Chapter 17
The Religious System as Adaptive: Cognitive Flexibility, Public Displays, and Acceptance

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Abstract Religion is often conceived as a conservative social force that sustains traditional cultural beliefs and behaviors. Religion, however, also exhibits predictable socioecological variation and facilitates adaptive response patterns in the diverse environments that humans inhabit. Here we examine how the religious system, which is composed of a number of interacting components, generates adaptive response patterns. We argue that the religious system accomplishes this by: (1) employing highly flexible cognitive mechanisms, (2) evoking emotional responses that provide reliable information concerning individual physical and psychological states, (3) supporting specialists who introduce religious ideas that endorse and sustain the social order, and (4) encouraging collective acceptance of these ideas with public displays, typically in the form of rituals, badges, and taboos. These interacting components of the religious system ultimately promote prosocial behavior under diverse conditions.

17.1 Introduction

There is considerable debate among evolutionary and cognitive scholars about the adaptive nature of religion (Bulbulia et al. 2008). In this chapter we contribute to this discussion and argue that religion is an adaptive system. Much of the debate about whether or not religion is an adaptation divides neatly between those who study cognition and reject adaptationist interpretations (Atran 2002; Barrett 2007; Boyer 2001; Kirkpatrick 2006) and those who study behavior and endorse such interpretations (Alcorta and Sosis 2005; Richerson and Newson 2008; Sanderson 2008a; Wilson 2002), although there are notable exceptions (Bering 2004; Harris and McNamara 2008). Despite our partiality to adaptationist interpretations, we situate our argument within the cognitive approach in hopes of building a much-needed bridge between the cognitive and behavioral studies of religion. A full adaptationist account of religion is beyond the scope of this chapter; our aim is more modest.

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Building on the work of Alcorta and Sosis (2005), we focus on several core elements of the religious system and examine how they motivate adaptive response patterns under diverse socioecological conditions.

To summarize our argument, we maintain that the cognitive mechanisms responsible for religious beliefs are adaptively flexible to accommodate the wide range of social environments that humans inhabit. The beliefs and behaviors that comprise religion are attention-grabbing and emotionally salient. Emotions can display and indicate an individual's physical and psychological state, and thus serve as honest signals providing important social information to others. When religious ideas are introduced by those who are in highly influential positions, as is often the case, their acceptance by the community helps sustain the hierarchical social order and facilitates intra-group trust. Acceptance of religious ideas that become institutionalized is publicly displayed by ritual behaviors, which further promotes cooperative behavior and solidarity, resulting in the benefits that individuals reap in prosocial environments. Selection favored the coalescence of numerous behavioral and cognitive traits to form the religious system because fitness benefits accrued to individuals who possessed the cognitive, emotional, and behavioral mechanisms necessary to participate in this system.

17.2 The Religious Mind

17.2.1 The Interaction of Nature and Nurture: Mental Organs and Cognitive Flexibility

Chomsky reasoned that our minds are innately equipped with "mental organs" or "modules" that require external stimuli in order to function optimally in various environments (Chomsky 1980). While there has been abundant debate among philosophers, linguists, cognitive scientists, and anthropologists regarding what exactly counts as a module (Atran 2002; Fodor 1998, 2001, 2005; Pinker 2005a, 2005b; Sperber 1996), one of Chomsky's lasting contributions to contemporary cognitive science and evolutionary psychology is his assessment of the language learning process. Learning, he argued, should be thought of as the growth of genetically endowed mental organs that are triggered and then influenced by the external environment. Chomsky emphasized the *interaction* between genetically determined cognitive faculties and the environments in which they operate (Chomsky 1980). One child grows up speaking British English, whereas another child grows up speaking Arabic because there are multiple, flexible cognitive mechanisms devoted to computing and producing linguistic information. Likewise, a child raised in a Christian environment is likely to grow up believing in the death and resurrection of Christ, whereas a child raised in an Islamic environment might grow up to believe that Muhammad spoke with the angel Gabriel. Religious beliefs are formed by the interaction between flexible cognitive mechanisms and the social environment.

Sperber argues that cultural ideas which are easier to retain and transmit have a *cognitive* selective advantage and will become culturally prevalent (Sperber 1996). Therefore, Sperber contends, to explain why some ideas survive whereas others do not, we must understand why our evolved minds find some ideas catchier than others. Sperber's epidemiological program has strongly influenced cognitive research examining the structure of religious ideas. Indeed, it is now axiomatic that religious ideas are widespread because they violate the default operations of our basic organizational mechanisms. This makes them particularly salient and memorable. Boyer (2001) argues that our evolved organizational mechanisms – our ontological templates – are much like software programs that consist of a number of default inferences about objects in the world. Religious ideas typically contain violations of these default inferences.

"A statue that listens to your concerns," for example, is a good candidate for a religious concept because it violates assumptions about entities in specific categories; we know that "listening" is a behavior particular to agents (animals and people) and not typically a feature of manmade objects. Such ideas are counterintuitive and attention-grabbing and therefore "catchier" than intuitive ideas (e.g., a squirrel that climbs trees or a refrigerator that keeps food cold). In a number of experimental memory studies, counterintuitive ideas are recalled more frequently and remembered longer than intuitive statements (Boyer and Ramble 2001; Norenzayan et al. 2006; Purzycki 2006). These results are consistent with Sperber's claim that violations of our cognitive architecture are more memorable and therefore more culturally prevalent.

The acquisition of religious beliefs, however, is not simply an anarchic transfer of counterintuitive ideas between minds where the catchiest ideas survive. There are many avenues of transmission, often broadly divided between vertical transmission (from elder generation to younger) and horizontal transmission (from peer to peer), and each avenue faces respective constraints (Boyd and Richerson 1985). Despite numerous experimental studies on the memorability of counterintuitive ideas, we have little understanding of the distinct dynamics of vertical or horizontal transmission in natural settings. Nor do these studies examine whether individuals *accept* the counterintuitive ideas they are remembering. Acceptance, as we argue below, is a crucial component of bridging the gap between the cognitive and behavioral aspects of religion.

We can produce and compute counterintuitive religious ideas because our means of categorizing the world are flexible; environmental stimuli are required to shape even our most basic ontological categories and these mechanisms interact with the social environment to facilitate an organism's success. Owing to this cognitive flexibility, the default inferences of one category can be attributed to an object in another category if the social environment provides this information (e.g., rivers having voices and the forest listens to you) generating the extraordinary diversity in religious beliefs that humans exhibit. This apparent diversity in beliefs, however, shares a similar underlying cognitive structure (Bulbulia 2004). Tomasello notes that

... truly cognitive adaptations, almost by definition, are more flexible than [modular accounts]. Although they may have arisen to solve one specific adaptive problem, they are quite often used for a wide array of related problems (Tomasello 1999, p. 206).

Therefore, adaptive mechanisms – physical and mental – are maximally beneficial for organisms if they have a particular degree of flexibility. Such flexibility has allowed humans to utilize virtually every environmental niche on Earth. Our cognitive mechanisms are flexible enough to produce adaptive responses under diverse social and ecological conditions, and they are flexible enough to create and process religious ideas that are accepted and incorporated into diverse worldviews. This is necessary, of course, for individuals to function optimally in any social environment.

17.2.2 The Ontogeny of the Religious Mind

Some children spontaneously create imaginary friends. Imaginary friends are counterintuitive (they lack physicality) and might be "catchy" if one were to transmit the idea, but this does not explain why children actually believe in and behave as though they perceive some agent. Children engaging in pretend play will also readily use sticks and rocks to represent counterintuitive creatures. These phenomena strongly suggest cognitive flexibility; if children are capable of *producing* (as opposed to simply "catching") prototypical counterintuitive ideas without explicit instruction, it suggests there is much more to religious beliefs than memorization. Cognitive flexibility poses a challenge to current cognitive accounts of counterintuitive religious ideas. If a child is raised in a social environment where others grant agency to mountains and this belief is actively encouraged, such a belief may change the very nature of the template upon which such ideas are built. Cognitive flexibility is an adaptation that enables us to learn appropriate socioecological information within local environments, and social pressures often define what information is valuable. While the persistence into adulthood of individualized fantasy play would likely entail social costs, the rejection of commonly shared beliefs can also have negative social consequences.

Beliefs that are endorsed and encouraged by the community may be internalized and become assumptions about the world. Internalizing such ideas and behaving with these assumptions makes adaptive sense if one is to successfully operate in a social organization comprised of like-minded individuals (D'Andrade 1992; Ryan et al. 1993). But internalizing ideas is never enough to ensure positive social outcomes; the acceptance of ideas must be *demonstrated* and the culturally derived motivations for demonstrating them must be understood as well. Motivations such as "participating in a community" or "ensuring the wellbeing of one's tribe" (see below) as opposed to purely selfish rationalization are often socially accepted reasons for religious participation. Demonstrating acceptance of religious beliefs defines who is within and outside the community, who shares ideological commitments, and who can be trusted (Rappaport 1999). Public displays of

acceptance often come in the form of transitional rites of passage for young members of societies.

Among the Walmadjeri and Gugadja of Australia, rites of passage involve genital mutilations, intensive religious instruction, blood rites, and extended pilgrimages to sacred sites. During subincision rites, an initiate "is repeatedly told to be good – not to go contrary to custom, not to quarrel, to conform; to pay attention to his elders...to shoulder his responsibilities and fulfill his obligations; to supply food and to look after those who perform ritual " (Berndt 1972:221). During circumcision rites among Pygmies of the Congo, on the other hand, boys are inducted as "blood brothers," forging life-long economic ties to each other. After the operation, boys "are made to sit down and join the others in singing one of the many work songs they will have to learn during the coming months" (Turnbull 1987, p. 221). These initiates endure considerable pain and religious indoctrination, but their successful completion of the rites is an unquestionable public demonstration of acceptance of societal norms. This is a critical social function of religious ritual. Alcorta and Sosis (2005) argue that the emotional intensity of initiation rites, coupled with explicit instruction about the sacred, facilitates, or even establishes, the transition into adulthood by collectively sharing cultural models about the world and the emotional motivations that ensure their retention. Rituals serve similar adaptive functions once shared cultural models and motivations are institutionalized and codified in the young. The shared nature of institutions is a prerequisite to an individual's success in their social group.

17.3 The Religious Community

17.3.1 On the Adaptive Value of Sharing Institutions

Our species has a remarkable ability to arbitrarily ascribe meanings and attributes to ordinary objects. This coupling is often difficult to reject. Searle, making the distinction between *brute* and *social* facts, defines institutions as the shared transference of the former to the latter (Searle 1997). The oft-used example of paper currency serves quite well; there is no inherent difference between pieces of reconstituted cotton and linen fiber with ink illustrations (brute facts) of the number 50 and the number 100 on them. However, we ascribe them a particular value where one is "worth" twice as much as the other (social facts). The active rejection of social institutions – once they are stable – can be particularly maladaptive. An economic transaction is unlikely to transpire if one were to try to pay for a meal with a tuft of cotton soaked in ink. The *conceptualization* and *acceptance* of this and similar social institutions are essential for successfully navigating social environments, and bear on one's ability to acquire resources and attract mates.

We typically defer to people in positions of power to rationalize the legitimacy or illegitimacy of institutions. If we were to sneak into the mint, make money with the machinery and materials used to print paper currency, it would be considered

counterfeit by virtue of its not being "made" by an elusive but designated authority, "the Treasury." Even if employees of the mint were to sneak in after hours to print money for their personal use and kept only what they would have been paid to work, it would still be counterfeit money. Institutions can also serve as profound motivators of collective action. While institutions may provide internal rationalizations for behavior, it is quite clear that publicly asserting these rationalizations does not serve to convince anyone of the merit of such institutions (although this may occur), but rather serve as a public demonstration of shared understandings which reinforces perceived solidarity within one's social group. The question of whether or not belief in institutions is required for the perpetuation of them is rather moot. What matters is that the population *acts as though* they believe by actively participating in them. It is unlikely that every Catholic, for instance, believes that ingesting a wafer and wine are actual acts of consuming the body and blood of Christ. This does not prevent the institution from perpetuation as though it were literally true.

Consider the notion that God knows and can do everything, and is everywhere at once. This idea is particularly counterintuitive. However, people often reason about God as though He were confined to the limits of time and space (Barrett 1998). The disparity between theologically correct (omniscient) and theologically incorrect (anthropomorphic) versions of God illustrates our point precisely (Slone 2004). The fact that our stated beliefs (i.e., the theologically correct, omniscient version) are so dramatically inconsistent with how we think about God in real-time suggests that our stated beliefs are useful signals of group affiliation and devotion, rather than the assumptions we carry with us. The beliefs that serve as signals must be publicly demonstrated and cognitively palatable for receivers if signalers are to reap benefits from sending such signals (Henrich 2009).

17.3.2 Supernatural Agents and Socioecological Variation

In the *Descent of Man* (Darwin 1879/2004), Darwin observes that belief in "unseen or spiritual agencies" is a human universal, and he characterizes such beliefs among "the less civilized races" as a means to make sense of the world around them (p. 117). Darwin assumes that "making sense of the world" has adaptive value, an assumption still entertained by many scholars today. However, the selective pressures that could have shaped our need for a coherent worldview are generally left unspecified. The notion that "God loves us" may be comforting, but this does not explain *why* many people find this idea comforting. Assuming for the moment that people do indeed strive to attain a worldview that makes sense, why do religious beliefs provide a satisfying worldview?

Religion provides a "satisfying explanation" for an individual when his or her own models of the world are successfully signaled and accepted by receivers, thus maximizing perceived solidarity and the benefits concomitant with this perception of solidarity. Religious views are satisfying when they are confirmed by one's peers; consequently, individuals constrain each others' religious beliefs. There is of course individual variation in religious belief within all religious communities, but all

communities also maintain a range of acceptable beliefs which are usually socially enforced. Those outside the range of acceptability are typically denied access to group benefits. Religions often change when the benefits derived from sharing models are no longer perceived to be worth the costs of participation.

Social organization also poses constraints on religious concepts (Sanderson 2008b; Wallace 1966). Conventional wisdom suggests that in small-scale societies, selective pressures for belief in one supreme moralizing supernatural agent are weak since social behavior in small communities is easily observed and moral reputations are easily communicated. The anonymity of individuals in large-scale societies, however, favors belief in an all-knowing supernatural agent that can encourage particular modes of conduct (Rappaport 1999). If God or "Big Brother" is watching, one might reconsider defecting from a social contract, especially if it is believed that this agent can enforce some punishment. Indeed, many have recently argued that belief in supernatural agents with access to strategic information evolved to enhance prosocial behavior (Johnson and Bering 2006; Rossano 2007; Shariff and Norenzayan 2007). In experimental studies, believing that supernatural agents are watching us has been shown to alter the way we make moral decisions (Bering et al. 2005) and influence our conduct in economic transactions. People are even more generous with their money when primed with a drawing of two eyes (Haley and Fessler 2005)!

Cross-cultural analyses indicate that supernatural agent concepts exhibit predictable socioecological variation (Sosis and Alcorta 2003), which suggests that religious beliefs are a product of the interaction between environmental (social and natural) constraints and our evolved cognitive architecture devoted to detecting mental states (Baron-Cohen 1995). The Yanomamö, for example, believe that in the afterlife, a spirit named Wadawadarwä directs those who have not been generous in life down a particular path "leading to a place of fire" (Chagnon 1996, pp. 112–113). However, these beliefs are unlikely to prevent hoarding or stinginess since, according to the Yanomamö, this spirit is easily fooled: "We'll just all lie and tell him we were generous, and he'll send us to *hedu* [the sky]" (p. 113). The Ju/'hoansi of the Kalahari (Lee 2003) seem to lack agreement on the nature of their two gods, but are virtually unanimous in their belief that ancestor spirits cause most major illnesses and other misfortunes. These ancestors, according to one Ju/hoa,

> . . . expect certain behavior of us. We must eat so, and act so. When you are quarrelsome and unpleasant to other people, and people are angry with you, the *//gangwasi* see this and come to kill you. The *//gangwasi* can judge who is right and who is wrong (Lee 2003, p. 129).

Supernatural agents in these societies vary in form and the roles they play in human affairs. Despite obvious cultural differences, agents in each society are *concerned* with proper human conduct, as is found throughout human populations.

To understand cultural variation and the adaptive nature of religious beliefs we must examine socioecological factors. Consider, for example, the widespread belief that ancestral spirits cause illness. Is such a belief adaptive? If such beliefs steer individuals away from reliable curing behaviors, then surely it is not adaptive. However, when effective medications and treatments are unknown or unavailable, convincing

someone else that *your* ancestral spirits have curing powers opens an opportunity for exchange of resources. Believing in the efficacy of ancestral spirits may have significant consequences on one's ability to survive and reproduce. *Not* believing in particular ideas, such as the ancestral spirits, might be socially costly and serve as an indicator of outsider status.

Religious ideas are not dormant assumptions that underlie worldviews; they motivate frequent expressions of acceptance of social institutions. Accusations of witchcraft or wearing an amulet to protect one from the "evil eye" reinforce an individual's beliefs, but also signal acceptance of such ideas. Experimental evidence suggests that emotionally salient counterintuitive ideas are easier to retain than intuitive or non-emotional counterintuitive ideas (Purzycki 2006). If emotions are default decision-making programs (Frank 1988), then the employment of emotion-triggering counterintuitive ideas undoubtedly affects the way we interact with each other and serves to maintain a perceived state of equality among individuals within a social unit (Alcorta and Sosis 2005). If idiosyncratic behaviors are associated with witchcraft, for instance, then those behaviors and individuals associated with them are avoided and ostracized by those who share this belief. However, these same mechanisms that can generate feelings of equality or *communitas*, as Turner famously described, are often exploited by religious authorities to organize others, maintain their own status, and enter into contracts between themselves and adherents (Turner 1995).

17.3.3 Specialists and Authorities

While surprisingly broad, there are limits to what individuals will believe. If we were to claim that pink rabbits inhabit the moon, you are not likely to take us very seriously. On the other hand, if we were to suggest that we had the ability to cure your loneliness or illness, find a valued article that you lost, or remove soul-sucking spirits from your body, you might be a little more credulous. Beliefs themselves might be *generated* or even *perceived* as violations of intuitive knowledge of the world, but in order for these beliefs to survive, others must accept them. One of the best predictors of which ideas survive is who proclaims the idea. If someone in a position of power announces, for instance, that their ancestral spirits have healing powers or that God told them to invade a particular country, the risk of social sanctions might prevent public denunciation of such claims. While some have discussed a "prestige bias" in terms of how cultural information is transmitted (Henrich and Gil-White 2001), such a bias is also likely to have significant effects on whether or not counterintuitive ideas are accepted. Humans may be disposed to readily accept, or at least evaluate less critically, the information offered by those in power, since the powerful may have greater access to important social information and their ascendancy to leadership may be a direct consequence of their social knowledge. Religious leaders often have the power to incur social and economic costs for non-participants. Moreover, regardless of the reliability of claims made by those in power, such social costs can encourage the acceptance of even patently false claims.

In some cases, a religious specialist quite readily suggests that he or she possesses exclusive knowledge or has been "chosen" for a specific role. Such claims stimulate intrigue and, if propositions are accepted, garner prestige for the producer of such ideas. Dennett refers to this as the "shamanic-advertising hypothesis" (Dennett 2006). The Hopi, for instance, participate in highly secretive, rigidly hierarchical religious clans where conformity garners benefits and violations yield supernatural sanctions (Whiteley 1998). Each clan owns rituals and knowledge about how to control natural forces, and access to this knowledge is positively correlated with age. Institutional leveling mechanisms serve to keep those in positions of power where they are, but also entice others to strive for more insight into the nature of reality. Knowledge increases the prestige of the elders and their ability to influence others. Among the Netsilik, medicine men were both "respected and feared" (Balikci 1970). They also publicly competed over who had more power by doing seemingly extraordinary things:

> [one] used to shoot himself with a gun . . . [one] removed his own leg, other[s] preferred to pierce themselves with spears and grow beards in a second (Balikci 1970, p. 235).

Moreover, medicine men "lived in an atmosphere of suspicion and fear, dreading both the possible secret attacks of his camp fellows and the spirits who might initiate an evil action on their own." These specialists served to "enforce norms or re-establish harmonious relations between environment, people, and supernaturals," yet they clearly competed with each other both publicly and privately (p. 237).

Among the Hopi and Netsilik, influential individuals were engaged in competition over both material and ideological resources, using institutions and counterintuitive ideas as leverage to maintain and propel their status. Demonstrations of power are necessary for individuals to attain and maintain their status and apparently counterintuitive behaviors are useful in this sense. Note, however, that such ideas do not become doctrine, but are associated with their performers. These demonstrations are often materially costly, and also pose potential social costs if the displays are revealed as dishonest. These costs can become excessive if an "arms race" develops between individuals competing for limited social status, particularly if many in a social group actively struggle for this status. However, in religious communities, benefits do not only accrue to successful leaders; as we discuss in Sect. 17.4, followers gain as well (Van Vugt et al. 2008; Van Vugt and Kurzban 2007).

17.4 The Costly Signaling of Ritual

Adherence to a set of religious beliefs entails a host of ritual obligations and expected behavioral patterns. Although there may be physical or mental health benefits associated with some ritual practices (Koenig et al. 2001), the significant time, energy, and financial costs involved in imitating such behavior serve as effective deterrents for anyone who does not believe in the teachings of a particular religion. Hence, those who engage in the suite of behaviors, badges, and bans required by a religious group can be trusted as individuals who largely accept the doctrines of the

group, which often includes behaving altruistically to other group members. As a result of increased levels of trust and commitment among group members, religious groups are able to overcome free-rider problems that typically plague communal pursuits and limit over-consumption and exploitation of the mutual benefits they generally offer their adherents (Sosis 2005, 2006). Schloss argues that

> Costly signaling theory helps make sense of a distinctive aspect of religious belief that neither spandrel nor memetic accounts alone address: not why people believe, but why their beliefs motivate such substantial investments (Schloss 2008, p. 201).

Rappaport (1999) claimed that religious rituals, badges, and bans are indexical signals; that is, they are signals which refer to what they denote by being truly affected by them (e.g., weathervanes denote wind direction). Rappaport argued that while ritual behaviors appear to be shrouded in mystery, they are deliberate and their message to other adherents is clear: participation in a ritual performance indexically signals acceptance of (and not necessarily belief in) the moral values encoded in the ritual. He maintains that regardless of whether or not individuals believe in the moral values encoded in a ritual performance, by participating they are signaling that they accept the moral code of the community, and can be held accountable if these rules are compromised. Rappaport insightfully observed that whereas belief is a private, internal state, acceptance is a public, external state (Rappaport 1999). Participating in a public ritual demonstrates acceptance of rites and the beliefs that underlie them. Such demonstrations, however, generally come at a cost to the participant.

Recall the above-mentioned rites of passage. Sending one's child to engage in particularly stressful rites seems especially maladaptive in the event of permanent damage or disfigurement. However, allowing one's children to engage in traumatic rites sends an unmistakable signal of commitment to other group members (Sosis et al. 2007). Such demonstrations of sharedness are a critical component of the religious system and its ability to promote cooperative behaviors under diverse conditions. Less traumatic rituals also serve similar adaptive functions once shared cultural models are institutionalized and codified in the young.

There is considerable experimental, cross-cultural, and historical evidence that costly rituals are associated with increased group solidarity and cooperation. In one cross-cultural study, a positive correlation was found between the costliness of male rites and warfare frequency (Sosis et al. 2007). Warfare is widely recognized as posing significant coordination and cooperation problems and it appears that costly rituals are one way in which groups increase male solidarity to overcome these problems. One illustrative case not represented in the sample is the Sundance of the Sioux of the Great Plains, who are well-known for their historical military prowess. After 4 days of "visiting. . . relatives, courtships, minor ritualsritual, and feasting" (Lewis 1990, p. 52), and four subsequent days of fasting, the flesh of ritual participants is pierced with eagle talons. The talons are ripped out by either pulling free from them or by dragging bison skulls attached to thongs. Often dancers extend and intensify the pain as a test and demonstration of endurance.

This elaborate rite is explained by many Lakota as a sacrificial one; piercing ensures the wellbeing of one's family and nation. People can sponsor dancers by cutting away pieces of their own flesh. If dancers require assistance in tearing themselves free from the talons, family members donate a pony to those who help (Standing Bear 1928/1975). Sundancers are afforded a fair amount of prestige for piercing. Although they are piercing for the good of the Nation and must give away some personal possessions, they also reap benefits from such an investment in the form of gifts and status (Feraca 1998; Lewis 1990). Feraca (1998) notes that "every candidate will pray for the general well-being of the people" but that there are, of course, personal motivations as well, including impressing women, political publicity, and laying the groundwork to become a medicine man.

This ritual rests on the collectively held belief that suffering ensures group wellbeing. Bodily sacrifice to *wakan tanka* ("Sacred Vastness" or "Big Holy"), the creative force that is found in everything, ensures that prayers are heard and enhances the group's chance of success (Mails 1979; Standing Bear 1928/1975). This practice also reinforces the shared understandings of the cosmos and demonstrates acceptance in that shared understanding. In the case of the Sioux, this idea has payoffs in the form of group cohesion, cooperation, and social solidarity. These beliefs and behaviors have efficacy among adherents precisely *because they actually do yield benefits*.

The prosocial effects of ritual have also been demonstrated in experimental and historical studies. For example, Sosis and Ruffle (2003, 2004) and Ruffle and Sosis (2007) found that individuals who participate in frequent public prayer, costly in terms of time investment, were more cooperative than those who did not attend synagogue daily. In related ethnohistorical work, Sosis and Bressler (2003) analyzed a sample of nineteenth century American communes and found that religious communes that imposed more ritual demands on their members survived significantly longer than less demanding communes. Signaling theory offers a parsimonious explanation for this paradox; the costly demands serve as both a gatekeeper preventing those who are not committed to the goals of the commune from entering and as a mechanism to bond individuals in their shared experience.

17.5 Conclusion

The religious system plays a vital role in human sociality. The cognitive mechanisms that entertain widespread cultural and religious assumptions are remarkably flexible and enable humans to respond adaptively under diverse conditions. Rituals, badges, and bans are collectively shared institutions that publicly display and internalize commitments to counterintuitive ideas. Youth, for example, often endure costly religious rites of passage in order to demonstrate their initiation into the adult community. These rites signal to others not only the child's, but also the parents' solidarity with the rest of the community. People regularly engage in religious behaviors that entail short-term costs, but doing so enhances long-term relationships built on a

foundation of trust. This trust, perpetuated by ritual signaling, sustains communities and promotes social coordination and cooperative behavior.

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