

# The Adaptive Value of Religious Ritual

*Rituals promote group cohesion by requiring members to engage in behavior that is too costly to fake*

Richard Sosis

I was 15 years old the first time I went to Jerusalem's Old City and visited the 2,000-year-old remains of the Second Temple, known as the Western Wall. It may have foreshadowed my future life as an anthropologist, but on my first glimpse of the ancient stones I was more taken by the people standing at the foot of the structure than by the wall itself. Women stood in the open sun, facing the Wall in solemn worship, wearing long-sleeved shirts, head coverings and heavy skirts that scraped the ground. Men in their thick beards, long black coats and fur hats also seemed oblivious to the summer heat as they swayed fervently and sang praises to God. I turned to a friend, "Why would anyone in their right mind dress for a New England winter only to spend the afternoon praying in the desert heat?" At the time I thought there was no rational explanation and decided that my fellow religious brethren might well be mad.

Of course, "strange" behavior is not unique to ultraorthodox Jews. Many religious acts appear peculiar to the outsider. Pious adherents the world over physically differentiate themselves from others: Moonies shave their heads, Jain monks of India wear contraptions on their heads and feet to avoid killing insects, and clergy almost everywhere dress in outfits that distinguish them from the rest of society. Many peoples also engage in some form of surgical alteration. Australian aborigines perform a ritual operation on adolescent boys in which a bone or a stone is inserted into the penis through an incision in the urethra. Jews and Muslims submit their sons to circumcision, and in some Muslim societies daughters are also subject to circumcision or other forms of genital mutilation. Groups as diverse as the Nuer of Sudan and the Iatmul of New Guinea force their adolescents to undergo ritual scarification. Initiation ceremonies, otherwise known as rites of passage, are often brutal. Among Native Americans, Apache boys were forced to bathe in icy water, Luiseño initiates were required to lie motionless while being bit-

ten by hordes of ants, and Tukuna girls had their hair plucked out.

How can we begin to understand such behavior? If human beings are rational creatures, then why do we spend so much time, energy and resources on acts that can be so painful or, at the very least, uncomfortable? Archaeologists tell us that our species has engaged in ritual behavior for at least 100,000 years, and every known culture practices some form of religion. It even survives covertly in those cultures where governments have attempted to eliminate spiritual practices. And, despite the unparalleled triumph of scientific rationalism in the 20th century, religion continued to flourish. In the United States a steady 40 percent of the population attended church regularly throughout the century. A belief in God (about 96 percent), the afterlife (about 72 percent), heaven (about 72 percent) and hell (about 58 percent) remained substantial and remarkably constant. Why do religious beliefs, practices and institutions continue to be an essential component of human social life?

Such questions have intrigued me for years. Initially my training in anthropology did not provide an answer. Indeed, my studies only increased my bewilderment. I received my training in a subfield known as human behavioral ecology, which studies the adaptive design of behavior with attention to its ecological setting. Behavioral ecologists assume that natural selection has shaped the human nervous system to respond successfully to varying ecological circumstances. All organisms must balance trade-offs: Time spent doing one thing prevents them from pursuing other activities that can enhance their survival or reproductive success. Animals that maximize the rate at which they acquire resources, such as food and mates, can maximize the number of descendants, which is exactly what the game of natural selection is all about.

Behavioral ecologists assume that natural selection has designed our decision-making mechanisms to optimize the rate at which hu-

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**Figure 1.** People across the globe engage in religious rituals that require a considerable amount of time or personal sacrifice. Ultraorthodox Jews spend hours every day worshipping at the Western Wall in Jerusalem (*upper left*). Vegans of Phuket, Thailand, perform various acts of self-torture, including bathing in hot oil, fire walking and piercing themselves with sharp implements during their annual vegetarian festival (*upper right*). Shiite Muslims in Karbala, Iraq, beat their backs with chains to mark the killing of one of their saints, Imam Hussein (*lower left*). And young Christian men in Bulgaria dive into icy waters to retrieve a crucifix to mark the feast of Epiphany Monday (*lower right*). From an evolutionary perspective these behaviors seem maladaptive, prompting anthropologists to ask why natural selection would favor a psychology that engages in such acts. It turns out that the answer can be found by studying the ecology of animal communication.

man beings accrue resources under diverse ecological conditions—a basic prediction of *optimal foraging theory*. Optimality models offer predictions of the “perfectly adapted” behavioral response, given a set of environmental constraints. Of course, a perfect fit with the environment is almost never achieved because organisms rarely have perfect information and because environments are always changing. Nevertheless, this assumption has provided a powerful framework to analyze a variety of decisions, and most research (largely conducted among foraging populations) has shown that our species broadly conforms to these expectations.

If our species is designed to optimize the rate at which we extract energy from the environment, why would we engage in religious behavior that seems so counterproductive? Indeed, some religious practices, such as ritual sacrifices, are a conspicuous display of wasted resources. Anthropologists can explain why foragers regularly share their food with others in

the group, but why would anyone share their food with a dead ancestor by burning it to ashes on an altar? A common response to this question is that people believe in the efficacy of the rituals and the tenets of the faith that give meaning to the ceremonies. But this response merely begs the question. We must really ask why natural selection has favored a psychology that believes in the supernatural and engages in the costly manifestations of those beliefs.

### Ritual Sacrifice

Behavioral ecologists have only recently begun to consider the curiosities of religious activities, so at first I had to search other disciplines to understand these practices. The scholarly literature suggested that I wasn't the only one who believed that intense religious behavior was a sign of madness. Some of the greatest minds of the past two centuries, such as Marx and Freud, supported my thesis. And the early anthropological theorists also held that spiri-

tual beliefs were indicative of a primitive and simple mind. In the 19th century, Edward B. Tylor, often noted as one of the founding fathers of anthropology, maintained that religion arose out of a misunderstanding among "primitives" that dreams are real. He argued that dreams about deceased ancestors might have led the primitives to believe that spirits can survive death.

Eventually the discipline of anthropology matured, and its practitioners moved beyond the equation that "primitive equals irrational." Instead, they began to seek functional explanations of religion. Most prominent among these early 20th-century theorists was the Polish-born anthropologist Bronislaw Malinowski. He argued that religion arose out of "the real tragedies of human life, out of the conflict between human plans and realities." Although religion may serve to allay our fears of death, and provide comfort from our incessant search for answers, Malinowski's thesis did not seem to explain the origin of rituals. Standing in the midday desert sun in several layers of black clothing seems more like a recipe for increasing anxiety than treating it. The classical anthropologists didn't have the right answers to my questions. I needed to look elsewhere.

Fortunately, a new generation of anthropologists has begun to provide some explanations. It turns out that the strangeness of religious practices and their inherent costs are actually the critical features that contribute to the success of religion as a universal cultural strategy and why natural selection has favored such behavior in the human lineage. To understand this unexpected benefit we need to recognize the adaptive problem that ritual behavior solves. William

Irons, a behavioral ecologist at Northwestern University, has suggested that the universal dilemma is the promotion of cooperation within a community. Irons argues that the primary adaptive benefit of religion is its ability to facilitate cooperation within a group—while hunting, sharing food, defending against attacks and waging war—all critical activities in our evolutionary history. But, as Irons points out, although everyone is better off if everybody cooperates, this ideal is often very difficult to coordinate and achieve. The problem is that an individual is even better off if everyone else does the cooperating, while he or she remains at home enjoying an afternoon siesta. Cooperation requires social mechanisms that prevent individuals from free riding on the efforts of others. Irons argues that religion is such a mechanism.

The key is that religious rituals are a form of communication, which anthropologists have long maintained. They borrowed this insight from ethologists who observed that many species engage in patterned behavior, which they referred to as "ritual." Ethologists recognized that ritualistic behaviors served as a form of communication between members of the same species, and often between members of different species. For example, the males of many avian species engage in courtship rituals—such as bowing, head wagging, wing waving and hopping (among many other gestures)—to signal their amorous intents before a prospective mate. And, of course, the vibration of a rattlesnake's tail is a powerful threat display to other species that enter its personal space.

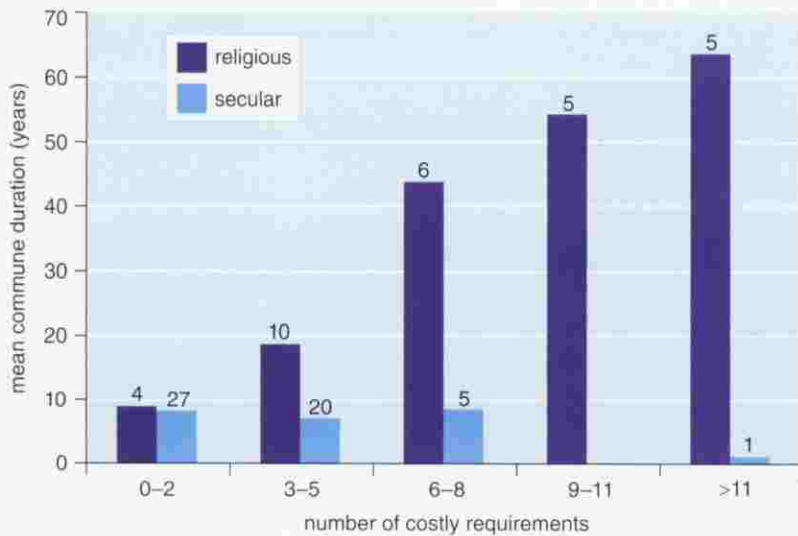
Irons's insight is that religious activities signal commitment to other members of the group. By engaging in the ritual, the member effectively says, "I identify with the group and I believe in what the group stands for." Through its ability to signal commitment, religious behavior can overcome the problem of free riders and promote cooperation within the group. It does so because trust lies at the heart of the problem: A member must assure everyone that he or she will participate in acquiring food or in defending the group. Of course, hunters and warriors may make promises—"you have my word, I'll show up tomorrow"—but unless the trust is already established such statements are not believable.

It turns out that there is a robust way to secure trust. Israeli biologist Amotz Zahavi observes that it is often in the best interest of an animal to send a dishonest signal—perhaps to fake its size, speed, strength, health or beauty. The only signal that can be believed is one that is too costly to fake, which he referred to as a "handicap." Zahavi argues that natural selection has favored the evolution of handicaps. For example, when a springbok antelope spots a predator it often *stots*—it jumps up and down. This extraordinary behavior puzzled bi-



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Figure 2. Stotting by a springbok antelope in front of a predator signals the animal's ability to escape. This behavior is too costly to fake by a weakened antelope, so it provides honest information about the animal's strength and speed. Similarly, human religious rituals that require an extreme display or a personal sacrifice are "too costly to fake" and so serve as honest signals of the member's dedication to the group.



**behaviors that are constrained**

**consumption of:**  
coffee, alcohol, tobacco, meat, other foods or beverages

**use and ownership of:**  
photographs, jewelry, certain technology, other material items

**activities:**  
monogamous marriage, gambling, communication with the outside, living as a nuclear family, maintaining rights to biological children

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**behaviors that are required**

trial period for membership; surrender of material belongings, learn a body of knowledge, endure public sessions of criticism, certain clothing styles, certain hairstyles, fasting

Figure 3. Religious communes that impose constraints on the behavior of their members tend to be long lived. As the number of costly requirements (examples on the right) imposed by a religious commune rises, its longevity increases. According to the “costly signaling theory of ritual,” the constraints and requirements signal a member’s commitment to the group. In this view, religious ritual promotes group cohesion; in turn, a cooperative group provides members with the benefits of group living, such as safety and cumulative wealth. Interestingly, there appears to be no relation between the number of costly requirements and the longevity of secular communes, suggesting that some other factor must be at play. The data are based on a study of 83 19th-century communes in the United States.

ologists for years: Why would an antelope waste precious energy that could be used to escape the predator? And why would the animal make itself more visible to something that wants to eat it? The reason is that the springbok is displaying its quality to the predator—its ability to escape, effectively saying, “Don’t bother chasing me. Look how strong my legs are, you won’t be able to catch me.” The only reason a predator believes the springbok is because the signal is too costly to fake. An antelope that is not quick enough to escape cannot imitate the signal because it is not strong enough to repeatedly jump to a certain height. Thus, a display can provide honest information if the signals are so costly to perform that lower quality organisms cannot benefit by imitating the signal.

In much the same way, religious behavior is also a costly signal. By donning several layers of clothing and standing out in the midday sun, ultraorthodox Jewish men are signaling to others: “Hey! Look, I’m a *haredi* Jew. If you are also a member of this group you can trust me because why else would I be dressed like this? No one would do this *unless* they believed in the teachings of ultraorthodox Judaism and were fully committed to its ideals and goals.” The quality that these men are signaling is their level of commitment to a specific religious group.

Adherence to a set of religious beliefs entails a host of ritual obligations and expected behaviors. Although there may be physical or psychological benefits associated with some ritual practices, the significant time, energy and financial costs involved serve as effective deterrents for anyone who does not believe in

the teachings of a particular religion. There is no incentive for nonbelievers to join or remain in a religious group, because the costs of maintaining membership—such as praying three times a day, eating only kosher food, donating a certain part of your income to charity and so on—are simply too high.

Those who engage in the suite of ritual requirements imposed by a religious group can be trusted to believe sincerely in the doctrines of their respective religious communities. As a result of increased levels of trust and commitment among group members, religious groups minimize costly monitoring mechanisms that are otherwise necessary to overcome free-rider problems that typically plague communal pursuits. Hence, the adaptive benefit of ritual behavior is its ability to promote and maintain cooperation, a challenge that our ancestors presumably faced throughout our evolutionary history.

### Benefits of Membership

One prediction of the “costly signaling theory of ritual” is that groups that impose the greatest demands on their members will elicit the highest levels of devotion and commitment. Only committed members will be willing to dress and behave in ways that differ from the rest of society. Groups that maintain more-committed members can also offer more because it’s easier for them to attain their collective goals than groups whose members are less committed. This may explain a paradox in the religious marketplace: Churches that require the most of their adherents are experiencing rapid rates of growth. For example, the Church of Jesus Christ of Latter-day Saints (Mormons), Sev-

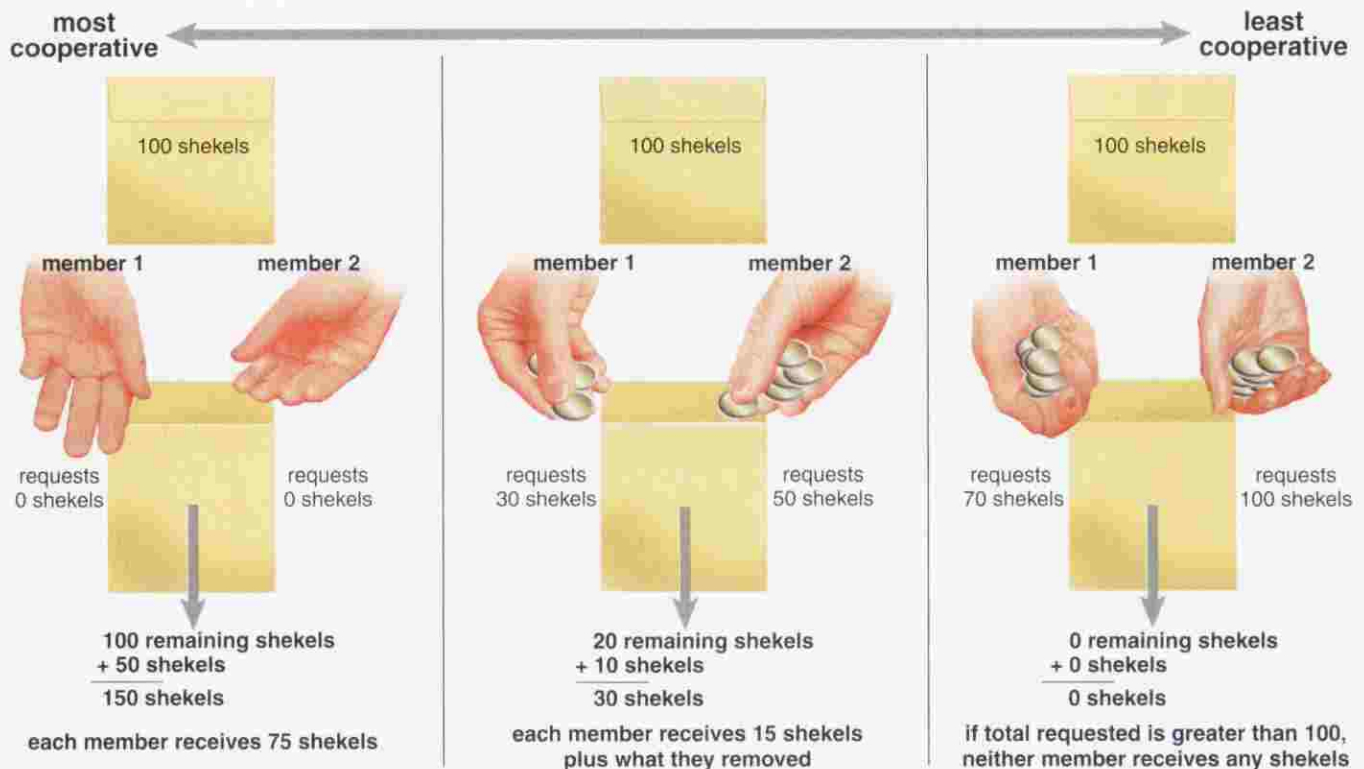


Figure 4. Relative cooperation by members of a group can be measured with a simple game. Two anonymous members of a kibbutz are told there are 100 shekels in an envelope to which both have access. Each member decides how much to withdraw for himself or herself. If the sum of both requests is less than or equal to 100, the money remaining in the envelope is increased by 50 percent and split evenly between the participants. Each member also keeps the amount originally requested. If the sum of both requests exceeds 100, neither member receives any money. The game mimics common over-consumption problems a kibbutz faces because members have unlimited access to resources provided by the kibbutz, such as food and electricity. The members who display the greatest restraint (by withdrawing the fewest shekels) exhibit the highest levels of cooperation. The game revealed that religious kibbutzniks were on average more cooperative than secular kibbutzniks.

enth-day Adventists and Jehovah's Witnesses, who respectively abstain from caffeine, meat and blood transfusions (among other things), have been growing at exceptional rates. In contrast, liberal Protestant denominations such as the Episcopalians, Methodists and Presbyterians have been steadily losing members.

Economist Lawrence Iannaccone, of George Mason University, has also noted that the most demanding groups also have the greatest number of committed members. He found that the more distinct a religious group was—how much the group's lifestyle differed from mainstream America—the higher its attendance rates at services. Sociologists Roger Finke and Rodney Stark, of Penn State and the University of Washington, respectively, have argued that when the Second Vatican Council in 1962 repealed many of the Catholic Church's prohibitions and reduced the level of strictness in the church, it initiated a decline in church attendance among American Catholics and reduced the enrollments in seminaries. Indeed, in the late 1950s almost 75 percent of American Catholics were attending Mass weekly, but since the Vatican's actions there has been a steady decline to the current rate of about 45 percent.

The costly signaling theory of ritual also predicts that greater commitment will translate

into greater cooperation within groups. My colleague Eric Bressler, a graduate student at McMaster University, and I addressed this question by looking at data from the records of 19th-century communes. All communes face an inherent problem of promoting and sustaining cooperation because individuals can free ride on the efforts of others. Because cooperation is key to a commune's survival, we employed commune longevity as a measure of cooperation. Compared to their secular counterparts, the religious communes did indeed demand more of their members, including such behavior as celibacy, the surrender of all material possessions and vegetarianism. Communes that demanded more of their members survived longer, overcoming the fundamental challenges of cooperation. By placing greater demands on their members, they were presumably able to elicit greater belief in and commitment toward the community's common ideology and goals.

I also wanted to evaluate the costly signaling theory of ritual within modern communal societies. The kibbutzim I had visited in Israel as a teenager provided an ideal opportunity to examine these hypotheses. For most of their 100-year history, these communal societies have lived by the dictum, "From each according to his abilities, to each according to his needs." The

majority of the more than 270 kibbutzim are secular (and often ideologically antireligious); fewer than 20 are religiously oriented. Because of a massive economic failure—a collective debt of more than \$4 billion—the kibbutzim are now moving in the direction of increased privatization and reduced communality. When news of the extraordinary debt surfaced in the late 1980s, it went largely unnoticed that the religious kibbutzim were financially stable. In the words of the Religious Kibbutz Movement Federation, “the economic position of the religious kibbutzim is sound, and they remain uninformed in the economic crisis.”

The success of the religious kibbutzim is especially remarkable given that many of their rituals inhibit economic productivity. For example, Jewish law does not permit Jews to milk cows on the Sabbath. Although rabbinic rulings now permit milking by kibbutz members to prevent the cows from suffering, in the early years none of this milk was used commercially. There are also significant constraints imposed by Jewish law on agricultural productivity. Fruits are not allowed to be eaten for the first few years of the tree’s life, agricultural fields must lie fallow every seven years, and the corners of fields can never be harvested—they must be left for society’s poor. Although these constraints appear detrimental to productivity, the costly signaling theory of ritual suggests that they may actually be the key to the economic success of the religious kibbutzim.

I decided to study this issue with economist Bradley Ruffle of Israel’s Ben Gurion University. We developed a game to determine whether there were differences in how the members of secular and religious kibbutzim cooperated with each other. The game involves two members from the same kibbutz who remain anonymous to each other. Each member is told there are 100 shekels in an envelope to which both members have access. Each participant decides how many shekels to withdraw and keep. If the sum of both requests exceeds 100 shekels, both members receive no money and the game is over. However, if the requests are less than or equal to 100 shekels, the money remaining in the envelope is increased by 50 percent and divided evenly among the participants. Each member also keeps the original amount he or she requested. The game is an example of a common-pool resource dilemma in which publicly accessible goods are no longer available once they are consumed. Since the goods are available to more than one person, the maintenance of the resources requires individual self-restraint; in other words, cooperation.

After we controlled for a number of variables, including the age and size of the kibbutz and the amount of privatization, we found not only that religious kibbutzniks were more cooperative with each other than secular

kibbutzniks, but that male religious kibbutz members were also significantly more cooperative than female members. Among secular kibbutzniks we found no sex differences at all. This result is understandable if we appreciate the types of rituals and demands imposed on religious Jews. Although there are a variety of requirements that are imposed equally on males and females, such as keeping kosher and refraining from work on the Sabbath, male rituals are largely performed in public, whereas female rituals are generally pursued privately. Indeed, none of the three major requirements imposed exclusively on women—attending a ritual bath, separating a portion of dough when baking bread and lighting Shabbat and holiday candles—are publicly performed. They are not rituals that signal commitment to a wider group; instead they appear to signal commitment to the family. Men, however, engage in highly visible rituals, most notably public prayer, which they are expected to perform three times a day. Among male religious kibbutz members, synagogue attendance is positively correlated with cooperative behavior. There is no similar correlation among females. This is not surprising given that women are not required to attend services, and so their presence does not signal commitment to the group. Here the costly signaling theory of ritual provides a unique explanation of these findings. We expect that further work will provide even more insight into the ability of ritual to promote trust, commitment and cooperation.

We know that many other species engage in ritual behaviors that appear to enhance

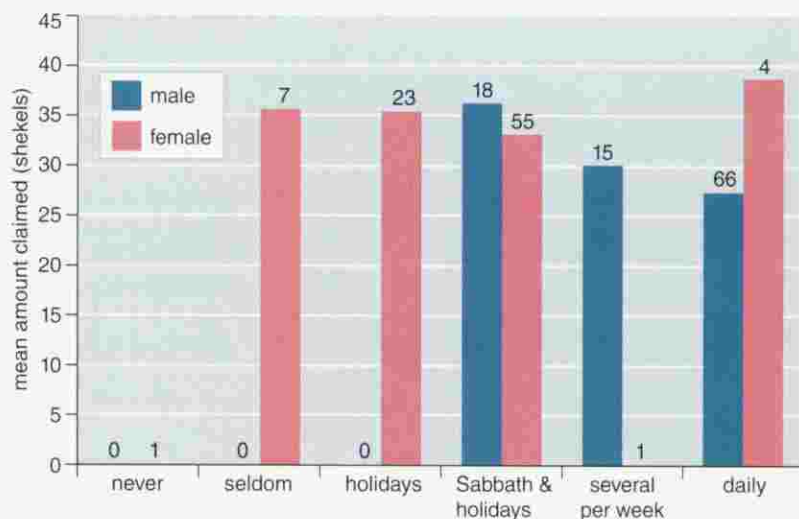


Figure 5. Increased synagogue attendance is correlated with increased cooperation among male kibbutz members. Men who attended religious services most often took the fewest shekels in a game designed to measure cooperation (see Figure 4). Interestingly, there was no relation between religious attendance and cooperation among women. This is consistent with the costly signaling theory of ritual because women are not required to attend services, and so their presence does not signal dedication to the group.

trust and cooperation. For example, anthropologists John Watanabe of Dartmouth University and Barbara Smuts at the University of Michigan have shown that greetings between male olive baboons serve to signal trust and commitment between former rivals. So why are human rituals often cloaked in mystery and the supernatural? Cognitive anthropologists Scott Atran of the University of Michigan and Pascal Boyer at Washington University in St. Louis have pointed out that the counterintuitive nature of supernatural concepts are more easily remembered than mundane ideas, which facilitates their cultural transmission. Belief in supernatural agents such as gods, spirits and ghosts also appears to be critical to religion's ability to promote long-term cooperation. In our study of 19th-century communes, Eric Bressler and I found that the strong positive relationship between the number of costly requirements imposed on members and commune longevity only held for religious communes, not secular ones. We were surprised by this result because secular groups such as militaries and fraternities appear to successfully employ costly rituals to maintain cooperation. Cultural ecologist Roy Rappaport explained, however, that although religious and secular rituals can both promote cooperation, religious rituals ironically generate greater belief and commitment because they sanctify unfalsifiable statements that are beyond the possibility of examination. Since statements containing supernatural elements, such as "Jesus is the son of God," cannot be proved or disproved, believers verify them "emotionally." In contrast to religious propositions, the kibbutz's guiding dictum, taken from Karl Marx, is not beyond question; it can be evaluated by living according to its directives by distributing labor and resources appropriately. Indeed, as the economic situation on the kibbutzim has worsened, this fundamental proposition of kibbutz life has been challenged and is now disregarded by many who are pushing their communities to accept differential pay scales. The ability of religious rituals to evoke emotional experiences that can be associated with enduring supernatural concepts and symbols differentiates them from both animal and secular rituals and lies at the heart of their efficiency in promoting and maintaining long-term group cooperation and commitment.

Evolutionary research on religious behavior is in its infancy, and many questions remain to be addressed. The costly signaling theory of ritual appears to provide some answers, and, of course, it has given me a better understanding of the questions I asked as a teenager. The real value of the costly signaling theory of ritual will be determined by its ability to explain religious phenomena across societies. Most of

us, including ultraorthodox Jews, are not living in communes. Nevertheless, contemporary religious congregations that demand much of their members are able to achieve a close-knit social community—an impressive accomplishment in today's individualistic world.

Religion has probably always served to enhance the union of its practitioners; unfortunately, there is also a dark side to this unity. If the intragroup solidarity that religion promotes is one of its significant adaptive benefits, then from its beginning religion has probably always played a role in intergroup conflicts. In other words, one of the benefits for individuals of intragroup solidarity is the ability of unified groups to defend and compete against other groups. This seems to be as true today as it ever was, and is nowhere more apparent than the region I visited as a 15-year-old boy—which is where I am as I write these words. As I conduct my fieldwork in the center of this war zone, I hope that by appreciating the depth of the religious need in the human psyche, and by understanding this powerful adaptation, we can learn how to promote cooperation rather than conflict.

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