The Origins of Religion

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Two Puzzles of Human Psychology and Cultural Evolution

The world's oldest known religious temple is about 11,500 years old, perched on a dry hilltop in Southeastern Turkey. It consists of massive, humanlike stone pillars carved with images of animals such as gazelles and scorpions, arranged into a set of rings (Schmidt, 2010). While archeologists are unearthing clues and debating their meaning, there are many unanswered questions: who built this monumental religious site, how did they do it, and why?

There has been little evidence of domestication of plants or animals. It is plausible that it could have been built and occupied by pre-agricultural foragers (or hunters and gatherers). Was Göbekli Tepe an early cosmopolitan center, where people periodically came together, worshipped and performed rituals? While Göbekli Tepe raises more questions than yields answers, it points to two of the deepest puzzles of human psychology and civilization. How did human societies scale up from comparatively small, mobile groups of foragers to increasingly large societies, even though anonymity is the enemy of cooperation? And how did the great polytheistic and monotheistic world religions culturally spread to colonize most minds in the world, even though in the long run, almost all religious movements fail?

The Puzzle of Large-Scale Cooperation

The first puzzle belongs to psychology and is of large-scale cooperation. For most of its evolutionary history, human beings lived in relatively small bands of foragers. Yet, today, the

vast majority of human beings live in vast, cooperative groups of mostly unrelated strangers. Total strangers regularly depend on each other for livelihood, economic exchange, shelter, and mutual defense (Seabright, 2004). This puzzle deepens further when we realize two additional facts: this expansion of cooperation happened primarily since the Holocene around 12,000 years ago[1] (when agricultural settlements emerged), and its intensity and scope is found only in humans, despite phylogenetic continuities (Chudeck & Henrich, 2011).

In evolutionary biology, a great deal of cooperation can be explained by of one of two forms of altruism: one based on kinship or helping among genetic relatives (Hamilton, 1964) and one based on reciprocal altruism among regularly interacting strangers (Axelrod, 1984). But cooperation within expanding groups of strangers is not easily explained by either. As group size increases, both forms of altruism break down. With ever-greater chances of encountering strangers, opportunities for cooperation among kin rapidly decline. Without extra safeguards, such as institutions for punishing freeloaders, and cultural norms that encourage cooperation with strangers, reciprocal altruism also stops paying off. So how did human minds, possessing temperaments and instincts calibrated for life in small foraging bands, expand group size to unprecedented levels? How did the human cooperative sphere "scale up" so dramatically and so rapidly?[2]

The Puzzle of World Religions

The second puzzle emerges from cultural evolution and refers to the peculiar cultural distribution of religious beliefs and practices that we see in the world today. Religions have always been multiplying, growing, mutating, and dying at a brisk pace. But religious ideas and practices, although created in abundance, have markedly different sticking power. In fact, while new religious entities are created in the legion, most of them die out, save a potent few that

survive and flourish. The outcome of this process is that the vast majority of humanity today adheres to a disproportionately few of these surviving movements that have achieved "world religion" status. If you are a Christian, Muslim, Jewish, Hindu, Buddhist practitioner, or a nonbelieving descendant of any of these or related traditions, you are the heir to an extraordinarily successful religious movement that once was an obscure cultural experiment.

Almost all religious movements that have ever existed eventually succumbed to myriad internal and external threats that undermine social cohesion, demographic stability, and cultural influence. The triple success of world religions – their demographic growth, geographic expansion, and historical persistence – is therefore a remarkable fact that begs for explanation. In one groundbreaking study that illustrates this point, Sosis (2000) analyzed the stability over a 110-year span of 200 utopian communes, both religious and secular, in 19th century America. The average life span of the religious communes was a mere 25 years. In 80 years, 9 out of 10 had disbanded. Secular communes fared even worse: they lasted for an average of 6.4 years; 9 out of 10 disappeared in less than 20 years. If most religious communes fail even within as little as a century, how is it that a few religious movements endured and went global, uniting diverse peoples across geography, language, and ethnicity? Here we have a fascinating case study of how cultural evolution – itself a product of interacting human brains shaped by evolution -- can harness different aspects of evolved psychology to build global communities of strangers.

Outline of A Solution

In this chapter I explore the explanatory reach of a potential solution– that the two puzzles partly answer each other. (For a fuller book-length account, see Norenzayan, 2013; see also Norenzayan, et al, under revision). In this evolutionary scenario, religious beliefs and behaviors arose as evolutionary by-products of cognitive architecture that arose independently of religion

and preceded it. Once that happened, the stage was set for rapid cultural evolution– non-genetic, socially transmitted cumulative changes in beliefs and behaviors (Chudek, Muthukrishna, & Henrich, this volume; Richerson & Christiansen, 2013) that acted on an interrelated suite of religious ideas and behaviors that co-evolved with large-scale cooperation. This argument integrates and extends previous and contemporary "social solidarity" accounts of religious elements (Durkheim, 1915; Haidt, 2012; Wilson, 2002; Sosis & Alcorta, 2003), and places them in a Darwinian framework that is grounded in both genetic and cultural evolution.

To be clear, this idea does not claim that large-scale cooperation cannot happen without religion, and obviously it does not claim that religion is necessary for morality of any scale. World religions with Big Gods -- powerful, watchful, deities concerned with regulating the moral life of people -- have broadened the moral sphere, but other processes and institutions can have the same effect. Religions are neither necessary for moral behavior, nor are they unique in having this effect (Norenzayan, 2014). Precursors of moral sentiments, such as empathy, shame, and anger have ancient evolutionary origins (de Waal 2008) and disapproval of anti-social behavior emerges even in preverbal babies (Hamlin et al. 2007), before they are exposed or affected by religious practices.

The idea is that any beliefs, behaviors, norms, institutions, that enhanced social cohesion and cooperation while allowing cultural groups to scale up at the expense of their rivals, were selected in cultural evolution. Therefore, there are many paths to large-scale cooperation, some of which draw from religious beliefs and practices, some draw on psychological mechanisms, institutions, norms, and practices that are unrelated to the supernatural or the sacred. To understand how, requires the integration of two important theoretical developments in evolutionary science, described next: 1) insights from the cognitive science of religion, and 2)

cultural evolution supported by evolved cultural learning strategies. In what follows, I describe this integration, review the evidence from various fields that speaks to the hypotheses derived from this cultural evolutionary-cognitive byproduct framework, briefly examine similarities and differences with alternative evolutionary theories, and finally conclude with outstanding questions for future research.

The Cultural Evolution-Cognitive Byproduct Framework

Cognitive Biases that Support Religious Beliefs and Behaviors

One key cognitive capacity implicated in religion is mentalizing (theory of mind), which enables people to detect and infer the existence and content of other minds (Epley & Waytz, 2010; Frith & Frith, 2003). This capacity also facilitates two key intuitions that ground religious belief: that minds can operate separately from bodies, or mind-body dualism (Willard & Norenzayan, 2013; Bloom, 2007), and that all people, things, and events exist for a purpose, or teleology (Kelemen, 2004; Banerjee & Bloom, 2013). By recruiting mentalizing abilities, believers treat gods as disembodied beings who possess humanlike goals, beliefs and desires (Barrett, 2004; Guthrie, 1993; Bering 2011; Epley, et al. 2007). Consistent with the byproduct argument that religious thinking recruits ordinary capacities for mentalizing, thinking about or praying to God activates brain regions associated with theory of mind (Schjoedt et al. 2009), and reduced mentalizing tendencies or abilities, as found in the autistic spectrum, predicts reduced belief in God (Norenzayan et al. 2012).

These and other cognitive biases make religious ideas compelling and plausible to human minds, and generate constrained but diverse set of intuitions, beliefs and behaviors that are recurrent all over the world. Once intuitions about supernatural beings and ritual-behavior

complexes are in place, they coexist with other ordinary intuitions and beliefs (Legare et al, 2012). The stage is set for cultural evolution to act on variants of these beliefs and behaviors, such that some proliferate more successfully than others.

Successful Religious Movements are the Products of Cultural Evolutionary Processes

The question as to why a few religious movements spread at the expense of their cultural rivals can be answered in a cultural evolutionary framework. Here I briefly outline why cultural evolution is key to understanding the cultural dominance of world religions. For a more thorough discussion on cultural evolution and evolved capacities for cultural learning, interested readers can consult Chudek, et al (this volume; see also Richerson & Christiansen, 2013).

As a cultural species, humans extract vital information from others, and therefore their brains are equipped with evolved cultural learning biases that enable a second inheritance system: a cultural evolutionary process that runs in parallel to, and can interact with, genetic evolution (Richerson & Boyd, 2005). These cultural learning biases include content biases that give a transmission advantage to some aspects of mental representations over others, for example, the fact that some ideas are inherently more memorable or attention-arresting than others (Sperber, 1996). In addition, other evolved cultural learning mechanisms bias learners to attend to cues such as whether the opinion or idea is held by the majority (conformist bias), and by people with perceived skill or success (prestige bias). But, the fitness benefits of learning from others are offset by learners' vulnerability to being duped or misinformed (the so-called "evil teacher problem"). In most likelihood, then, human minds are equipped with epistemic vigilance (Sperber et al, 2010) or a suite of preferences that guard against such manipulation. One key solution is an evolved bias in cultural learners to attend to cues that a cultural model is genuinely committed to his or her advertised belief. Cultural learners are therefore more likely to

be influenced by cultural models when the latter engage in Credibility Enhancing Displays or CREDs (Henrich, 2009). This is, in essence, the idea that actions speak louder than words, and when they do, they bias the cultural transmission process.

Content biases in religious representations have received the most attention so far (e.g., Boyer, 2001), but all three types of cultural learning biases play an important role in the transmission of religious beliefs and practices. For example, CREDs are important in proselytizing religious groups where faith in gods spreads by cultural influence, and where believers are vigilant against religious hypocrisy. There are two additional reasons why cultural evolution plays an important part in explaining the dominance of world religions. Relative to genetic evolution, cultural evolutionary pressures can exert powerful effects in relatively short periods of time (Richerson & Boyd, 2005). Moreover, cultural and historical variability, and culturally transmitted group differences (Henrich, Heine, & Norenzayan, 2010) are the central focus of cultural evolution. It can therefore contribute to an account of the massive changes in some human groups that have occurred in the relatively short timescale of 10000-12000 years.

An Emerging Synthesis

Bringing insights from the cognitive science of religion and cultural evolution together, the picture that emerges is a process of coevolution between societal size and complexity on one hand, and devotional practices to Big Gods on the other -- increasingly powerful, interventionist, and morally concerned supernatural monitors of the expanding group. The idea is that these Big Gods and supporting practices were early cultural variants of "natural religion" that promoted prosocial behavior – features like cooperation, trust and self-sacrifice. These features outcompeted rival cultural variants of morally indifferent deities with limited omniscience and powers to intervene in human affairs. As a result, Big Gods, supported by extravagant loyalty

displays and intensely prosocial rituals and practices, culturally spread with these expanding, cooperative groups, also explaining the prevalence of what we now call world religions (Norenzayan, 2013). These religions thus forged anonymous strangers into imagined moral communities (Graham & Haidt, 2010; Haidt, 2012) tied together with sacred bonds that are overseen by supernatural surveillance.

Commitments to Big Gods Co-emerge with Big Groups across Cultures and History

The reasoning outlined above depends on the empirical claim that across cultures and history, Big Gods co-emerged with big groups by mutually energizing each other. As societies scale up, gods become more powerful and morally involved. If so, then we ought to observe a positive correlation between the prevalence of Big Gods and group size. In this section, I explore anthropological and historical evidence that speaks to this hypothesis.

Small and Big Gods across Cultures: Anthropological Evidence

In foraging and other small-scale societies, people must tackle an extensive variety of cooperative challenges, and therefore they are guided by a sophisticated set of local moral norms that apply to a wide range of domains, including food sharing, caring of offspring, kinship relations, marriage, leveling of risk, and mutual defense (Powell et al, 2009). Yet, the ethnographic evidence suggests that the gods play a small part, if any, in the rich and varied cooperative lives of these societies.

In fact, the gods and spirits of the smallest foraging groups, such as the Hadza of Eastern Africa (Marlowe, 2010) and the San of the Kalahari (Marshall, 1962), have little omniscience and moral concern. In other small-scale societies, the picture is similar, the gods and morality are

largely disconnected (e.g., Purzycki, 2011). While some gods are pleased by rituals and sacrifices offered to them, they care little about how people treat each other.

These ethnographic observations begin to make sense if we consider the social dynamics of life in small-scale societies. Although people in these societies do intermingle with strangers under limited conditions, face-to-face interaction is the norm, and in these transparent societies, it is hard to escape the social spotlight. Granted, there is considerable diversity in the cultural traits of modern-day and ancestral foragers that limit broad generalizations (Kelly, 1995). Nevertheless, if foraging groups tell us anything, it is that the connection between religion and morality has in fact emerged culturally over human history, probably rather recently.

Quantitative analysis of the anthropological record is consistent with this idea. In moving from the smallest scale human societies to the largest and most complex, Big Gods – powerful, omniscient, interventionist supernatural watchers – go from relatively rare to increasingly common, and morality and religion move from largely disconnected to increasingly intertwined (Roes & Raymond, 2003; Sanderson & Roberts, 2008; Johnson, 2005). While there are important issues in these cross cultural patterns that are open to debate (e.g., see Norenzayan, in press; Atkinson, Latham & Watts, in press), these results hold controlling for several variables that covary with group size and religion, such as economic inequality, population densities, and exposure to missionary activity. Interventionist Big Gods are also more prevalent in places with water scarcity (Snarey, 1996), as well as in agricultural societies, and those that are engaged in animal husbandry (Peoples & Marlowe, 2012). One interpretation of these patterns is that these gods and related practices are more likely to spread in all these conditions, where group survival is highly dependent on the group's ability to curb free-riding. Other studies have found a complementary cultural shift in ritual forms: as societies get larger and more complex, rituals

become routinized affairs at the service of transmitting and reinforcing shared doctrines (Atkinson & Whitehouse, 2011). Notions of supernatural punishment, damnation and salvation, heaven and hell and karma are common features of modern religions, but are relatively infrequent in small-scale cultures.

Gods Get Bigger As Groups Expand: A Very Brief Overview of The Historical Record

These anthropological findings converge with archaeological and historical evidence suggesting that both Big Gods and routinized rituals coevolved with large, complex human societies, along with increasing reliance on agricultural modes of production (e.g., Marcus & Flannery, 2004; Whitehouse & Hodder, 2010). Although interpreting the written historical record is no simple matter and open to many active debates, once it begins, links between large-scale cooperation, ritual elaboration, Big Gods and morality become more apparent. It has been argued that ideas of morally concerned gods did not emerge until the so-called Axial Age (800-300 BCA) (e.g., Baumard & Boyer, in press). However, there is evidence from many cultures long before this period, such as Babylon and Egypt (Bellah, 2011; Assmann, 2001), that as societies grew larger and more complex, they also developed divinely inspired guidelines for public morality. A case in point is Hammurabi's code (1772 BCE) in Babylon that was inspired by fear of Marduk, patron god of Babylon, and the powers of Shamash, god of justice (Bellah, 2011). A great deal of the historical work related to this topic focuses on the Abrahamic faiths. For instance, Wright (2009) provides a summary of textual evidence that reveals the gradual evolution of the Abrahamic god from a rather limited, whimsical, tribal war god—a subordinate in the Canaanite Pantheon—to the unitary, supreme, moralizing deity of two of the world's largest religious communities.

The highly organized Greek city-states and Imperial Rome are sometimes portrayed as possessing only amoral and fickle deities (e.g., Baumard & Boyer, in press). However, new scholarship has increasingly challenged this view. The gods of the Greek city-states were believed by the populace to be human-like, but this should not be confused with indifference to human morality. Not only they demanded costly sacrifices and elicited elaborate rituals, they also played an active role in enforcing oaths and supporting public morality (Mikalson, 2010, pp. 150-168). This pattern is seen in Greek city-states and even more starkly in the case of the deities of imperial Rome (Rives, 2007, pp. 105-131). For instance, cults dedicated to Mercury and Hercules in the 2nd and 1st c BCE Delos – an important maritime trade center, leaned on supernatural surveillance and divine punishment in order to overcome cooperation dilemmas in long-distance trade relations (Rauh, 1993).

China also has sometimes been portrayed as lacking moralizing gods, or even religion at all (e.g., Ames & Rosemont, 2009). New work suggests otherwise (Clark & Winslett, 2011; Slingerland, 2013). While there are arguments that Chinese civilization developed secular alternatives to religious morality much earlier than did Middle Eastern and European civilizations (e.g., Sarkissian, in press), in the earliest Chinese societies for which written records exist, the worshiped pantheon includes both literal ancestors of the royal line as well as a variety of nature gods and cultural heroes, all under the dominion of a supreme deity, the "Lord on High" (*shangdi*). The ability of the royal family to rule was a direct result of their possessing the "Mandate" of Heaven, the possession of which was—at least by 1000 BCE or so—seen as linked to moral behavior and proper observance of costly sacrificial and other ritual duties. The written record reveals, over time, an increasingly clear connection in early China between morality and

religious commitments. Failure to adhere to these norms—either in outward behavior or one's inner life—was to invite supernatural punishment (Eno 2009).

These ethnographic, archeological, and historical patterns offer suggestive evidence that prosocial religions with Big Gods co-emerged with large, complex societies. It is important to note that this process is not an all-or-nothing phenomenon. Rather, both the ethnographic and historical record reveal that it is a gradual process with many intermediate cases. For example, in chiefdom societies, such as in Fiji, groups are larger and more hierarchical than in foraging societies, and the gods appear to have more powers and moral concern than the gods of foragers, but less so than in much larger state societies (McNamara, Norenzayan, & Henrich, in press). Moreover, these associations cannot be taken to suggest causation, of course—at least some of these anthropological and historical data would also be consistent with the alternative hypothesis that bigger and more prosocial societies simply imagined bigger and more prosocial gods in their own image. The theoretical framework I explore here is not inconsistent with that possibility either, as the causal pathways can go in either direction (hence the assertion that the two co-emerged), and their importance may vary in different places and historical periods (Atkinson et al, in press). However, this framework does depend on the claim that one important causal arrow goes from conceptions of Big Gods and related practices to cooperation. Next, I examine this causal hypothesis and explore the psychological mechanisms behind this process.

Religious Solutions to the Problem of Large-Scale Cooperation

A key problem for large-scale cooperation is the threat of anonymity; when groups expand in size, anonymity erodes the bonds of cooperation. Consistent with this, studies show that even illusory anonymity such as the act of wearing dark glasses or sitting in a dimly lit room –

encourage selfishness and cheating (Zhong, Bohns, & Gino, 2010). Social surveillance, such as being in front of cameras or audiences, has the opposite effect. Even subtle exposure to drawings resembling human eyes encourages good behavior towards strangers (Bateson, Nettle, & Roberts, 2006; Haley & Fessler, 2005)[3]. As the saying goes, "watched people are nice people." It makes sense, therefore, that the world over, many cultures that have successfully tackled the problem of large-scale cooperation have stumbled upon the idea of "eyes in the sky" -- watchful deities who see far and particularly care about human morality (Norenzayan, 2013). People play nice when they think a morally concerned, punishing God, is watching them – even when nobody is.

Pressure from Above

Here I highlight several lines of converging experimental evidence that give support to this hypothesis (for further details, see Norenzayan et al, 2013). In cooperation research, economic games have been used as a prism through which prosocial behavior can be measured. The dictator game, for example, involves two anonymous players engaged in a one-off interaction. Player 1 is allotted a sum of real money and must decide how to divide this sum between herself and Player 2. Player 2 then receives the allocation from Player 1, and the game ends. Henrich and his colleagues (2010) found that, across 15 diverse societies of foragers, pastoralists, and horticulturalists from all over the world, and controlling for a wide range of demographic variables and other factors that predict cooperative tendencies, adherence to the Abrahamic "Big God" predicted larger offers compared to adherence to local deities who are not as omniscient and morally concerned.

The study by Henrich and colleagues is an important piece of the puzzle, because it demonstrates that participation in religions with Big Gods (relative to religions having local gods

with limited scope) encourages actual prosocial behavior towards strangers. However it does not conclusively demonstrate causality. Recent religious priming experiments address this issue. In one study conducted in Canada, we planted reminders of God under the pretext of playing a word game and without arousing suspicion. Other participants played the same word game without religious content. Finally, a third group played the word game with words reflecting secular sources of monitoring. Then all participants played the dictator game (Shariff & Norenzayan, 2007). Self-reported belief in God was not associated with generosity. However, reminders of God had a reliable effect on generosity. In the unexposed group, the typical response was selfish: most players pocketed the entire amount. In the God group, the typical response shifted to fairness. Importantly, the secular prime had a similar effect as the religious prime, suggesting that secular mechanisms can also encourage nice behavior towards strangers.

A recent meta-analysis of religious priming, pooling the results of 25 experiments, shows that religious priming effects on prosocial behavior are reliable and remain robust even after correcting for publication bias in psychology (Shariff, Willard, Andersen, & Norenzayan, 2014). These religious priming effects found in the laboratory also can be seen in the real world. One example of this is the "Sunday Effect." One study looked at responsiveness to an online charity drive over a period of several weeks. Christians and non-believers were equally likely to give to charity except on Sundays, when Christians were three times more likely to give (Malhotra, 2008).

Bringing these experimental findings together, several important conclusions can be reached about the mechanisms behind religious priming. First, belief in supernatural punishment is more strongly associated with reductions in moral transgressions, whereas belief in supernatural benevolence, if anything, has the opposite effect (Shariff & Norenzayan 2011;

Shariff & Rhemtulla 2012). Second, there is evidence that believers offload punishing duties to God, and therefore belief in a punishing God leads to *less* punishing behavior towards free-riders (Laurin et al., 2012). Third, reaction time analyses suggest that believers intuit that God has knowledge about norm-violating behaviors more than they believe God does about normative behaviors (Purzycki et al. 2012). Fourth, religious primes on average do not have reliable effects on non-believers (Shariff et al, 2014). Finally, the same religious primes that increase generosity towards strangers, also increases believers' perceptions of being under social surveillance (Gervais & Norenzayan, 2012a).

These and other findings suggest that salient beliefs in punitive supernatural monitors increase prosociality towards strangers. These findings contradict the idea that already prosocial individuals spontaneously imagine conceptions of prosocial deities, or that religious priming brings to mind thoughts of benevolence, which in turn encourage benevolent behaviors such as generosity (Norenzayan et al., 2013). Neither is the evidence consistent with the idea that religious priming effects are the result of low-level associations or cultural knowledge that are generalized to everyone regardless of religious socialization.

Additional Mechanisms that Galvanize Religious Cooperation: Extreme Rituals, Synchrony, Self-control, and Fictive Kinship, Among Others

In the logic of cultural evolution, multiple solutions to large-scale cooperation are cobbled together in historical time. Therefore, it is likely that there are myriad other mechanisms found in world religions (and their secular successors and competitors) that converge with supernatural monitoring and have cooperative effects. These mechanisms are not unique to religions, of course – the idea is that culturally successful religions draw on these mechanisms to promote social solidarity. These include participation in extreme rituals (Xygalatas et al, 2013),

synchronous movement and music, that is, collectively moving together in time (McNeil, 1995; Wiltermuth & Heath, 2009), practices that cultivate self-control, which may in turn help people suppress selfishness (McCullough & Willoughby, 2009), fictive kinship (Nesse, 1999), and cultural practices that promote high fertility rates (Blume, 2009; Kaufmann, 2010). There are likely many more that are open to investigation. Given the limited space, here I highlight extreme rituals.

World religions, by virtue of encouraging prosociality in the group, commonly create opportunities for participation in extreme rituals that build social solidarity. Xygalatas et al. (2013) investigated the prosocial effects of participation in, and witnessing of, the Kavadi, an extreme devotional ritual among Hindus in Mauritius for Murugan, the Tamil war god. This ritual is practiced in the context of the Thaipusam festival, and can range from the mild, such as shaving one's head and carrying a light load, to the extreme, such as days of fasting, piercing the flesh with skewers, and walking on metal nails. The greater the pain experienced, the more participants gave. Moreover, the act of witnessing this intense, pain-inducing set of rituals increased anonymous donations to the temple as much as participating did. This suggests that extreme ritual worship like the Kavadi is not only a commitment device for the participants, it is also a credible display that is culturally contagious (that is, a CRED).

Religious Cooperation is Shaped by, and Contributes to, Intergroup Conflict and Distrust

For all its virtues in binding strangers together, religious cooperation is likely born of competition and conflict between groups. It follows that religious cooperation in turn fuels the very conflicts -- real or imagined -- that are seen to threaten it. This dynamic helps us understand

and resolve the seeming paradox that religions with Big Gods are both the handmaiden of cooperation within the group, and of conflict between groups (Atran & Ginges, 2012).

Intergroup Competition Intensifies Religious Cooperation

As competition between groups intensify, and when other factors such as war technology and population size are similar, groups that happen to have members who subordinate self-interest for group interests, that is, groups that possess social solidarity, will tend to win out. When the whole group wins out, the individuals in the group win out as well, which explains how self-sacrificial strategies that led to the group's success spread in human populations (Atran & Henrich, 2010). Moreover, these are the conditions that foster the evolution of "parochial altruism," or a suite of tendencies (whether genetic or cultural, or both, is open to debate) that combine preferential self-sacrifice for the group with hostility towards rival groups when the latter are seen to threaten one's group. There are lively debates about how important parochial altruism has been in human evolution (e.g., Bowles, 2008). But to the extent that it has been, religious cooperation might be a paradigm example of it.

For example, in one recent global study spanning 97 sites, it was found that threatened minority groups that have high levels of religious participation were more likely to direct aggression towards majority groups than threatened minority groups with low levels of religious participation, suggesting that the perception of being under threat turns the solidarity building potential of religion toxic and adds fuel to intergroup conflict (Neuberg et al, 2014; see also Ginges, Hansen, & Norenzayan, 2009). Not surprisingly, then, as religious cooperation went global, so did the potential for religious conflict. Religious communities "cooperate in order to compete," and this imperative can be seen in quantitative analysis of the ethnographic and the cross-cultural record. What causes what remains open to debate, but we do know that the

prevalence of intergroup conflict and warfare, resource-rich environments, large group size, and religions with Big Gods are interrelated (e.g., Roes & Raymond, 2003; Gelfand et al, 2011).

In Atheists We Distrust

Supernatural surveillance by Big Gods helped religions expand while sustaining social solidarity within the group. Concern with supernatural surveillance also explains one of the most persistent but hidden prejudices tied to religion: intolerance of atheists[4]. Surveys consistently find that in the United States (Edgell, Gerteis, & Hartmann, 2006), as well as in other societies with religious majorities comprising most of the world (see Gervais & Norenzayan, 2013), atheists have one of the lowest social approval ratings of any social group. Even enlightenment ideals of religious tolerance did not spare atheists. "Those are not at all to be tolerated who deny the Being of a God," philosopher John Locke wrote in *Letter Concerning Toleration*. "Promises, Covenants, and Oaths, which are the Bonds of Humane Society, can have no hold upon an Atheist."

Intolerance of atheists is a puzzle. In societies with religious majorities, atheists are not a visible, powerful, or even a coherent social group. There is no such thing as atheist music, cuisine or attire. Why wouldn't believers simply ignore atheists? An evolutionary approach to prejudice, combined with the psychology of supernatural monitoring, helps demystify this prejudice. From an evolutionary psychology perspective, it makes little sense to treat prejudice as a one-dimensional construct ("like" vs. "dislike" of different groups). To understand prejudice towards a specific group, it helps to know what specific threat a group is perceived to pose, which in turn would help identify the particular psychological response to the particular imagined or real threat, such as the threat of violence triggering fear, and the threat of contamination triggering disgust (Schaller & Neuberg, 2008; Kurzban & Leary, 2001). Research

shows that intolerance towards atheists is rooted in another perceived threat – that of free riding, triggering moral distrust (Gervais, Shariff, & Norenzayan, 2011).

This analysis further predicts when distrust of atheists among believers waxes and wanes. If concerns about monitoring are fueling this distrust, and if exposure to secular sources of monitoring can replace religious sources, then secular monitoring should dilute believers' distrust of atheists. Both cross cultural (Norenzayan & Gervais, in press) and experimental findings (Gervais & Norenzayan, 2012b) support this prediction. The simple act of reminding believers in Canada and the US (countries that have strong rule of law) of police effectiveness softens distrust of atheists, but has no effect on prejudice towards other groups (Gervais & Norenzayan, 2012b). This also partly explains why, in places such as Northern Europe, where people can depend on the rule of law and have access to wide social safety nets that buffer against life's adversities, believers no longer see religion as necessary for moral conduct (Zuckerman, 2008).

From Big Gods to No Gods

These same conditions have also initiated a key social transition in some parts of the world, from religious to secular means of large-scale cooperation. The recent spread of secular institutions and traditions since the industrial revolution – courts, policing authorities, and contract-enforcing cultural mechanisms, has created conditions for large-scale cooperation without God. These institutions and mechanisms, if effective in building trust and cooperation, have replaced religion. Studies of cooperative behavior find that believers put their best foot forward when they think God is monitoring their actions (Shariff et al, 2014). However, these same studies show that awareness of human institutions that monitor anonymous interactions and ensure the rule of law, also encourage cooperation and trust (Shariff & Norenzayan, 2007), in

addition to rupturing religion's link with perceived moral conduct (Gervais & Norenzayan, 2012b).

If non-believers in the world were grouped together, their numbers would be in the hundreds of millions, rivaling the size of major world religions (Zuckerman, 2007). This process of secularization can be understood by combining the same insights that help us explain the prosocial religions with Big Gods. Since religious belief is a joint product of cognitive biases, core motivations, and cultural learning strategies, these psychological pathways, if altered, jointly or in isolation lead to disbelief (Norenzayan & Gervais 2013). These multiple interacting pathways occasionally converge and reinforce each other, and when they do, secular societies, such as the ones found in Northern Europe, achieve a cultural equilibrium. These societies with atheist majorities, some of the most cooperative, peaceful, and prosperous in the world, have climbed religion's ladder, and then kicked it away.

Conclusions and Implications

Towards a Theoretical Synthesis in the Evolutionary Studies of Religion

The theoretical framework presented here incorporates key elements of the two most influential evolutionary approaches to religion to date—the *byproduct* and *adaptationist* approaches. Both approaches have made distinct and important contributions to the evolutionary study of religion, and continue to generate empirical research that has increased our knowledge of the origins of religion. Yet, these contributions have remained theoretically disconnected, with opportunities for synthesis open for exploration (for discussions that addresses this issue, see Sosis, 2009; Schloss & Murray, 2011; Bulbulia et al, 2013).

The present framework aims to be one such synthesis (there could be others). It builds directly on the insights gleaned from the cognitive byproduct perspective. It then grounds these insights within a framework that considers both genetic and cultural inheritance, and explains both the recurrent features of religions as well as their cultural and historical variability. In doing so, it also tackles additional phenomena that deserve more attention than received.

One such phenomenon is *faith or commitment* to particular gods that are a key aspect of life in cooperative religious communities. This is the "Zeus Problem" (Gervais & Henrich 2010), which asks how the same supernatural agent draws passionate commitment in one historical period, but is treated as fictional in another, even when the content of the idea remains similar.[5] Put another way, believers do not commit to any and all cognitively plausible supernatural agents. They commit to a subset of them that are backed up by credible displays, endorsed by prestigious leaders, and supported by most people in the local community. If these cultural learning cues are altered, significant shifts occur in the particular deities people are committed to.

Another key phenomenon that cognitive byproduct approaches confront is the growing body of empirical evidence showing that some elements of religion spread by having cooperative effects. Baumard and Boyer (2013) attempt to explain world religions as cultural reflections of evolved moral intuitions, such as proportionality and fairness, and argue against the idea that some religions spread by having prosocial effects. However, this "byproduct only" account is incompatible with the experimental evidence reviewed here that shows such prosocial effects, and the cross cultural and historical evidence that suggests powerful cultural selection for such religious groups at the expanse of rival ones. However, as the framework developed here illustrates, the insights gleaned from the cognitive byproduct perspective can be retained, while also explaining why some, but not most cultural variants that arise as cognitive byproducts, can

have downstream cooperative effects (see Baumard & Boyer, in press, and Norenzayan, in press for a debate on these issues).

The current framework also speaks to a set of important phenomena that are addressed by two distinct adaptationist theories of religion: costly signaling approaches and the supernatural punishment hypothesis. Costly signaling approaches argue that extravagant religious displays are the product of a naturally selected genetic adaptation for life in cooperative groups that allows individuals to reliably signal their degree of cooperation or their group commitment to solve the free-rider problem (Sosis & Alcorta 2003; Bulbulia 2008). The current framework recognizes and integrates insights from this approach in two ways. First, it accounts for both the cultural contagion generated by these extravagant displays and what they communicate to others about the actor's commitment. In this sense, CREDs and signals are compatible strategies and can be mutually reinforcing. Second, by embedding signaling approaches within a cultural evolutionary framework (Henrich 2009), we can explain why people might acquire religious beliefs with varying degrees of commitment.

Another adaptationist account that has generated interest and has made important contributions to the evolutionary study of religion is the supernatural punishment hypothesis (SPH: e.g., Johnson 2009; Bering 2011). The SPH is an error-management account (Johnson et al, in press) that argues that fear of supernatural punishment is a naturally selected genetic adaptation targeting moral self-constraint. By fearing supernatural punishment, people refrain from social defection and avoid the genetic fitness costs of being ostracized.

There are many similarities between the SPH and the cultural evolutionary-cognitive byproduct framework, and the two draw from some of the same body of evidence. The two approaches make a range of empirical predictions that are similar, and converge on the

hypothesis that supernatural threats (the stick) are stronger and more impactful than the supernatural rewards (the carrot). However, there are also important theoretical differences that make somewhat different empirical claims, inviting new opportunities to further test and refine hypotheses about the evolution of religion. Whereas in the cultural evolutionary account, Big Gods were culturally selected by having effects on individuals and cultural groups, the SPH argues that fear of punishing gods is an evolved mindguard that curbs social defection (Johnson & Bering 2006; Schloss & Murray 2011; Johnson 2009). I presented evidence that, consistent with the cultural evolutionary scenario outlined here, in small-scale societies, and especially among foragers, the gods have limited omniscience and moral concern, and they become more moralizing and interventionist (not less!) as societies become more anonymous (where the costs of defection are arguably smaller than in small-scale societies). These hypothesized observations are currently being investigated in greater detail (For further discussion and debate, see Norenzayan, 2013; Schloss & Murray, 2011; Norenzayan, in press, and associated commentaries, particularly Johnson, in press).

The Cultural Evolutionary-Cognitive Byproduct Framework Can Explain the Slipperiness of the Construct "Religion"

The reader might have noticed that in this chapter, I avoided the issue of defining the construct "religion." This was a deliberate move, and now that the theoretical framework has been fleshed out, we are in a position to pay this issue its due. Scholars who study religion do not agree on a definition, or even if the term constitutes a coherent category of beliefs or behaviors (Clarke & Byrne, 1993; Stausberg, 2010). In the evolutionary study of religion, there is less concern about definitions. Scientists pick out certain aspects of the construct and operationalize

it, but whether the construct lends itself to clear semantic boundaries is actively debated (Bulbulia et al, 2013). In the cultural evolutionary-cognitive byproduct framework outlined here, this is to be expected; the religious bundle is a predictable but statistical pattern, rather than a concept with necessary or sufficient features. There is therefore no expectation of a single over-arching definition of religion or clear semantic boundaries across cultural and historical contexts. The suite of traits that gets labeled "religion," while containing recurrent elements, culturally mutates, taking different shapes in different groups and at different historical times (Norenzayan 2013; Bulbulia et al, 2013; for a similar but distinct account, see Taves, 2009).

Open Questions and Future Directions

Despite significant advances in the evolutionary study of religion, there are many unknowns and open questions. Where and how did the spread of world religions coincide with the unleashing of large-scale cooperation? How did these belief-ritual complexes take shape and diffuse across continents? There is little systematic exploration of how believers around the world (and throughout history) mentally represent their deities (see for example, Purzycki, 2013), and how these mental representations are implicated in human psychology. Are supernatural beliefs in Buddhism and Hinduism -- notions such as karma, fate (Obeyeskere, 2002) act as deterrent mechanisms similar to some core beliefs found in the Abrahamic faiths -- notions such as hell and divine wrath? Which forms of rituals are felt to be efficacious, and why (Legare & Souza, 2012)? There are also many open psychological questions regarding religious disbelief. How do children come to adopt belief in supernatural agents, and how is it that they come to maintain faith in some but not others? Are there implicit theistic intuitions, such as dualism, reincarnation, and fate, even among self-declared atheists? (e.g., Bering, 2011). On a theoretical level, the evolutionary study of religion is in the midst of a vibrant period with

fecundity of hypotheses and perspectives that are breaking disciplinary boundaries, generating new findings, and consolidating seemingly disparate facts and theoretical perspectives in an increasingly unifying framework. While research is ongoing and there are many debates, we are beginning to see the forest for the trees, as evolutionary science tackles religion -- one of the most far-reaching and enduring aspects of human minds and cultures.

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[1] I use 12,000 years as a convenient starting point when the first human groups in the Middle East began to scale up (see also Diamond, 2005). However, human populations expanded at different times in different regions, and there were fluctuations in the size and social complexity of human groups even in the Pleistocene.

[2] Some evolutionary arguments do not see this as a puzzle, maintaining that large-scale cooperation is, from an evolutionary point of view, a "big mistake." (Burnham & Johnson, 2005;

Dawkins, 2006). The limitations of this argument have been discussed in detail elsewhere (e.g., Richerson & Boyd, 2005).

[3] This doesn't imply that there can be no prosocial behavior without social monitoring. Some residue of prosocial behavior arguably remains even in complete anonymity (see for example, Gintis et al, 2003). This important point does not, however, change the observation that prosocial behavior markedly increases under social surveillance.

[4] There is the related but distinct perceived threat to religious groups coming from within: "religious hypocrites," or individuals who profess religious faith but in fact do not really believe. For evolutionary explanations, see Norenzayan, 2013, chapter 6; Schloss, 2008; Henrich, 2009.