

## Chapter 12

### WHY DO RELIGIOUS CULTURES EVOLVE SLOWLY? THE CULTURAL EVOLUTION OF COOPERATIVE CALLING AND THE HISTORICAL STUDY OF RELIGIONS

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Collective representations are the result of an immense cooperation, which stretches out not only into space but into time as well; to make them, a multitude of minds have associated, united and combined their ideas and sentiments: for them, long generations have accumulated their experience and their knowledge. A special intellectual activity is therefore concentrated in them, which is infinitely richer and complexer than that of the individual.

(Émile Durkheim, *Elementary Forms of the Religious Life*, [1912] 1965: 29)

The languages and folkways of ancient peoples hold little relevance for us, except in one respect: the religions of the ancient world remain our religions. Though religions change, core features of the scriptures and rituals of the world's most popular religious traditions appear to have been conserved with remarkably high fidelity. We explain slow religious change from how religion facilitates cooperation at large social scales. At the end, we clarify how historians of religion, in collaboration with psychologists and computational biologists, might test and improve explanations such as ours.

#### COOPERATION AND RELIGION

##### *An evolutionary problem of cooperation*

Why do humans cooperate? That evolutionary scholars should find this question interesting might perplex some religious studies scholars. The benefits of cooperation are familiar. Yet, as Thomas Hobbes observed, these benefits are fragile, and cooperative exchange requires mechanisms

for social order. Hobbes imagines life “in a state of nature” lacking such ordering mechanisms as “solitary, poor, nasty, brutish, and short” (Hobbes 1651: pt 1, ch. 13). According to Hobbes, humans have managed to improve on the state of nature by creating governing institutions, which require that individuals:

confer all their power and strength upon one man, or upon one assembly of men, that may reduce all their wills, by plurality of voices, unto one will: which is as much as to say, to appoint one man, or assembly of men, to bear their person ... This is the generation of that great LEVIATHAN, or rather, to speak more reverently, of that mortal god to which we owe, under the immortal God, our peace and defence. (*Ibid.*: pt 2, ch. 17)

Yet there is a problem with the evolutionary logic of Hobbes’s presumed mechanism. The problem centres on the evolutionary stability of individual consent. Where theft of a cooperative benefit is possible, “common interests” do not exist independently of protection mechanisms. Rather, manifold individual interests exist, and these overlap only to varying degrees. Common interests must be forged and maintained. If individuals were to grant their power and strength to governments, then what will prevent those who govern from exploiting this power for selfish gain? Some explanation for the evolutionary emergence and stability of cooperative institutions is therefore needed.

Worries about the stability of cooperative institutions are hardly new. The Roman author Juvenal famously asked, “*Quis custodiet ipsos custodes?*”—“Who will guard our guardians?” (Juvenal, *Satires* 6.347–8). Juvenal worried about the chaperoning of wives, but the question applies quite generally. The general version of “*Quis custodiet ipsos custodes?*” appeared earlier in Plato’s *Republic*, an extended reflection on the question of how a good society may be established. Plato’s answer imagines a Utopia run by virtuous philosophers who deceive. According to Plato, such philosophers will understand that the benefits of political order demand plausible but false mythologies. A population must be made to believe, without any natural justification, that civic authority is justified. Plato sought a solution from deception: “how ... may we devise one of those needful falsehoods of which we lately spoke—just one Royal Lie which may deceive the rulers, if that be possible, and at any rate the rest of the city?” (Plato, *Republic* 414b–c, trans. B. Jowett). Yet expedient lying does not answer “*Quis custodiet ipsos custodes?*” From an evolutionary perspective, wherever incentives to exploit cooperation bring fitness advantages, nature will favor those who are incredulous of Noble Lies. That corruption pervades many political institutions suggests that the problems of “*Quis custodiet ipsos custodes?*” are not trivially solved. That social order is often established, however,

implies that mechanisms have evolved to prevent the warring of all against all. What are these mechanisms? What explains their stability over time?

### *The folk theory of religion*

The ancients held that religion is conserved because religion supports political order. An early expression of this idea possibly comes from the fourth-century BCE Greek philosopher Critias (quoted by Sextus Empiricus, *Against the Mathematicians* 9.54; Diels & Kranz 2001: 88 B 25). The idea also appears earlier in the writings of the Chinese philosopher Mozi (I. Johnston 2010: ch. 10; for discussion, see Bulbulia 2012). Philosophers have been reinventing the cooperation theory ever since (Preus 1987). Indeed, the cooperation model is so commonplace that it deserves to be called the folk theory of religion.

The folk theory pervades the evolutionary literatures on religion (Bulbulia 2004b; Norenzayan & Shariff 2008: 62; Rappaport 1971). What to make of it? Religion is associated with prosociality (see Atkinson & Bourrat 2010; Bering 2006; Johnson & Kruger 2004).<sup>1</sup> Does religion function to *cause* a political order, or is religion the effect of a political order? To suppose that religion causes large-scale cooperation raises the general version of Juvenal's problem for the evolutionary stability of religious cooperation mechanisms: why would incredulous defectors not evolve to exploit religious cooperators for selfish gain, eventually driving religious cooperators to extinction?

Commitment signalling models of religious cooperation point out that religious commitment presents a vision of the nature in which cooperation appears to benefit the cooperative (Bulbulia & Sosis 2011).<sup>2</sup> Those who believe in this vision will find motivations to cooperate.<sup>3</sup> Such models also point out that religious commitment is difficult-to-fake. Try, for example, presenting an emotion of overwhelming gratitude to Zeus. It

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1. Unfortunately, religious cooperation does not always extend beyond the boundaries of a religious group. Indeed, religious cooperation sometimes fuels conflicts. Such conflicts are not wars of all against all, but rather wars of us against them. Evolution does not care about moral perfection. It rather blindly favors designs that foster survival and reproduction. We should, then, follow Darwin, who distinguished concepts of moral goodness from the effects of natural selection (Darwin [1874] 1989). Our point here is to understand the mechanisms by which cooperation evolves, allowing that morality is a separate question.
  2. "Commitment signalling" is sometimes called "costly signalling." Strictly speaking, however, hard-to-fake signals need not be costly.
  3. The faithful may cooperate from a desire to avoid supernatural punishments or from an inherent desire to please the gods, or both. Benefits may be perceived as extrinsic or intrinsically rewarding, or combinations thereof.

is difficult—though not impossible—to do this convincingly. Over time, it will be difficult to manage this act. Where religious commitments are associated with cooperative tendencies hard-to-fake religious displays may evolve to signal within-group cooperation (Bulbulia 2004a; Henrich 2009; Irons 2001; Mahoney 2008; Sosis 2003). The idea: religious displays have the power to address the stability problem because religious displays reliably identify cooperative commitments by identifying intrinsically or extrinsically rewarding commitments supernatural worlds.<sup>4</sup>

We think that commitment signalling models help to explain how religious cooperation supports stable cooperation at small social scales. Wherever partners are able to signal and decode each other's hard-to-fake signals of commitment they may effectively predict each other's cooperative actions. Notice however that commitment signalling has difficulty explaining how religion supports cooperation in contexts where person-to-person signalling is absent. We call such contexts *anonymous exchange*. If your signals cannot reach anonymous partners, then your signals cannot assure your partners of your cooperative commitment—at least not straightforwardly. Likewise, if your partners remain unknown to you, then their cooperative signals cannot straightforwardly assess your consciousness, at least not straightforwardly. We might say that anonymous exchange is defined by *signalling blindness*. It is uncontroversial that cooperation in large societies involves substantial amounts of anonymous exchange. Cooperators in large social worlds learn to trust the cooperative actions of strangers, whose identities remain unknown and whose signals they cannot straightforwardly detect (Gil-White & Richerson 2003). How is Plato's problem solved for the exchange that pervades large social worlds? Those who have investigated this problem do not find one and only one mechanism (Ostrom 2005). Rather cooperation receives support from many and various interlocking cooperative designs. We are interested in whether and how religion contributes to large-scale exchange.

## COOPERATION'S THREATS FROM INSECURITY

### *Risky coordination*

The dominant conception of cooperation's evolutionary problem is that of a prisoner's dilemma, a hypothetical thought experiment that evolutionary researchers use to explain how selfishness may fail a mutually benefiting cooperation. The thought experiment imagines that potential cooperators

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4. To evolve, religious signalling need not work infallibly. It need only work reliably enough to reward religious cooperators.

are in the position of two suspects held for a crime for which they are guilty. The police have offered the following deal. If one accomplice talks, and the other is silent, the talker will be freed and the silent accomplice will get a heavy sentence. If both talk, both will get a moderate sentence. Jointly silent partners, the game imagines, will receive only a light sentence. Mutual cooperation thus yields the highest *average* return. However unilateral defection yields the highest *individual* return, no matter what one's accomplice does. In a world where outcomes translate to fitness advantages, evolutionary dynamics predicts that defection will evolve, despite higher average returns from universal cooperation. The general form of a prisoner's dilemma is called a tragedy of the commons (Hardin 1968). For cooperation to evolve at large social scales, it would appear that an anonymous commons must be protected from thieves.

We follow those who challenge the idea that prisoner's dilemmas are the only evolutionary problem that cooperators face (Ostrom 1990; Schelling [1978] 2006). Indeed, we believe that the key to understanding religion's support for large-scale cooperation comes from understanding that the motivation to cheat cooperation, as in a prisoner's dilemma, is only a special, limiting case of cooperation's more basic evolutionary problems. Another thought experiment called "the stag hunt" reveals a distinct threat from risk aversion.

### *The stag hunt*

Game theorists derive the stag hunt from a parable in Rousseau's *Discourses*:

If it was a matter of hunting a deer, everyone well realised that he must remain faithful to his post; but if a hare happened to pass within reach of one of them, we cannot doubt that he would have gone off in pursuit of it without scruple.

(Rousseau [1755] 1992: 47)

Those who hunt stags have no incentive to cheat cooperation. A stag portion pays better than a hare portion. However capturing a stag requires cooperation. Capturing a hare does not. In the formal presentation of the stag hunt, there are two evolutionary equilibria:<sup>5</sup>

- 1 All cooperate.
- 2 All defect.

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5. An equilibrium is a set of behaviors for which any single behavior cannot yield a better result, given the behaviors of others. Evolutionary theory defines "better" in terms of fitness effects.



In a stag hunt, if everyone were to cooperate, a focal partner, “Alice,” could do no better than by cooperating as well, thus obtaining her preferred stag share. However, if even one partner were to defect from the stag hunt, then Alice could do no better than by defecting too. Otherwise Alice would lose her hare, with no compensating stag portion. Alice’s strategic problem generalizes. If any one should defect then so should all.

Alice’s capacity to represent the thoughts of her partners makes cooperation less likely. Alice might be tempted to chase hares merely because she suspects that others *might* chase hares. Others might worry after representing Alice’s worry. In thinking about the representations of others, Alice might find additional worries, and so forth. The loss of confidence that strategic representation poses for a stag hunt also generalizes. Worries may ramify. Representing risk as pervasively represented elaborates increasing risks. Notice that such representations of risk can potentially poison the resolve of otherwise risk-averse cooperators. Even if Alice were confident of her own power for resisting hare temptations the success of the stag hunt does not turn on Alice’s resolve. Success rather turns on the resolve of the most risk averse member of the minimal group necessary to secure cooperation’s advantage. Yet we have noticed that for anonymous exchange, partners cannot individually signal their resolve to each other. Failures of risky cooperation for anonymous exchange arise from a combination of *uncertainty* and *risk avoidance*. This remains true even though there is no selfish incentive to cheat successful cooperation. Defection in a stag hunt will be motivated from prudence not theft. To defect in a stag hunt is no more stealing than avoiding a party you have no reason to believe will happen.

What happens when the stag hunt is played in real life? Formal analysis, simulations, and experimental literatures agree that only the defection equilibrium is evolutionarily stable (Keizer *et al.* 2008; Skyrms 2004; Van Huyck *et al.* 1990; Young 1998). The explanation for the instability of the cooperation equilibrium is clear. Though it takes only one or several defectors to destroy a cooperative good, it takes near universal cooperation to restore it. After cooperation has failed, moreover, it is unlikely that an entire group will simultaneously change their behaviors to favor cooperation. For why will anyone predict that others will change their behaviors?<sup>6</sup> Again, stability in a stag hunt is threatened from failures of confidence.

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6. It might seem that solutions to the stag hunt would be easily ratified, because it is in every partner’s best interest to secure universal cooperation. Problems, however, abound. Consider a simple dilemma where only two partners face an insecure cooperation problem. Imagine that both speak the same language and that both may communicate their intentions. Suppose that (1) mutual cooperation pays five utiles, (2) mutual defection pays three utiles, (3) unilateral defection pays the defector four utiles, and the unrequited cooperation loses one utile. Though neither partner can

The stag hunt is not merely an intellectual curiosity of theoretical economists. Many social dilemmas assume the character of a stag hunt. A poignant example comes from the obedience of citizens living under repressive political regimes. If all were to revolt, tyrants would be toppled. Typically, revolt brings few costs to citizens who simultaneously and universally opt for revolt. Indeed, where everyone revolts, any individual who persists in supporting the *ancient regime* will face trouble. Alice would happily join in a revolution, except for this: how can Alice know that others will also revolt? On the other side, Alice knows that those who attempt revolutions alone do not fare well. Lacking a clear sign that the revolution will occur, Alice and her cohort would be wise to persist with the status quo (for further discussion, with examples, see Bulbulia & Schjoedt 2010). Risks and uncertainty combine to favor universal defection, even if universal cooperation would achieve benefits all desire and even though such benefits cannot be stolen. The key difference between the stag hunt and the prisoner's dilemma, or its larger sibling the tragedy of the commons, is that it is in everyone's best interest to solve a stag hunt.

It is important to notice that solutions to risky coordination problems do not hinge on the availability of *discrimination mechanisms* such as commitment signalling systems. This is fortunate because we have defined anonymous exchange as situations in which interpersonal signalling is not available. Rather, cooperation in a stag hunt may be stabilized where systems evolve to synchronously modify partner sensibilities. Broadly speaking there are two pathways to widespread and synchronous modification. Cooperative sensibilities may be evoked in synchrony (1) from factors that widely modify the perceived rewards and risks of cooperation and (2) from factors that widely distract attention from the strategic problem (Bulbulia 2011). If Alice were to value cooperation from some perception of a higher intrinsic or extrinsic reward, then she will be motivated to cooperate. Similarly, if Alice fails to notice that there is any risk involved in cooperation, then she may also find motivations to cooperate. Alice will fail miserably, however, unless other partners view cooperation as similarly worthy, in synchrony.

If cooperation were in everyone's best interest, why would risky coordination problems pose a special evolutionary problem? Consider the coordinated actions of workers against management in a strike. Employees share a common interest in cooperating, but unilateral cooperation is damaging. However to enable collective action, trade unions are formed, people join, risks are mitigated and we coordinate. This example

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cheat cooperation, each can do no better than when the other cooperates. It pays partners to promise cooperation even when they will not. Verbal assurances are not intrinsically reliable (for extensive discussion of this problem see Binmore 2008; Rubinstein 1989).

generalizes. People share an interest in cooperating and learn to trust the institutions that manage cooperative problems. Where is the problem? The core problem arises from randomness. Laboratory and field experiments show that after coordination fails, information of failure sets up a negative feedback loop that elaborates increasingly lower levels of cooperative confidence over time. Randomness can and does perturb our coordinating institutions (see Bulbulia 2009). As Elinor Ostrom's Nobel Prize-winning work makes clear, we cannot take the stability of cooperative institutions for granted; where cooperative institutions survive, an intricate matrix of subtle designs cleverly manages cooperation's tough motivational problems (Ostrom 2005). How might religion support anonymous coordination threatened by risk?

### THE CHARISMATIC CALLING MODEL FOR RELIGIOUS COOPERATION

#### *Reverse engineering mortal gods*

The core properties of a robust coordination device are as follows:

- 1 A synchronous *calling mechanism*—or “mortal god”—that entrains powerful cooperative motivations among partners who are exposed to it.
- 2 An *exposure ecology* that connects partners to calling mechanisms. Exposure ecologies may recruit spatially and temporally focal placements, what Hobbes calls “one man.” Or exposure ecologies may recruit *dispersed* placements, what Hobbes calls “an assembly of men [linked] by plurality of voices, unto one will,” which are diffusely accessible to anonymous partners. Focal and dispersed calling mechanisms must affect all partners in synchrony for sufficiently long periods of time to effect a mutually benefiting cooperation.
- 3 A *learning regime*, for which cooperative responses to calling systems are forged.

We suggest that religious cultures fit the design specifications of a robust coordination devices. Such designs resist risky coordination's entropic trend by synchronizing and sustaining cooperation motivations among partners to anonymous exchange. Religious cultures offer stable solutions because they have evolved to be “charismatic,” loosely in Max Weber's sense of the term, by commanding extraordinarily powerful attention and motivations for response (discussed by Bulbulia & Schjoedt 2010). We next consider how religious cultures contribute to supporting risky-cooperation against coordination's entropic trend by *calling* the cooperative



motivations of potentially anonymous partners in synchrony, at potentially unlimited social scales.<sup>7</sup>

*Evidence of mortal gods: the sacred values literatures*

Are there any motivational states that might reliably lead to cooperation in risky and uncertain social worlds? It would seem that cooperation is most stably assured when cooperative motivations do not depend on a calculus of rational self-interest. Again, where cooperation is fragile, rational partners may defect merely because such partners anticipate that others will be risk-averse (Bulbulia & Schjoedt 2010). Sacred values appear to be good candidates for providing the motivational states that are needed to stabilize cooperative exchange against risk avoidance (Taves 2009). The evidence suggests that sacred values are typically maintained as moral absolutes: such values cannot be bought, and they do not yield easily to economic or personal risks. As Tetlock observes:

Students of judgment and choice have long paid homage to normative models of rationality anchored in narrowly utilitarian perspectives on human nature: people are posited to be either intuitive economists aspiring to maximize utility or intuitive scientists trying to discern predictive regularities... Research on sacred values suggests a supplementary perspective that posits people to be intuitive theologians struggling to defend sacred values from secular encroachments. (Tetlock 2003: 323)

Sacred values combine two critical properties for stabilizing effective cooperative exchange against risk: such values (1) produce “intuitive theologians” who are insensitive to material rewards (2) support collective goals.<sup>8</sup>

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7. We do not use “calling” in Weber’s sense of this term, because for Weber “calling” is restricted to Protestant Christianity. We regard the calling capacity of religious cultures to be an evolved property of successful religious cultures, Protestant or otherwise.

8. Notably, sacred values do not lead to the rigid pursuit of fixed goals, which would render them harmful in worlds where strategic circumstances are liable to change. Evidence for such strategic flexibility comes from a recent study conducted on the West Bank, where Ginges and Colleagues found an abundance of moral absolutists, among both Palestinians and Jewish participants, who reacted with outrage and moral disgust to political proposals offering cash trades for sacredly valued land (Ginges *et al.* 2007). Such moral absolutists were also found to exhibit a much higher tolerance for violence in response to such proposals. Yet while participants tended to frame their values in absolute terms, such framing did not produce strategic inflexibility.

Knowing nothing else, then, factors coordinate the expression of sacred values would appear to possess the motivational qualities of a Hobbesian mortal god. Partners bound by common sacred values will tend not to think about cooperation as a means to some personal end, but will rather tend to act for cooperation as “intuitive theologians,” throwing calculation to the wind.

*The synchronization of durable value states  
through calling cultures*

We have noticed that the production of sacred values alone will not be sufficient to support reliable cooperative exchange: cooperation must also be synchronously expressed across the relevant exchange group, and must also endure for sufficiently long to generate mutually benefiting cooperative behavior. Do religious institutions function to align the cooperative motivations of members of exchange groups? The conjecture that sacred rituals function as exquisite coordination devices has formed the basis of much functional speculations about religions. For example, Durkheim writes:

if collective life awakens religious when it rises to a certain intensity, that is so because it brings about a state of effervescence that alters the conditions of the psychic activity ... we feel somehow transformed and in consequence transform our surroundings.  
(Durkheim [1912] 1965: 24)

While there is some preliminary quantitative evidence for the cooperative of sacred rituals (reviewed by Bulbulia & Reddish 2012), Durkheim’s conjecture remains largely untested.<sup>9</sup> Testing this hypothesis is an area for intensive collaboration between anthropologists of religion and psychologists of religion. The charismatic calling model is interesting because it suggests a mechanism for the conservation of any such effects.

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In conditions where opposing sides respectfully acknowledged each other’s sacred values, and expressed sincere regret for past offences, tolerance for violence declined (see also Fiske & Tetlock 1997; Tetlock *et al.* 2000).

9. In a study of nine naturally occurring rituals, we found that, the most powerful cooperative effects from rituals that combine synchronous movements with sacred values (see Fischer *et al.* 2013).

THE TEXTUAL HISTORICAL EVIDENCE FOR  
EVOLUTIONARY MODELS OF RELIGION

*Qualitative historical evidence for the charismatic model*

Core features of the most popular religious cultures appear to have been conserved with remarkable fidelity. Though the myth of the perennial tradition that remains unchanging over time is deservedly challenged (Stout 1981), it is nevertheless interesting that certain religious symbols, texts, and rites survive relatively intact over long temporal spans (Bulbulia 2009). Indeed, the central elements of the world's dominant religions have lasted for centuries. The charismatic calling model throws explanatory light on the strong conservation of sacred cultures, by revealing functional benefits from high-fidelity transmission mechanisms.

- 1 *Fidelity enables success frames.* An abiding tradition offers a hard-to-fake signal of its power for organizing cooperative solutions. A tradition's long success supports optimism for overcoming current risks. We have been through worse. The age of a tradition is its *curriculum vitae*. Even activists who seek change will often appeal the prophetic and revolutionary stories of a tradition's past. Examples abound: Abraham Lincoln, Martin Luther King, the liberation theology movement, and others. Faithful transmission of old traditions affords a success frame from the past, set in a cosmic perspective, from which motivations against risk avoidance may be evoked. Relatedly, memorializing a tradition's most humbling defeats enables partners to appreciate the resilience of their tradition for overcoming failures. The idea:

Our tradition has survived failures. Our forebears have recovered from worse. We can recover from any defeat except perhaps the loss of our tradition, to which our defection will contribute. If such a tradition is lost, however, what evidence will we have for our ability to overcome present risks? By what standard will we judge such risks as surmountable?

- The answers to such questions are not clear, and the representation of this doubt can plausibly motivate cascading declines in cooperative confidence. Finally, reflecting on the past may also elicit intrinsic commitments for cooperation from feelings of indebtedness to past cohorts whose sacrifices have enabled our existence and persistence.
- 2 *Restraint of authority.* Where the decisions of political authorities are associated with supernatural realities, political authority may receive additional motivational support from justifications that transcend

human interests. Robert Bellah and others have argued that political elites use religion to verify submission to a higher law, as a kind of virtue signalling device (see Bellah 1967). Evidence for strong submission to charismatic authority comes from brain imaging machines. Schjoedt and colleagues have demonstrated that audiences tend to cede control to traditional authorities merely because an authority holds an office, irrespective of any special virtue signalling (Schjoedt *et al.* 2011). The authors point out that such effects bear a striking resemblance to hypnotic effects. The hypnotic control of traditional offices is well explained as a component of a mortal god. Such dispositions to authority may coordinate cooperative responses among participants who remain personally unknown to each other, yet who are nevertheless linked to focal authorities, in whom they share a common confidence.

- 3 *Positive externalities.* As cooperative networks grow, unfamiliar partners will profit whenever they are motivated by the same (or similar) symbolic, ritual, and ecological arrays. Such arrays are similar to monetary instruments, document formats, USB ports, and other technologies, which are effective only when commonly shared. Economists call the benefits of shared conventions and technologies *positive externalities*. The charismatic model predicts that the demands of similarity will tend to constrain religious innovation, particularly where cooperative worlds are both large and risky. Even where sacred cultures are inefficient, the norms that favor conservation may be retained for their benefits in reducing symbolic variation. The demands of local fidelity will plausibly yield historical effects, slowing the rate of change for religious cultures. What is the relative rate of change for religious culture, compared to other types of culture? This answer is unknown. Teams of historians and life scientists are needed to estimate such relative rates of change.

#### TEXTUAL HISTORICAL EVIDENCE AND A SCIENCE OF RELIGIONS

What to make of the charismatic model? No model should hope to account for everything about religion. As Boyer has long urged, the naturalistic study of religion has no room for magic bullet explanations (Boyer 2002a). The model we have presented here is interesting because it relates the puzzle of large-scale cooperation and the puzzle of religious conservation under a common explanation. The hypothesis that religious minds and cultures interact to assure mutual cooperative exchange by calling cooperative motivations in synchrony may go part of the way to explaining how the difficult problem of assuring otherwise insecure cooperation in large social worlds. We conclude by discussing how teams of historians of

religion and life scientists might test, improve, and integrate cognitive and evolutionary models of religion.

*Hypothesis 1: religion as minimally counterintuitive concepts*

Many readers of this volume will be familiar with the “cognitive optimum” theory of religion (J. L. Barrett 2000; Slone 2004). The theory holds that religious cultures persist because religious ideas are easily recalled and transmitted as minimally counterintuitive concepts (Boyer 1994a). Though abstract theological treatises demand specialist casts of theological interpreters, the cognitive optimum theory claims that folk religions flourish because religious concepts are slightly adjusted versions of ordinary concepts. Such adjustments render religious concepts uncanny. Zeus is not merely a person, but rather an almighty, immortal person. Ganesh is also immortal, and moreover has an elephant’s head. St. Jude is a person who lives in a supernatural world—outside of place and time—but who can nevertheless hear our inner pleas for help, here and now.

Notice that if religions were best explained from the propagation of ideas that are minimally adjusted for uncanny memory formation, we would predict a tendency for cultural evolution to favor slight novelty. Moreover, such patterns of change in the transmission of religious concepts over time should be reflected in historical signals. Good evidence for the cognitive optimum theory would come from observations along the following lines.

*Zeus → Zeuus → Zuus → Suus → Sam → ... Ricardo*

The rate of such change would, itself, be a matter of interest. One prospect is that transitions over time will be smooth, and regular. Though as the transmission rate increases we might expect a steeper rate of change: more people, more conversations, more minimally counterintuitive adjustments. Another prospect is that every so often a big change is introduced and gains widespread influence (e.g., say “Ricardo”), which leads to a dramatic shift, or in the language of biology, to a “saltation.”

Of course, cognitive optimum theory and the charismatic model might be compatible. If so, we should expect oscillations, for which the benefits conserving the old tradition constrain an innovation that is nevertheless important for whetting interest:

*Zeus → Zeuus → Zuus → Zues → Zeus → Zeuus → Zuus → Zues ...*

Currently, only collaborative teams of textual historical scholars and life scientists have the training by which to evaluate the cognitive optimum model, and to relate it to evolutionary models. Such historical experiments



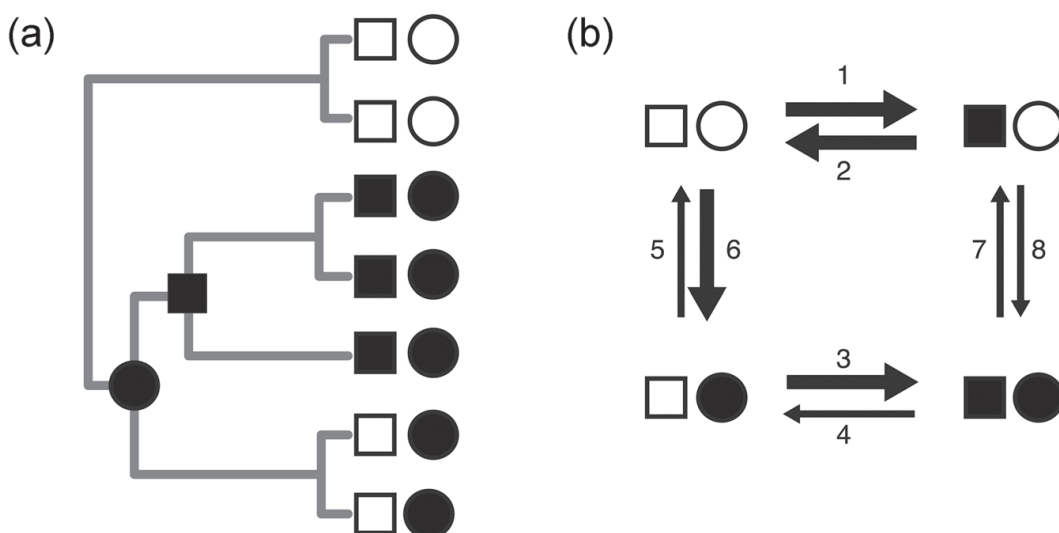
lie on the horizons of current research (for initial interest see Geertz & Jensen 2011; Martin & Sørensen 2011).

*Hypothesis 2: cultural selection favors moralizing high gods*

A second popular theory of religion claims that cultural selection favors “high god” religious concepts because, by hypothesis, beliefs in Gods with moral intentions are more likely to forge solidarity. Religion-induced solidarity, on this model, leads to the defeat of low god cultures by high god cultures (Gervais *et al.* 2011). If the high god hypothesis were correct, then we would expect the historical record to show that high gods religions precede growth of large and complex societies, rather than the opposite, as in Figure 12.1.

Another prediction of the high god model is that high god religions should become increasingly common, such that over time:

*Frequency of those who maintain low god religions < frequency of those who maintain high god religions*



**Figure 12.1** (a) A cultural phylogeny showing the absence (white circle) or presence (black circle) of social complexity, and the absence (white square) or presence (black square) of high gods. On this phylogeny social complexity evolved before high gods. (b) A hypothetical transition matrix of the evolution of high gods and social complexity. Arrows are proportional to the transition rate between states. This matrix shows that gaining a high god only rarely leads to social complexity (arrow 7), but social complexity very often leads to the evolution of a high god (arrow 3).

The timing and rate of change for high god religions could be analyzed using cultural phylogenetics (indeed such studies are in the works; Gray & Greenhill 2011). Again we find that historical resources are needed to evaluate the high god model, and the distinction between a “high god” religion and a “low gods” attributed to the historical record. It is unclear whether any such distinction will survive analysis.

*Hypothesis 3: charismatic calling models of religion*

The Charismatic Calling Model hypothesizes that religions evolve as “mortal gods” in Hobbes’s sense. Core features of religious cognition and cultures function as mechanisms that express and synchronize cooperative motivations in anonymous populations. The model specifically predicts the evolution of ecologies that (1) afford strong motivational states (2) in synchrony among partners to risky trade. What historical signals might support the charismatic model? Consider four retrospective predictions:

- 1 Religious cultures should tend to express generic cooperative motivations, which do not depend on commitment signals, particularly in large social worlds where anonymous partners share a religion in common.
- 2 Religious cultures should harbour otherwise impractical spatial and temporal designs that evoke cooperative states.
- 3 Investment in the production and maintenance of such designs should increase with the risks of exchange.
- 4 Core properties of religious cultures should be conserved with high fidelity.

We believe that collaborative teams of historians of religion and life scientists are required to test such predictions.

Notably, teams of textual-historical scholars and quantitative scholars have recently begun to evaluate cognitive and evolutionary models of religion (for example, see Czachesz & Biró 2011; Martin & Sørensen 2011; Slingerland & Chudek 2011). Such projects are part of a larger intellectual movement that is seeing biologists and historians teaming up to test, and to improve, models of social evolution (see for example Currie *et al.* 2010; Gray *et al.* 2009; Matthews 2012; Matthews *et al.* 2012; Turchin 2006). We believe that collaboration between historians of religion and life scientists will soon become standard practice in religious studies scholarship. The advantages to understanding that such collaborative teamwork uniquely affords will continue to motivate the irrepressibly curious, whatever their departmental affiliations.

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