. It appears that what the author calls the “consensus model” has emerged from an ambient Christian (and largely Protestant) cultural environment that defines religion with reference to belief, and we suspect that this environment has partially motivated an emphasis on ideology (at least chronologically) in many evolutionary accounts. Sterelny’s emphasis is also consistent with non-Christian world religions. For example, one scholar of Hinduism writes, “it is certainly not possible [to define Hinduism] in terms of doctrine and theological beliefs. Ritual is prior to theology, both historically and conceptually” (Flood, 1996, p. 99). Other examples of this recognition abound (e.g., Cohen, Siegel, & Rozin, 2003; Fernandez, 1965).

In Sterelny’s model, articulated religion developed when human groups came into contact with one another and when the external signaling of collective identity became important. Religious diversity, then, is the result of (a) between-group historical contingencies, including the elaboration and emphasis of “domestic” narratives, (b) the adaptiveness (or maladaptiveness) of these ideologies, and (c) the functional demands of the internal signaling of roles and status, and the external signaling of collective identity.

We suggest that the ethnographic and historical records offer a different account of religious diversity, however. While we agree that religious diversity is partially the result of historical circumstance, both the ideological and ritual components of religions are often flexible and adaptively respond to evolving socio-ecologies (Shariff, Purzycki, & Sosis, 2014). In other words, environmental variation in threats to collective resources predicts variation in religious systems and the amount of diversity a society or social system will maintain. Critically, socio-environmental challenges often change over short time spans.

If it is the case that religious beliefs and behaviors influence others in ways that stimulate collective action, coordination, and cooperation, we should expect the content of religious communication (e.g., appeals to what gods want) and the frequency, intensity, placement, and timing of rituals (and other religiously rationalized behaviors) to evolve and stabilize accordingly. Examples suggesting this is the case are wide-ranging: warfare frequency predicts intensity of ritual acts (Sosis, Kress, & Boster, 2007); cultural models of gods’ concerns appear to correspond to emergent conditions (Purzycki, 2016); important rituals occur on territorial borders under conditions of land competition (Jordan, 2003); rituals can be timed and coordinated in ways that reap measurable food resources (Bird, Tayor, Coddng, & Bird, 2013; Lansing & Kremer, 1993; Rappaport, 1984); and morally concerned gods correspond to emerging social complexity, resource competition and scarcity (Botero et al., 2014; Johnson, 2005; Peoples & Marlowe, 2012).

With respect to articulated religion, Sterelny postulates a signature of horizontal and vertical integration, and an internally distinctive material culture that serves to externally signal identity. Now, we agree that the persistence and ubiquity of religion is due to the cooperative affordances of ritual. However, consistent with the above, we contend that internally nested pluralism enables the maintenance of economies of different scales. There are cases where different social groups share the same general religious framework, as in tribal organization, but also have competitive rituals devoted to
locally specific spirits (e.g., Sneath, 1992). In other words, signaling various group identities also exists within vast networks of co-religionists. The extent to which these internal demands are favored, or disfavored, predicts considerable diversity.

Moreover, when two different groups come into contact with one another, there is often a substantial borrowing of religious elements between groups, not just external signaling, or the absorption of one group into the other (e.g., the Native American Church). Even when considering that religious diversity may increase as a function of pathogen load and intergroup avoidance (Fincher & Thornhill, 2008), the borrowing of religious aspects of external groups facilitates at least partial integration with that group, and access to previously inaccessible resources. Elements of local religions, however – especially those important for motivating local economic exchange – though altered, are typically retained. Historically, what has emerged from these processes – syncretic religions – can be viewed as systematic responses to the management of cooperation and coordination problems at different levels of social integration (Shaver & Bulbulia, forthcoming). Interestingly, in the evolution of syncretic religions, the adoption of the rituals of outsiders has typically preceded the incorporation of ideologies into native religious frameworks (see, e.g., Shaver, 2015; Thornley, 2002, 2005 for a discussion of conversion dynamics in Fiji).

Conversion is often adaptive in the sense that it provides access to economic and social resources that were previously external and/or minimizes threats associated with a dominant regime. Even under conditions of forced conversion, however, those elements of traditional religions that are critical for the maintenance of local social and economic challenges are not lost. These evolutionary dynamics help to explain why a great diversity of contemporary ideological and ritual traditions also make appeals to one of the moralistic high gods (cf. Botero et al., 2014; Norenzayan et al., 2016; Purzycki et al., 2016).

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In his thought-provoking reflections on the evolution of religion, Kim Sterelny notes that “religions … are so variable from culture to culture that one might reasonably wonder whether there really is a unitary phenomenon to be explained.” Like many anthropologists (e.g., Bloch, 2008; Boyer, 2013), I don’t see religion as a unitary phenomenon. I don’t believe that all or even most human societies have had a religion in any useful sense of the term. What we find rather across societies is a variety of ideas, practices, and institutions that can be said to have “religious” features in some vague sense of this polythetic term. Wittgenstein could well have used “religion” instead of “game” (another apparent cultural universal) to illustrate his idea of mere family resemblance.

Here, by way of illustration, are the main practices that could be described as “religious” that I observed in my fieldwork among the Dorzé of Southern Ethiopia:

- Various forms of divination typically leading to sacrifices to ancestors or, more rarely, to genii loci.
- Various household offerings and sacrifices performed in private by the head of the household addressing his ancestors, most of the time to avoid or put an end to health or economic misfortunes.
- Sacrifices made by specialists to genii loci, mostly at the request of private individuals.
- Mandatory public sacrifices performed by dignitaries on various occasions or by every head of household on the occasion of a yearly festival, with no clear declared purpose.
Communal funerary rituals.

For a minority of people, participation in a socially marginal spirit possession cult of a type common in Ethiopia.

For everybody, participation in the main rituals of the Ethiopian Orthodox Church.

These various practices do not form a system and are not components of one religion. They have among themselves some degree of family resemblance, but no common diagnostic set of features. Divination and household sacrifices are closely linked to a system of taboos. Funerary rituals stand largely on their own. Public sacrifices have mostly to do with social and political status of the sacrificers. Pan-Ethiopian spirit possession and Orthodox Christianity are quite separate from one another and from the more local practices involving ancestors or genii loci. There are myths of origin and stories about supernatural events, but they don’t constitute an integrated body of beliefs, they are not taught, they are not universally known, and they do not play an important role. There is little that could be described in terms of “faith” or “worship” except, to some extent, in the case of Orthodox Christianity.

Far from being exceptional, such a variety of poorly integrated practices with a greater or lesser religious character is quite common in the anthropological record. Even in the historical record, Ancient Roman religion, for instance, is more a variety of domestic practices and public cults – religion “à la carte” rather than a set religious menu – and is not exceptional in this respect. Religion as something every society can be expected to have, as an institutional and ideological package demanding exclusive commitment from a community of believers, religion as an integrated and central institution in society is relatively well exemplified by a few modern cases such as classical Christianity and Islam (and even there, far from perfectly). Most human societies, however, have not had religion in this sense. The tendency to take religion as an essential ingredient of all cultures and to look for it in every society should be seen as a misguided projection of a phenomenon specific to a few relatively recent large societies onto all past and present societies, most of which may have had ideas and practices with “religious” features but not a religion.

Here is Sterelny’s own answer to the question of the unitary character of religion: “I take it that there is enough family resemblance between religious traditions to make it plausible that there is an explanatory target.” He suggests, moreover, that there are a few diagnostic features of religion, viz.

(i) a belief in powerful hidden agents or forces; (ii) the actions of these agents or forces sometimes impact on human affairs; (iii) these hidden agents are not indifferent to human action (what we do can make a difference to what they do; in some religions they punish or reward); (iv) these hidden agents are to some extent under positive human influence: they can be begged, cajoled, communicated with, bribed, their affection can be won by devotion, by obedience to apparently arbitrary prohibitions, and so forth; (v) these beliefs (or public expressions of commitment) tend to be fairly homogenous within small world communities, taught quite systematically to the next generation, and are linked to public displays and practices of various kinds.

Note, to begin with, that Sterelny’s list of diagnostic features could be exemplified by a system of beliefs in powerful hidden natural agents, such as members of a super-secret society exercising power on other people’s destiny but open to being cajoled, bribed, and so on. If we ever found anything of the sort, however, we would see it not as a religion but as a weird variant of a conspiracy theory. There is no enduring system of ideas and practices of that kind. The forces and agents involved in beliefs and practices that are studied as religion are not just powerful and hidden, they are in good part “supernatural.” While the notion of the supernatural is problematic and arguably ethnocentric, it is, if not always explicitly, at least in practice, treated as diagnostic of the religious by everybody, Sterelny included. The view developed by Pascal Boyer (1994, 2002) that religious ideas typically involve minimally counterintuitive representations provides a way to replace the metaphysical notion of the supernatural with a cognitive notion open to empirical investigation (see also Sperber, 1985). Boyer’s account of minimal counter-intuitiveness, by the way, is not meant to provide an explanation of religion (and should not be criticized as if it were). Being “minimally
counter-intuitive” is, rather, one among many factors of “cultural attraction” that contribute to explaining the relative cultural success of religious ideas and practices (and also of some literary and artistic representations, for instance stories of Mickey Mouse).

Note also that, in his list of “diagnostic features of religion” cited above, Sterelny mentions hidden “agents or forces” in (i) and (ii) but only agents and not forces in (iii) and (iv). Why? Because only with agents can you have the kind of relationships of begging, bribing, worshipping, and so on that are considered typical of religion. When, in cultural ideas and practices, supernatural powers are attributed not to agents but to objects or substances seen as inanimate, the usual anthropological practice has been to talk not of religion but of magic or witchcraft. How justified is this way of distinguishing religion and magic? The taboo system of the Dorzé, their most integrated set of “religious” beliefs and practices, involves both the power of agents such as ancestors, and of inanimate objects or substances such as blood. It is by no means exceptional in this respect. Notwithstanding, recent evolutionary explanations of religion, including Sterelny’s own, are uniquely focused on the relationship of humans to supernatural agents. But where is the decisive argument that the classical anthropological distinction between religion on the one hand and magic and witchcraft on the other in terms of agentive vs. non-agentive supernatural powers genuinely cuts culture at the joints and properly isolates religion as a “unitary phenomenon to be explained”?

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Defining religion
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Religion is a notoriously difficult concept to define (Harrison, 2006; Lawson & McCauley, 1993). Rather than a discrete set of traits, religion is a family resemblance category (see Medin,
Wattenmaker, & Hampson, 1987); things can seem more or less like religion but there are no clear boundaries that tell us what is or is not religion. Empirical research in the cognitive science of religion has gotten around this problem by splitting religion into traits and defining only the specific traits that are being studied (e.g., high moralizing gods or high arousal rituals) (Hill et al., 2000). This has been a largely effective strategy. It has allowed researchers to make falsifiable claims about various aspects of religion without having to deal with the issue of the indefinability of religion itself.

This strategy falls apart as soon as we start making claims about the whole family resemblance category of religion once again. A claim that religion is ancient, but not very ancient, as Sterelny makes, requires some agreement on a precise definition of religion. Without this, claims about the origin of religion in human history become untenable. To make a claim that religion is a consequence of changes in human social life, rather than intrinsic structures of the human mind, requires a clear articulation of what religion is, otherwise we are aiming at a moving target.

Sterelny does offer several points as diagnostic of religion: (i) belief in supernatural agents or forces (ii) that can impact human affairs, (iii) are not indifferent to human actions, (iv) can be influenced by human action, and (v) are shared by a community and passed through generations. Further, (vi) these beliefs involve ritual and communal activities. These points do well to capture much of what we think of as religion, but cannot establish that religion is not based in intrinsic structures of the human mind and therefore is not very ancient in our species. Its origins are still found in our tendency towards supernatural thought and our abilities to accumulate culture.

I'll start with the cultural aspects of religion. The communal and ritual nature of religion is not specific to religion, but based in otherwise existing cultural abilities (Norenzayan et al., 2016). These abilities to learn, accumulate, and transmit culture are based on a suite of cognitive biases that help guide the contexts in which we learn and who we learn from (Chudek & Henrich, 2011; Henrich & McElreath, 2007). Our cultural learning abilities are evolved intrinsic structures of the human mind (see Henrich, 2015). Though we absolutely do need an explanation of how religion evolves and spreads in culture to fully understand religion, we should not expect this explanation to deviate much from that of other cultural institutions.

The fact that religion is indefinable supports its roots in more general cognitive and cultural learning processes. Religion is a family resemblance category precisely because nothing about religion clearly delineates from other parts of culture. No piece or combinations of pieces of our category of religion can capture everything that we consider religion without also capturing a number of things we generally do not consider religion. For example, rituals makes up much of our day-to-day cultural behavior, from how we greet others to how we prepare food (Kapitány & Nielsen, 2015; Watson-Jones & Legare, 2016). Supernatural beliefs are found widely outside of religion, and are potentially evolutionarily very ancient (Foster & Kokko, 2008). The combination of these two is also found outside of religion in things like the superstitions of sports fans (Dömötör, Ruiz-Barquín, & Szabo, 2016).

Sterelny’s main concern is not the transmission of religion, but how we get religious concepts in the first place. He counters previous claims that the religious concepts are founded in cognitive biases (see Atran & Norenzayan, 2004; Barrett, 2004; Boyer, 2001), and suggests that religion arises out of collective ritual and high intensity communal experiences. It is clear that cognitive biases require additional cultural practices to become anything we might consider religion (see Gervais, Willard, Norenzayan, & Henrich, 2011), but it is unlikely that the role of these biases can be entirely replaced by collective ritual. It is hard to see how collective ritual could account for similarity in the content across religious beliefs (i.e., the use of mentalistic reasoning) or the striking similarity between religious concepts and non-ritually supported beliefs such as paranormal beliefs.

It is worth noting that the logic behind cognitive biases stands even if theories of specific cognitive biases, such as minimally counterintuitive (MCI) theory and hyperactive agency detection device (HADD), are not supported. HADD may turn out to be a poor explanation for why so many supernatural concepts involve mental state reasoning (Guthrie, 1993), but this does not change the
observation that supernatural concepts often do involve mental state reasoning. MCI theory has been discussed elsewhere (see Purzycki & Willard, 2015).

If we cannot get rid of the role of cognitive biases, Sterelny’s claim that religion cannot exist before humans start engaging in intense collective activities and ritual practice is an argument about the definition of religion. It redraws the lines around a set of phenomena and states that only this combination of things can be religion. What his argument does not do is change our understanding of the evolutionary roots of the broader family resemblance category of religion. Supernatural beliefs, ritual behavior, and our ability to share these things collectively still have origins that are very ancient in our species.

As researchers we are free to, and should more readily, tackle the task of defining religion. When we talk about “religion,” we can still operationally define the set characteristics that we are interested in, but in doing this we need to recognize that dating the evolutionary origins of “religion” is ineffective if there is no widespread agreement on our definition. Changing the age of religion only requires changing the set of traits we consider part of our operational definition of religion. This does not change our understanding of the evolutionary age of these traits themselves.

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RESPONSE

Religion well explained? A response to commentaries on “Religion Re-explained”

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ABSTRACT
This article responds to the commentaries on my “Religion Re-explained.” There is a common element running through many of the comments: ritual, its changing role as Pleistocene life became more complex, and the social factors that drove those changes cannot explain the content of religious narratives and of the doctrines those narratives turn into. For while there is much variation across religions, many or most involve supernatural agency and forces. Surely this could be such a common theme only if belief in the supernatural was in some way natural to the human mind. In this response, I clarify and expand an alternative account, while responding as well to more particular questions and objections.

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Preliminaries

Let me begin by thanking all the commentators for their thoughtful remarks and generous spirit. I often agreed with their comments, and even when I did not, I often learned from them. I shall mostly respond to the comments individually, though with some cross-referencing, as there is some convergence. I shall begin, though, with an issue that threads through many, though not all, responses to the target article.

Many of the commentators wondered whether the framework outlined in the target article could give an account of the distinctive character of religious belief without some concession to the cluster of the views that suggest that such beliefs come naturally to the human mind. That issue is pressing, for if the target article is right, many of the social functions of the narratives associated with the ritual and experiential elements of religion do not seem to depend on those narratives being about supernatural agency and forces. Surely this could be such a common theme only if belief in the supernatural was in some way natural to the human mind. In this response, I clarify and expand an alternative account, while responding as well to more particular questions and objections.

The issue is also especially pressing once we realize that there is a spectrum of views available about the potential role of specific cognitive biases in priming religious belief. These range from the idea that religious belief is more or less innate or instinctive, requiring only minimal triggering, through to views that suggest that we have cognitive habits which do not in themselves have religious
content, but which nevertheless raise the prior credibility of religious ideas, to the view that religious ideas only establish if there is explicit, targeted, and sustained social teaching of those ideas. In the target article, I took the fact that communities typically do induct the next generation into their religion through such explicit, targeted, and sustained social teaching to be prima facie evidence of its necessity. But quite a few of the responses press me on this, suggesting that my rejection of the “religion is natural” framework rests on an over-dichotomized view of the options. Religion may not be innate, but perhaps supernatural scenarios are rendered plausible by an addiction to teleological explanation or perhaps by an intuitive dualism about the mind.

I am not yet persuaded. For one thing, the supposed intuitive dualism of children does very little to support the naturalness of religion. Many religions do not seem to traffic in disembodied supernatural spirits; the figures of the Australian Aboriginal Dreaming, for example, are certainly extraordinary, and with far-from-mundane powers. But they are not disembodied (or not obviously disembodied). Likewise (I depend here on Hayden, 2003), the supernatural individuals with whom shamans interact seem to be elsewhere – in some kind of different plane of reality – rather than being here but disembodied. Many afterlives, likewise, seem to be conceived of as embodied but elsewhere rather than as a mind continuing without a body (the apocryphal 42-virgin reward for martyrdom makes no sense on any other conception). Teleology, likewise, seems more naturally connected to Abrahamic, big gods religions. The origin explanations of many small world religions seem to be narrative rather than teleological. Aboriginal Australian landscapes are the results of the travels and deeds of Dreamtime beings, and quite often of conflicts between them, rather than being expressions of prior supernatural design.

Of course, these considerations are not decisive, and if cognitive biases do not explain the prevalence of supernatural figures in religious narratives, what does? If I were to nominate a cognitive bias important to the establishment of supernatural narratives as true, it would be our apparent preference for any explanation, however ill-evidenced, over explicit recognition of our total ignorance of the causes of things. We are addicted to confabulation rather than to teleological or supernatural explanation. Given a bias in favor of causal confabulation over brute mystery, it is no surprise that origin explanations are often agentive and supernatural. As Paul Seabright reminds us, until the last few centuries we lacked the cognitive tools we needed to formulate naturalistic origin explanations. But an excessive desire to somehow, anyhow, fill in blank spaces on our cognitive map is a content neutral bias, unlike those standardly suggested. This issue will return, and immediately, as it is central to Justin Barrett’s response.

**Justin Barrett**

I probably did over-state my skepticism about the naturalness of religion; Barrett gently chides me for intemperate words about “minimally counter-intuitive concepts,” pointing out that there is indeed some cross-cultural confirmation of these natural ontological categories. Fair enough, but the point remains (as Purzycki and Willard [2015] insist) that there is a very large gap between these intuitive categories and the various religions’ descriptions of their supernatural superstars. In any case, I did not take it that “natural” meant “innate,” certainly not in the sense that religious views or commitments would develop without any cultural input. I take it that we both agree that Tarzan would not have any religious views, any more than he would speak English (Banerjee & Bloom, 2013). I may have misconceived the line of thought Justin represents, but not that badly. Rather, I take the “religion is natural” thesis to imply that religious views develop readily, without intensive and specific adult scaffolding. Consider the argument from Nicaraguan sign language to the naturalness of language. The idea is that Nicaraguan sign language emerged spontaneously, in the sense that the linguistic development of that deaf community was not scaffolded by rich and language-specific social input (Senghas, Kita, & Özyürek, 2004). It does not seem to me that there is a case that religion is natural in that sense. At the very minimum, children as they become part of a community with established religious practice, get rich and religion-specific inputs, and arguably more: Henrich’s Credibility Enhancing Displays
(CREDS) are costly signals of adult sincerity and commitment; and there is often significant social cost for indifference or deviance. There is no semi-plausible “poverty of the stimulus” argument about religious belief, as there may be about language, or about normative beliefs.

Let me now take up the issue of timing. The target article suggested that something resembling religion first emerged around 100 kya, and that this relatively late emergence is a problem for the consensus view. Now, that date might be wrong. As Jeffrey Schloss points out, not all ritual is religious ritual, so even if I am right in thinking that ritual life becomes a more prominent feature of Anatomically Modern Human (AMH) life around 100 kya, that might not mark any change in AMH religious life. Likewise, Schloss is of course right that many religious rituals would be archaeologically invisible. Even so, if rich religious lives were typical of human (or hominin) communities long before 100 kya, given the cross-cultural variation in the forms and material symbolisms of religion, I suspect that there would be some archaeological signal of that fact. Moreover, if the date is right, religion, or something rather like religion, emerges with behavioral modernity, a suite of loosely correlated changes in technology, ecology, geographic range, and (arguably) social behavior establishing in human populations between approximately 120 kya and 80 kya. It is widely accepted, though not universally accepted, that the root cause of these changes was social and demographic, not genetic (Klein & Steele, 2013; McBrearty, 2007; McBrearty & Brooks, 2000; Powell, Shennan, & Thomas, 2009; Sterelny, 2011; Klein and Steele are skeptical of the non-genetic explanation). If so, this offers some support for a social origin of religion: it appears within a cohort of other changes that have social causes.

Barrett does not dispute the timing, but instead points out that the standard cognitive equipment of hominins very likely changed over 500 kya. Moreover, relatively subtle changes in our cognitive equipment, a minor upgrade in theory of mind capacities,

could have made the difference between individuals entertaining ideas about superhuman beings and groups sharing common beliefs about a god that might motivate collective action … Hence, it is not obvious that the consensus model gets the timing of religion’s emergence wrong.

Clearly, in principle this is right. But I remain skeptical, in part for the reason already given: the emergence of religion was part of a larger complex with social and demographic causes. But in addition, the Heidelbergensians of 500 kya were large-brained, technically sophisticated foragers, so it does not seem much of a stretch to suppose that they were third-order intentional systems. Fear and respect for supernatural police, and their effect on collective action problems, does not seem to require any difficult form of third-order intentionality: I have to believe that the gods know what I am up to; I have to believe that others also know that the gods know about them; and we all have to be suitably motivated by these beliefs. Perhaps the Heidelbergensians were cryptically religious. But if they were not religious, I doubt that this was because they lacked the theory of mind capacities that made religious belief adaptive.

A final remark. In the target article, I express great skepticism about whether our belief-forming dispositions would be selected to err on the side of false positives: seeing agents and the hand of agency when it is not there. Of course, selection might not optimize. But the Hyperactive Agency Detection Device (HADD) hypothesis relies on the power of selection: given that perfection is impossible and that some error is inevitable, risk false positives rather than false negatives. Barrett notes that a very modest version of this idea might explain community-wide beliefs, so long as social learners are not skeptical. Communal belief in a haunted house does not require everyone to have had a ghostly experience. A few will do, so long as the rest trust the few. The point is well taken, but one would still need to explain the ghostly beliefs of the few, and others’ lack of skepticism.
Ryan McKay

McKay’s response returns us to the main theme of the comments: does the framework give an account of the content of religious beliefs? In the target article, I suggested that the family resemblances between small world mythologies might, as he interprets me,

stem from attempts (perhaps collective attempts) to explain unusual and intense experiences ... owing to ... similar (albeit independently discovered) consciousness-altering technologies (e.g., psychoactive drugs, emotionally charged rituals). As a result, the explanations for these experiences (eventually coalescing into ideologies) may have taken a similar form in different cultures.

All very well, McKay notes, but why should these somewhat convergent explanations of anomalous experience all (or almost all) involve supernatural agents and interactions with supernatural agents? The delusion literature indicates the anomalous experience by itself does not produce converging responses. To convert an anomalous experience of interacting with a partner or parent into a Capgras delusion, a second factor is needed.

The question is pressing. In the target article, I gestured at an answer. Given the strangeness of the experience, it is no surprise that if the experience is interpreted as experiences of an agent, that agent will also be strange. Moreover, one does not have to buy into a HADD to think that agentic explanations are salient and available to humans. We are agents ourselves, and individually and collectively we experience ourselves as causal agents; we make things happen. In that sense, we are primed to think agentively and teleologically. So, the thought is that ancient humans, individually and collectively, tried to make sense of their experience, not through the lens of a hyper-active agency detection module, but through their mundane and normally fairly reliable ways of recognizing and responding to agents. In the course of floating this idea in the target article, I gave some familiar examples in suggesting that agentic explanations are especially salient to people.

Much of McKay’s commentary reinforces reasons for skepticism about the existence of a bias in favor of false positives about agency. I am not sure how worried I should be about McKay’s line of thought. The explanation sketched above depends on agentic explanations being salient; it need not depend on cognitive biases through which we over-count evidence in favor of an agentic explanation of anomalous experience. There need be no cognitive bias if the experiences were powerful and agent-like, especially if the alternative (and correct) explanation was not cognitively accessible. They had fried their neurochemistry. Should they have just thought: we were stoned out of our minds, no wonder we seemed to see stuff that was not there? Does the fact that they did not seem to think that, or at least they packed their descriptions of their experiences in terms of agents with magical powers, hint at the existence of a content bias predisposing agents to find credible ideas about supernatural agency? Perhaps, but recall that these initial responses to experiences need not have been accepted as true; they only needed to be striking and memorable enough to be repeated, with the epistemic status of these journeys into spirit worlds slowly changing through repetition and incorporation into local lore. “It seemed as if I were transported to a different world” gradually becomes “we were transported to a different world.”

Rita McNamara

McNamara wonders what model of selection (or even if there is a model of selection) is behind the view of religion presented in the target article. She is particularly concerned with the claim that one adaptive function of ritual is solidifying group bonds, improving the prospects for cooperation. I agree with McNamara that cooperation is often individually beneficial in forager societies, and that information sharing is one of those benefits. That said, I doubt that “early human populations” formed into groups “purely for the individual benefit of gaining information from each other”; I think evidence of ancient large-game hunting is indirect evidence of ecological cooperation
(Pickering, 2013), and I find the arguments in favor of early reproductive cooperation persuasive (Hrdy, 2009). But my main point here is that even when cooperation is mutually beneficial, social life can be tense and conflicted (Boehm, 2012). Suppose that we are indeed better off mutually hunting the stag rather than individually hunting the hare; I am better off sharing with you today, in the expectation of aid from you next week. Even so, there can be conflict about the division of spoils and fair return from aid, especially when information about what others have done and the value of what they have is not perfect. Selection in favor of cooperation is selection in favor of social technologies that reduce the inevitable friction of cooperative life. So, the argument that cooperation is individually (or collectively) advantageous is not an argument for downplaying the importance of conflict management.

McNamara also wonders whether I have understated the importance of cognitive phenomena in my account of religion. As she notes, “Cumulative cultural learning in humans draws heavily upon the social cognitive mechanisms; indeed, ability to learn based upon intent appears to be a key cognitive feature distinguishing humans from chimpanzees.” I agree that there are important cognitive baseline differences between AMHs and earlier hominins, let alone chimps, and that these differences matter. I still doubt, though, that the shift to a more ideology-intensive form of religion in the last 100,000 years depended on newly acquired cognitive mechanisms (pace Barrett’s minor theory of mind upgrade), or newly evolved forms of social learning. That said, I think McNamara is right to point out that ritual can be a way of packing culturally important worldly knowledge, and that more complex societies typically need to transmit more worldly information to the incoming generation. Lynne Kelly develops this argument in detail. Even though she much exaggerates the relative importance of formal mechanisms of knowledge flow, in contrast to informal, experiential learning, the core idea is right (Kelly, 2015). I suspect McNamara is right to think that this is an important function of ritual, and it was neglected (only very briefly mentioned) in the target article.

**Eleanor Power**

I have little to say in response to Power’s comments. Her remarks draw out two positive consequences of a greater focus on religious practice. One is that this focus makes salient just how atypical the Abrahamic religions are; she doubts that this message has been fully received. I suspect she is right: only if you are imprinted on the Abrahamic religions will you take promiscuous teleology and intuitive dualism to be immediate cognitive precursors of religious belief. The second is that a focus on practice makes clear the continuing relevance of classic foundational works in the study of religion: Durkheim, thence Turner and Rappaport. In saying this, she gently chides me for not citing them in the target article, before still more kindly suggesting that this was probably a strategic decision to refer to contemporary work. Sadly, I can claim no such strategy: the citation pattern of the target article reflects the contingency of my personal history; my own trackways into the debates.

**Jeffrey Schloss**

I think Schloss identifies a couple of flaws in the original article. He is right that I mischaracterized the nature of religious belief in the supernatural. I characterized it too much in instrumental terms: these agents are there; they are powerful; they are subject to influence. He rightly adds that religious commitment involves some form of non-instrumental element in the agent’s attitude to those beings. To a believer, the gods are not agents to be manipulated and cajoled to the extent possible, otherwise ignored or avoided. But while Schloss has identified a gap in the analysis, I am not sure how to fill it more precisely. I doubt whether reference to the sacred helps. I did not mention the sacred because I do not know what it is: presumably some variable mix of belief, emotion, and phenomenological experience. So, talk of the sacred does not seem to add much to what is distinctive of religious commitment. Moreover (as Schloss notes), a focus on the sacred or ineffable character of experience returns us to the problem with which this response began. Unless agents are firm-wired to think
about their environment in agentive terms, why should those who have these experiences interpret them as experiences of agents? Why do those who do not have such experiences accept those interpretations? I gave these questions my best shot above.

I think Schloss is also right to suggest the target article does not succeed in characterizing the unusual nature of religious belief. As he points out, it is not true that religious beliefs are fixed; rather, conversion and religious change are common features of the histories of religion. That is true, though very often change in religious view has nothing to do with evidence. For example, in a nice case study of Fijian ritual participation, John Shaver suggests that Christianity invaded Fiji through the missionary strategy of targeting high chiefs: they switched to Christianity to gain access to powerful allies and because Christianity validated their authority; once they converted, the cost of resisting conversion became unsustainable to those with less power (Shaver, 2015). Of course, this only distinguishes change in religious belief from change in other beliefs, if change in mundane belief is typically somewhat evidence driven, and it is not clear how true that is. In his own attempt to characterize the distinctive character of religious commitment, Schloss suggests distinguishing between routinized belief (which largely involves fairly passive conformity with social role and expectation) and “ordering beliefs,” which “effectively organize priorities and life decisions under a canopy of shared sacred meanings and values.” He then goes on to discuss religious awakenings, and how evangelical religion can wield doctrine as a way of de-legitimizing hierarchy. I see the distinction, though it seems likely to name a gradient rather than a dichotomy. More importantly, it does not seem to help us say what is distinctive about religious commitments. To recycle Schloss’s own example, commitment to a football team can order an individual’s life; the commitment is a vehicle linking a community of the committed, with their “shared meanings and values.” Unless mundane beliefs really are responsive to evidence, the problem of saying exactly what is cognitively distinctive of religious belief remains.

**Paul Seabright**

As with other commentators, Seabright suggests that the framework I have presented does not adequately explain the emergence of ideological religion, or its content, the pervasive elements of the supernatural. If he is right, the explanation is political rather than cognitive. He suggests that the ideological character of religion, and the fact that this ideology involves commitment to supernatural agents, is very naturally explained when, and only when, those transmitting this ideological system have something to gain by its acceptance. In his view,

belief transmission in the religious domain is typically strategic. Many of those who foist their confabulations on others have a good deal to gain from their being believed and are very good at finding weaknesses in the skepticism of those with whom they communicate.

Moreover, manipulation is not hard. For I have exaggerated the prima facie empirical implausibility of folk religion to pre-contemporary minds.

There are two ways to read Seabright’s suggestion. On one interpretation, there is a genuine conflict of interest between the transmitters of religious doctrine and the receivers. If so, religious education is manipulation in the Krebs-Dawkins sense (Krebs & Dawkins, 1984), and we should expect to find religious lives with significant ideological elements involving supernatural agents only in communities with incipient hierarchies and elites. For those elites invest in the transmission of those religious doctrines that legitimate their privileged role. My reading of the ethnography does not support this picture. Egalitarian forager societies typically do not have religions involving moralizing big gods, but they do have religious lives that include doctrinal elements – elements in which supernatural agents play a key role (Peoples & Marlowe, 2012). But Seabright might have a more benign form of manipulation in mind. Folded in with the ideological elements of religion is information about the norms, customs, and mores of the group (and perhaps, if Kelly and McNamara are right, a lot of ecological information as well). It is in the interests of the parental generation that the incoming generation absorb this information, but it is in that incoming generation’s interests...
too. A spoonful of sugar makes the medicine go down; good for both sender and receiver. On this interpretation of Seabright, it is easy to see why the doctrinal elements of such religions take the form of striking narratives. We really do find narratives easy to process and remember (Boyd, 2009). But it is less easy to explain why supernatural figures play such a regular role in these narratives.

**John Shaver and Benjamin Purzycki**

John Shaver and Benjamin Purzycki find plausible much of the framework of the target article. But they do not think it sufficiently accounts for the diversity of religion. As they interpret it, on my picture, diversity is the result of (a) between-group contingency; (b) the extent to which ritual and ideology are adaptive; (c) the relative importance of within-group versus between-group signaling. That is a fair reading of the target article, though I would now add (d) the ways in which ritual and doctrine serve as a vehicle for the transmission of worldly information. Shaver and Purzycki are also right to point to cross-borrowing as a source of diversity, supporting Sperber’s skepticism about treating religions as organic wholes. I had neglected borrowing in the target article.

These additions would not undermine their point that different communities face different collective action problems. As shared religious life plays an important role in mobilizing the community for collective action problems, if a community faces especially demanding collective action problems, that will have consequences for the nature of their shared religious life. Variation is generated by variation in collective action problems. In small world cultures, the most obviously demanding collective action problems are external threats, but I have argued elsewhere that the intensification of agriculture in the Neolithic transition also posed severe collective action and free-rider control problems (Sterelny, 2015; Sterelny & Watkins, 2015). I think Shaver and Purzycki are also right to see more complexity in internal signaling in religious life. As communities become more complex and segmented, internal signaling through religious practice often involves status competition. Internal signaling is not just investment in group cohesion and coordination, but is as well jockeying for place. I explore these issues in a forthcoming publication (Sterelny, 2016).

**Dan Sperber**

Unsurprisingly, Dan Sperber’s commentary is especially challenging: he presses the problem variation poses to any attempt to deliver a unified evolutionary account of religion. I noted in the target article that cross-cultural variation in religious practices might be so great as to make it implausible that there is a single phenomenon, a single explanatory target, and one point of the target article was to show that cross-cultural variation in religion can be a fuel for explanation, not a road block. Demographic, social, evolutionary, and cognitive factors all operate differently in different contexts, and so predict variation. The framework is tested by the extent to which actual and expected variation converge. But Sperber raises a different challenge. Are the various practices within a culture – practices that bear some family resemblance to one another and to analogous practices in other communities – integrated in important ways? If not, it is misleading to write, as I have done, about the religious life of a community. On Sperber’s view, the Dorzé (and many other groups) have no religious life. Rather, they have many semi-independent ritual lives; some more or less shared doctrinal views; perhaps some shared, though somewhat vague, origin myths, and so on. Moreover, with a few exceptions (participation in the Eastern Orthodox Church), these “lives” are only partially congruent; they are common to different fractions of the community. This line of thought accords with Sperber’s general skepticism about seeing cultures as holistic systems (Sperber, 1996); there is (often) no holistic system that constitutes that community’s religion.

I am not sure just how worried to be about this line of thought. Empirically, at least in the Australian aboriginal ethnographies with which I am somewhat familiar, I think there is somewhat more integration and connection than Sperber suggests. The Rainbow Serpent and other motifs seem to reoccur across many groups and practices. Moreover, Lynne Kelly argues that this integration is
important: it is the vehicle through which narratives encode much critical worldly knowledge. But suppose Sperber is largely right. There is still room for a modest version of my story. The main elements of the explanatory framework outlined would go through if, for example, many or most of the ritual and magical practices of the group had reinforcing or complementary functions of the kind sketched: if some reinforced community cohesion and sustained collective action; if others signaled collective identity and right to place to other groups. Particular rituals, symbols, and doctrines might have individual histories of origin and spread and depend on different proximate mechanisms, yet play mutually reinforcing roles in the social ecology of the group. So even if Sperber is right, there is room for a revised, less ambitious form of the framework developed here, appropriate for those communities that do have something like an integrated religious life, and/or communities where a cluster of independent ritual, magical, and doxastic traditions have convergent roles of the kinds identified in the framework.

Aiyana Willard

Aiyana Willard begins with cross-cultural variability and the family resemblance character of the category as I have characterized it. Given that it is such a category, Willard is right in thinking that there will always be classification decisions on the margin, and that any proposal about religion’s time of origin (or cultural ubiquity) will be sensitive to decisions about what to count as religion. That is true, but let me offer three comments in response. First, it does not follow that such a decision is arbitrary. Indeed, to the extent that the framework offered gives a coherent account of the cases that fall under its umbrella, that is a reason for thinking that the decision to count religions using those criteria carves out a useful explanatory category. Second, decomposing religion into traits escapes this problem only if the traits are not themselves family resemblance concepts. Her two examples are “high arousal ritual” and “high moralizing gods” and both of those are good candidates for family resemblance concepts; indeed, “ritual” almost certainly is. Third, Willard describes my dating religion’s origin at roughly 100 kya claim as a proposed redefinition, saying:

What his argument does not do is change our understanding of the evolutionary roots of the broader family resemblance category of religion. Supernatural beliefs, ritual behavior, and our ability to share these things collectively still have origins that are very ancient in our species.

But that is just what I deny. I claim that the ability to share information is indeed very ancient, long pre-dating AMHs, but that supernatural belief and ritual behavior significantly post-date the origins of our species. These three traits dissociate in hominin evolutionary history. I accept that this view rests on a particular reading of the archaeology, but Willard points to nothing in the hominin record to support her case for a very deep time origin of these capacities. Whether I am right or wrong, the issue is not definitional but substantive.

Willard also thinks that the target article overplays the role of social factors and underplays the role of intrinsic cognitive factors. One of her worries here is the legitimate one noted at the beginning: can I give an account of the similarity of content across religious beliefs without allowing some role for intrinsic biases? Here, of course, the fact that there are only family resemblances between systems of belief reduces the power of this challenge. Sperber’s commentary might suggest that the similarities are not so marked after all. Nonetheless, as I have said throughout this response, I see this as a significant issue for the framework. But Willard also thinks I neglect the cognitive aspects of cultural transmission. She thinks that these depend on intrinsic traits of the human mind and thus the cultural transmission of religion will be essentially similar to the cultural transmission of other features of culture. Again, I disagree. Of course, cultural transmission depends on intrinsic features of the human mind. But it depends on the cultural context, demographic organization, norms, and the material culture of the local communities as well. Different elements of the cognitive capital of a culture depend in different ways on these factors: contrast the cross-cultural transmission of techniques in quantitative reasoning with the transmission of norms of interpersonal interaction. Not all cultural institutions
sail from one generation to the next in boats of similar character. Thus, cultures typically, perhaps always, invest in the cultural transmission of religious practice in ways they do not invest in the cultural transmission of other information, even information that is life critical. Joseph Henrich’s discussion of credibility-enhancing displays is one indication of that: foragers do not have to engage in CREDS in order to transmit information about how to recognize and track animals.4

Notes
1. For what it is worth, Dunbar and colleagues would predict that they were, on their neocortex size (see Gamble, Dunbar, & Gowlett, 2014, p, 146); indeed, they expect Heidelbergenians to be fourth-order intentional systems.
2. Perhaps Gil-White and Henrich’s distinction between hierarchies of prestige and dominance hierarchies might help (Henrich & Gil-White, 2001). The attitude of the committed to the divine has some elements of the relationship of the submissive to the dominant (for the divine are to be feared). But it has many elements of the prestige hierarchy: the divine are esteemed, sources of wisdom, guidance, and protection.
3. Moreover, there is a debate about whether Buddhism and Hinduism, the two non-Abrahamic world religions, challenge the link between big gods and big societies; see, for example, the book symposium on “Big Gods” in this journal, volume 5, no. 4, 2015. That debate suggests the same is true of “high moralizing gods”; that too is a family resemblance concept, with these Eastern religions resembling the Abrahamic creeds in some important ways (for example, their very explicit normative codes and developed theologies), but not in others.
4. Let me conclude by thanking again all the commentators, Joseph Bulbulia for midwifing the comments and response, and the Australian Research Grants Council for their generous support for my work on human social and cognitive evolution.

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