WHY AREN'T WE ALL HUTTERITES?
Costly Signaling Theory and Religious Behavior

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In this paper I explore the psychology of ritual performance and present a simple graphical model that clarifies several issues in William Irons's theory of religion as a "hard-to-fake" sign of commitment. Irons posits that religious behaviors or rituals serve as costly signals of an individual's commitment to a religious group. Increased commitment among members of a religious group may facilitate intra-group cooperation, which is argued to be the primary adaptive benefit of religion. Here I propose a proximate explanation for how individuals are able to pay the short-term costs of ritual performance to achieve the long-term fitness benefits offered by religious groups. The model addresses three significant problems raised by Irons's theory. First, the model explains why potential free-riders do not join religious groups even when there are significant net benefits that members of religious groups can achieve. Second, the model clarifies how costly a ritual must be to achieve stability and prevent potential free-riders from joining the religious group. Third, the model suggests why religious groups may require adherents to perform private rituals that are not observed by others. Several hypotheses generated from the model are also discussed.

KEY WORDS: **Costly signaling theory; Evolution of religion; Intra-group cooperation; Ritual**

Religious behavior poses a genuine challenge for those who employ optimization, rational choice, or other egoistic-based models to explain human

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behavioral variation. The challenge lies in determining why humans perform behaviors that often entail significant proximate costs, such as time, energetic, and material costs, as well as physical and psychological pain. William Irons (1996a, 1996b, 1996c, 2001) has argued that these characteristics, which make religious behaviors puzzling from an egoistic perspective, are actually the key to understanding their universality. He claims that the costliness of religious behaviors enables them to serve as hard-to-fake signs of commitment to a group. Empirical tests have supported Irons's verbal arguments (Sosis 2000; Sosis and Bressler 2003; Sosis and Ruffle 2003), although a formal model of the theory of ritual has yet to be developed. To move closer to that goal, in this article I briefly explore the psychology of ritual practice and present a simple graphical model that addresses three ambiguities in what I will refer to as the costly signaling theory of ritual.

While the argument presented here attempts to explain why humans engage in religious rituals, the primary question concerns why humans internalize religious beliefs that demand ritual practice. The model described below deviates from traditional behavioral ecological models, which generally assume that actors can accurately assess the cost and benefit consequences of a set of alternative behaviors. Behavioral ecologists have made significant progress in advancing our understanding of the selective pressures that have shaped human decision patterns (see Winterhalder and Smith 2000), despite their lack of attention to the psychological processes that enable humans to evaluate the payoffs of alternative decisions. Here, however, I argue that the answer to the question posed in the title of this article lies precisely in our perception of the costs and benefits we would face if we were to sincerely contemplate joining a Hutterite colony.

COSTLY SIGNALING THEORY AND RELIGIOUS BEHAVIOR

Scholars of religion have described a range of somatic, reproductive, and psychological benefits that religious communities offer. These benefits include improved health, survivorship, economic opportunities, sense of community, psychological well-being, assistance during crises, mating opportunities, and fertility (see Reynolds and Tanner 1995 for a review). Religion's ability to promote group solidarity and cooperation underlies its capacity to offer many of these benefits. Irons (2001; also see Cronk 1994a; Sosis 2000) suggests that religion can promote intra-group cooperation by increasing trust among adherents. Various authors have argued that religion facilitates intra-group cooperation, most notably Durkheim (1995 [1912]); however, Irons's work posits a plausible adaptive explanation for

why it occurs. He argues that in human history the adaptive advantage of group living was the benefits that individuals attained through intra-group cooperation such as cooperative hunting, food sharing, defense, and warfare. However, despite the potential for individual gains through cooperation, these collective pursuits are often difficult to achieve. Intra-group cooperation is typically characterized by conditions in which individuals can maximize their gains by refraining from cooperation when others invest in the cooperative activity. Thus, although everyone may gain if all group members invest in the cooperative goal, attaining such large-scale cooperation is often difficult to achieve without social mechanisms limiting the potential to free-ride on the efforts of others (Dawes 1980; Olson 1965).

The potential for collective action is confronted with problems of trust and commitment (Frank 1988; Schelling 1960). When individuals can guarantee their participation in a cooperative pursuit, intra-group cooperation is more likely to emerge. However, in most human social interactions it is impossible to guarantee a commitment to cooperate. Those who interact can advertise a willingness to cooperate, although this strategy is not stable. When faced with the conditions of collective action, the incentive to falsely claim that one will cooperate is especially high since individuals can achieve their greatest gains by refraining from cooperation when others cooperate. Therefore, whenever an individual can achieve net benefits from defection, the only credible signals of cooperative intentions are those that are "costly-to-fake." If commitment signals are not costly-to-fake, they can easily be imitated by free-riders who do not intend to invest in the cooperative pursuit. Several researchers (Berman 2000; Cronk 1994a; Irons 1996a, 1996b, 1996c, 2001; Iannaccone 1992, 1994) have suggested that religious behaviors are costly-to-fake signals of commitment.

Communities that share a religious identity require a host of ritual obligations and expected behavioral patterns. For example, many populations require males and females to undergo initiation rites that include beatings, genital mutilations, exposure to extreme temperatures, tattooing, isolation, food and water deprivation, consumption of toxic substances, and death threats (e.g., Tuzin 1982; Whiting et al. 1958; Young 1965). In literate societies, religious legal codes (e.g., Laws of Manu, Talmud, etc.) outlining appropriate behavior tend to be formalized and regulate a wide range of activities, including food consumption, work, charitable commitments, and dress, as well as defining the frequency and structure of ritual ceremony and prayer. Although there may be physical or mental health benefits associated with some ritual practices (see Levin 1994; Reynolds and Tanner 1995), the significant time, energy, and material costs involved in imitating such behavior serve as effective deterrents for anyone who does not accept the teachings of a particular religion. Therefore, religions often

maintain intra-group solidarity by requiring costly behavioral patterns of group members. Religious beliefs appear to be well suited to solve collective action problems by increasing commitment and loyalty to others who share these beliefs. By increasing trust among group members, religious groups avoid or minimize costly monitoring mechanisms that are otherwise necessary to overcome free-rider problems that typically plague communal pursuits.

By way of example, consider Ensminger's (1997) argument that the spread of Islam throughout Africa resulted from the economic advantages of religious conversion. Ensminger claims "Islam was a powerful ideology with built-in sanctions which contributed to considerable self-enforcement of contracts. True believers had a non-material interest in holding to the terms of contracts even if the opportunity presented itself to shirk" (1997:8). Thus, Islam provided a mechanism to overcome the collective action problems of long-distance commerce. Conversion to Islam increased trust among traders, which reduced transaction costs, making trade more profitable. In addition, high levels of trust among Muslim coreligionists allowed for greater credit to be extended, facilitating further trade expansion. Ensminger contends that the steep initiation costs of entry into Islam, such as daily prayer, abstaining from alcohol, fasting during Ramadan, and the pilgrimage to Mecca, served as the means for establishing a reputation among traders for trustworthiness. In other words, these rituals and taboos are costly signals of commitment that served to prevent free-riders from achieving the benefits of more efficient trade.

Irons's theory may provide insights into the adaptive functions of a wide range of religious rituals, including subincision rites, mourning practices, and even prayer. It may also explain a variety of secular rituals (cf. Sosis and Bressler 2003). For example, army boot camp and fraternity hell week can both be interpreted as necessary rites that signal commitment to other group members. Nevertheless, there are several issues in the argument that need clarification.

Why Aren't We All Hutterites?

> Considering the phenomenal reproductive rates of Hutterites, the real mystery for evolutionary biology is why the rest of us are not trying to join their colonies (Cronk 1994b:615).

The extraordinary reproductive success of Hutterites is well documented (Cook 1954; Eaton and Mayer 1953; Tietze 1957); why are most of us unwilling to pay the costs of joining the Hutterites to achieve these reproductive gains? Hutterites engage in a variety of ritual practices, such as fasting, daily church worship, and thrice-daily communal meals that are preceded and followed by prayer. Hutterites also face a wide assortment

of restrictions on their behavior, such as prohibitions on owning or using musical instruments, radios, jewelry, tobacco, and other material items. Dancing and gambling are also forbidden and colonies impose constraints on contact and communication with non-Hutterites (Hostetler 1997; Janzen 1999; Wilson 2000). Collectively these requirements of Hutterite life are rather costly (Sosis and Bressler 2003), but presumably these costs have little (negative) impact on their fertility. If membership in a group that requires ritual practices genuinely results in *net* fitness gains, why do others not simply perform the rituals required for membership, even if they do not believe the doctrine that gives meaning to the rituals? Rituals are often costly, but nonbelievers *can* perform them. In commenting on the Yomut Turkmen of northern Iran, Irons states:

> All ethnographers who are immersed for an extended time in a community very different from that of their origin eventually ask themselves, What if I were to spend the rest of my life here? When these thoughts occurred to me, it always seemed obvious that were I to stay, conversion to and conspicuous practice of Islam would be the best route to acceptance by the local community (Irons 2001:301).

Irons provides a valuable insight. The important point here is that although the ritual practices of the Yomut are costly, Irons claims that complete outsiders can successfully perform them to gain acceptance in the group, *even if they do not accept the teachings of Islam.* If the net gains from joining a group outweigh any ritual costs that are required to join the group, how do the costs of the ritual practices serve as deterrents of free-riders who do not believe in the teachings of a religion? Conversely, if rituals must be costly enough to prevent free-riders from entering a population, why is it beneficial for anyone to pay the costs of group membership?

How Costly Is "Costly-to-Fake?"

A second issue that needs to be clarified in the costly signaling theory of ritual is the size of the costs that are necessary to prevent free-riders from entering a population. Costly signaling theory informs us that the costs of a signal are always conditional; they are dependent on the quality of the signaler (Johnstone 1997). Thus, there is no absolute level of costliness that will ensure that a ritual will stabilize in a population. Stability will be determined by the relative costs of ritual performance to signalers of varying quality, although it is not clear how great the relative costs must be to achieve a state of equilibrium.

Consider an example Irons (2001) discusses from Utilia, in the Bay Islands of Honduras. As in any population, marital fidelity varies among Utilian women and is a trait of significant interest to Utilian men. Men

claim that they prefer to marry women who regularly attend church because they are more likely to be faithful wives. In the language of costly signaling theory, variance in church attendance is used as a signal to assess variance in fidelity; faithful women are of higher "quality" than promiscuous women. However, what is preventing women from attending church *and* pursuing discreet free sexual choice? Is church attendance costlier for promiscuous women than faithful women? This seems unlikely, but how then can it deter promiscuous women from sending false signals of fidelity? How costly for faithful and promiscuous women, respectively, does church attendance have to be for it to stabilize as an honest signal of marital commitment?

Why Do Religious Groups Require Private Ritual Performance?

Most anthropological approaches to the function of religion, including Irons's, have focused on the group-level phenomenon of ritual performance and its unifying effect among participants (e.g., Durkheim 1995 [1912]; Hayden 1987; Radcliffe-Brown 1952; Rappaport 1979; Turner 1969), whereas the function of private ritual performance has received much less attention (but see Rappaport 1999). If the function of ritual is to promote group solidarity, why do religious groups often require the performance of rituals that are not publicly observed? How can the performance of private rituals serve as a signal of commitment to group members? Some private rituals, such as textual study, have consequences that can be evaluated in the public arena and hence are difficult to fake. However, many religiously prescribed private rituals can seemingly be ignored without possibility of detection. In addition, religious taboos are commonly observed in public, yet they can often be privately broken with little risk of detection. Public observance of religious dietary taboos, for example, may serve to increase group identity and cohesiveness, but why do religions also mandate that these taboos be privately practiced when it is impossible to detect and punish noncompliance?

THE PSYCHOLOGY OF RITUAL PERFORMANCE

> Not many people are convinced by Socrates' claim that "to know the good is to do it" (Smith 1991).
>
> We do not have faith because of deeds; we may attain faith through sacred deeds. . . . Through the ecstasy of deeds he learns to be certain of the hereness of God. Right living is a way to right thinking (Heschel 1955:282–283).

Although there is no universally accepted definition of religion, indeed anthropologists have generated dozens (for reviews see Klass 1995; Spiro

1966), almost all definitions recognize that "belief" in some supernatural agent (spirits, ancestors, ghosts, deities, etc.) is an essential feature, and for many the primary element, of religion. Any theory of religion and religious behavior must explain the relevance of belief to religious life.

To answer the questions posed above we must briefly examine the psychological motivations and consequences of ritual performance and their relationship to belief patterns. Although it is commonly held that behavior patterns are proximally motivated by attitudes developed from past experience (e.g., Ajzen 1988; Fishbein and Ajzen 1975) and current environmental stimuli, social psychologists have also shown that behavior can impact attitudes, opinions, and beliefs (Bem 1965, 1966; Fazio 1987; Janis and King 1954; Vallacher and Wegner 1985; Zimbardo et al. 1969). For example, studies have shown that performing an action as seemingly innocuous as signing a petition (Freedman and Fraser 1966) or filling out a form (Cioffi and Garner 1966) can result in significant attitude change. Two main theories have been developed to explain these observations: self-perception theory and cognitive dissonance theory. Self-perception theory (Bem 1965, 1972) claims that one way that people acquire their attitudes and beliefs is by observing themselves. Cognitive dissonance theory (Festinger 1957, 1964; also see Aronson 1997) claims that psychological discomfort that arises from possessing attitudes inconsistent with behavior can produce changes in those attitudes. A person's belief prior to the relevant action is the critical determinant of which process will occur. When individuals perform actions that are not in discord with their initial attitudes, social perception processes occur; when actions are divergent from initial attitudes, emotional discordance is experienced and cognitive dissonance occurs (Fazio et al. 1977). Both theories predict, however, that when the values associated with a behavior are highly contrary to initial beliefs, behaviors are likely to be altered rather than belief, unless additional pressures (e.g., social or authority pressures) are influencing the continuation of the behavior. Distinguishing between these theories is not critical for the present argument; what is important is the observation that action can influence attitudes.

When overt actions imply a set of values, such as the cause of a petition, the values can become internalized into private conviction. Although external forces such as punishment threats or social control can alter behavior, studies have shown that once these pressures are removed, individuals often return to their prior behavioral patterns (e.g., Freedman 1965). Internalization is the critical determinant of successful *long-term* attitudinal change, and consequently behavioral change (Deci and Ryan 1985; Freedman 1965; Kelman 1958; Tyler and Blader 2000). Those who *believe* that an action is correct or appropriate will continue to perform it even after punishment threats for noncompliance are removed. Interestingly, performance of the action itself may lead to changes in attitude about the

behavior, consequently reinforcing the behavioral pattern (e.g., Chandler and Connell 1987).

Although psychologists of religion have explored "intrinsic" religious motivation (i.e., internalized belief) as an independent variable to explain variation in prejudice (e.g., Allport 1966; Donahue 1985a) and altruism (e.g., Batson and Ventis 1982), little effort has been invested in explaining how religious beliefs become internalized. It is argued here that ritual, by employing the same psychological processes that translate value-laden actions into attitudinal changes, is the mechanism through which religions maintain belief among adherents. Rituals are not empty performances; they are embedded with meaning, symbolism, and moral consequences (Geertz 1973; Leach 1976; Turner 1967). Rituals are always buoyed by cosmological explanations that provide significance, insight, and appreciation for the performers. Cosmology and theology also serve to inextricably bind ritual's performers to the moral code of the community (Rappaport 1999). Since ritual performance is unambiguously associated with overt group values, self-perception or cognitive dissonance processes will cause nonbelievers to either modify their belief or discontinue the ritual actions. For example, consider the reactions of religious sect members to failed prophecy. One would expect a group to dissolve after the claims of its leader have been shown to be undeniably false (the world did not end, no visitors from another planet, etc.). However, studies have shown that commitment to the group actually *increases* after some anticipated event fails to transpire (Festinger et al. 1956; Gager 1975; Wilson 1987; cf. Balch et al. 1983, 1997). To reconcile the contradiction of their behavior (i.e., investing and participating in group activities) and the new information suggesting that their leader is a fraud, or at least not prophetic, adherents claim greater belief in the teachings of the leader and pursue group rituals and activities with renewed passion.

Rituals possess four characteristics that enable them to promote the cosmological beliefs that imbue them with meaning: rituals are (1) physical actions, (2) generally social and publicly performed, (3) formal, and (4) often repetitive and cyclical. By providing concrete evidence of their participation, each of these features potentially contributes to cognitive dissonance or self-perception processes if the performer does not share the values encoded in the ritual. Since ritual performance is widely observed there are additional social pressures to reconcile any contradictions between belief and behavior, pressures that would be absent if ritual were only privately performed. In addition, the formality of ritual makes it an effective mode of communication. As Rappaport (1979, 1999) has pointed out, although ritual behaviors appear to be shrouded in mystery, they are deliberate and their message to other adherents is clear: participation in a ritual performance signals acceptance of the moral values encoded in the

ritual.[1] For example, during a wedding ceremony the bride and groom send a public signal that they accept the moral values, as defined by the community, incumbent upon the institution of marriage. Although some rituals such as weddings and rites of passage occur only once, many religions require daily, weekly, monthly, seasonal, yearly, and multi-yearly rituals. The repetition of formal, publicly observed ritual actions demands greater reconciliation with any conflicting beliefs.

The multimodality of ritual requirements also enables ritual to maintain and promote belief. As biologists have observed, multicomponent signals facilitate transmission of a message by enhancing clarity for the receiver (Rowe 1999). Ritual requirements are generally diverse and employ the range of human sensory systems. Consequently, the multimodality of ritual obligations not only facilitates interpersonal communication but also forces practitioners to reconcile a variety of behaviors with any conflicting values and beliefs. The multimodality of ritual requirements serves to completely affect its performers. Theologians (Hefner 1993; Kelley 1972; Tillich 1951, 1952) as well as social scientists (Klass 1995; Rappaport 1999) have noted that religion is the "ultimate concern" of its adherents. It is likely that the multimodality of ritual enables religion to achieve this primacy.

The success of cults in attracting new members is testament to the ability of ritual to transform attitudes (Appel 1983; Collins 1991; Galanter 1999; Singer 1995). Although the proselytization methods employed by cults are diverse, joining a cult is typically not a process of "brainwashing," at least as it is popularly conceived (Robbins and Anthony 1982). Some cults, such as the Unification Church, attract members not by introducing them to the wisdom of their teachings; potential members are simply drawn into the group by participating in activities such as workshops, group singing, sport competitions, and distributing flowers at airports. It is only after several months of such ritualized activity that new members are even introduced to the teachings of the Rev. Sun Myung Moon (Galanter 1999; Pesternak 1988). As a result of either cognitive dissonance or self-perception (depending on the individual's initial state of beliefs), teachings which several months before would have found unreceptive ears are now willingly accepted. Nonetheless, it is important to emphasize that ritual is most effective at transforming beliefs when initial views and attitudes are either ambiguous or not too divergent from those implied in the ritual performance. Research on proselytizing religions suggests that missionaries are most successful at converting those who already share many of their beliefs. For example, Mormon proselytization efforts have been most effective where Christianity has already gained wide acceptance (Stark 1987).

Religious training for children is a process similar to that employed by proselytizing cults and religions. Galanter (1999) suggests that self-perception plays a role in the development of religious identity:

> People may, for example, attribute meaning to important experiences in life by recourse to their family's religious background, but usually they had adopted these attitudes without formal intention, in part because they observed themselves engaged in that faith as they grew up. One does not necessarily arrive at a conscious decision about one's religious orientation, but rather acknowledges "I am a Catholic" or "I am a Jew" because one has repeatedly carried out practices associated with that faith (Galanter 1999:56).

Indeed, theology is not taught to a five-year-old child, but five-year-old children raised in a religious environment engage in a wide array of ritual behaviors. Later in life, theology will provide the meanings and rationalizations for the rituals that the individual has performed for years.[2]

There appear to be two additional factors that impact the relationship between ritual performance and belief. First, as Aronson and Mills note, "persons who go through a great deal of trouble or pain to attain something tend to value it more highly than persons who attain the same thing with a minimum of effort" (1959:177). Several researchers (Aronson and Mills 1959; Gerard and Mathewson 1966) have shown that individuals who pay higher initiation costs to enter a group are more satisfied with group membership than those who had little or no initiation costs for entry. Second, since Festinger's ground-breaking Theory of Social Comparison Processes (Festinger 1954), social psychologists have demonstrated that human opinions are significantly influenced by others, even when all other evidence contradicts these opinions (e.g., Asch 1951; Sherif 1958). Thus, it is likely that the social and public nature of ritual activity puts added pressure on performers to accept the values communicated by the performance (Rappaport 1999).

A COSTLY SIGNALING MODEL OF RITUAL

When organisms have conflicting interests, there are two possible mechanisms that enable honest communication. First, if variation in the signal is directly linked to variation in the phenotypic quality being advertised, there is no possibility of deceit (Johnstone 1997, 1998). For example, in most species the frequency of vocal signals reliably reveals the size of the caller because physical size is directly linked to the organism's ability to produce calls of specific frequency. Second, even if the signal is not directly linked to phenotypic quality, signals expressing phenotypic condition can be honest if the costs to lower-quality organisms of imitating the signals of higher-quality organisms outweigh the benefits that can be achieved (Grafen 1990; Zahavi 1975, 1977). This may result from differential costs or benefits faced by high- and low-quality signalers.

The costly signaling theory of ritual posits that ritual performance is a signal that advertises an individual's level of commitment to the group.

Preferred signalers are those who are highly committed to the group and are thus likely to be cooperators. The critical underlying condition of interest to the receiver is the depth of belief in the teachings and values of the group; devout believers are those who are most dedicated to the ideals, values, and goals of the group. If ritual actions influence belief, as was argued above, then there is a direct link between the signal (ritual performance) and phenotypic quality (piety); the physical performance of the ritual inspires belief in the group's cosmology and consequently induces group loyalty. However, regardless of how powerful and efficient these psychological processes may be, they assume some initial ambiguity in belief. Thus, although there is a partial link between the signal and advertised phenotype, the link is not absolute. Accordingly, those who are firm in their disbelief can send false signals of piety and intra-group commitment by imitating ritual actions. History is replete with examples of minorities, such as the Marranos (Stillman 1979), who were forcibly coerced into adopting religious practices of a dominant group, yet maintained their traditional beliefs. Therefore, rituals must also be costly to maintain their signaling reliability. Ritual performers, whether they are free-riders or committed members, are not likely to face differential benefits; *ceteris paribus* any individual performing the ritual requirements of a religious group is likely to gain the benefits of group membership. Individuals also face similar costs when performing rituals; however, here I will argue that they perceive these costs differently.

The model presented here is aimed at explaining why anyone would internalize religious beliefs that demand costly ritual practices.[3] Furthermore, the model will answer three questions posed above: (1) Why are most of us unwilling to join reproductively successful religious groups? (2) How costly must a ritual be for it to be an effective deterrent of free-riders? (3) Why do religious groups mandate that their members engage in private rituals that can easily be ignored? Consider a population of two groups: one group consists of individuals (believers) who are fully committed to a doctrine that mandates in-group altruism (as many religions do; Alexander 1987); the other consists of individuals (skeptics) who pursue their self-interest and are not committed to this doctrine. If the economic survival of each group is dependent upon their ability to cooperate with others in their group, believers will always achieve higher net gains than skeptics. Consider conditions in which the individual payoffs for interaction take the form of the well-known prisoner's dilemma game.[4] In the skeptic group, cooperation will require members to monitor each other's investment and punish defectors. However, this is unlikely to be stable since monitoring and punishment only introduce second-order collective action problems. Even if this second-order collective action problem is solved (see Boyd and Richerson 1992), monitoring and punishment will always entail some costs. Believers, on the other hand, will pay fewer

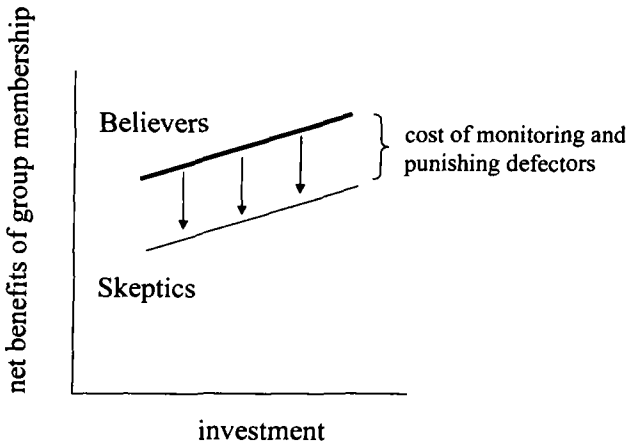

Figure 1. Net benefits of group membership as a function of investment. The net benefits of group membership for two groups, believers and skeptics, are illustrated as a function of investment in the group. Believers attain higher net benefits than skeptics because they pay less monitoring and punishment costs. The arrows indicate that the believer group is not stable, and without some mechanism preventing defectors from invading the group of believers, skeptics will dominate the population.

costs to encourage cooperation. Since their doctrine promotes in-group altruism, believers are more likely to cooperate, and the costs of monitoring others' behavior or punishing defectors will be less (Figure 1). Assuming that monitoring and punishment costs, as well as the benefits of collective action, are evenly distributed among group members, believers will have higher net gains than skeptics, even if both groups achieve similar levels of cooperation.

Of course, unconditional trust is not a stable strategy. Cheaters who profess belief but defect can easily invade a group of trusting believers, and a mistrustful strategy will quickly dominate the population. However, consider what happens if one must perform a costly act, such as a ritual, to become a member of the believer group. Initially, let us assume that to enter the group everyone must perform the ritual, and this performance results in the same costs for everyone. In other words, the ritual can be performed equally well by believers and skeptics. In addition, as long as an individual performs the ritual action, she will attain the benefits of group membership. Under these conditions the ritual does not serve as a signal of commitment to the group. Whether or not an individual believes the doctrine that promotes cooperation, the dominant strategy is to perform the

costly ritual as long as the net benefits are higher than what can be attained by joining the skeptic group. At equilibrium, joining either the group of believers or skeptics will result in equivalent payoffs. Thus there will be no incentives to perform costly rituals, and they are not expected to emerge.

Consider, however, conditions in which believers have been regularly practicing a set of rituals, and skeptics have not. The resource costs (i.e., time, energy, or material costs; see Hames 1992:205) of a ritual performance will be equal for believers and skeptics. If group members are required to pray five times per day, regardless of whether or not individuals believe the words they are reciting, they pay the same time and energy costs while engaging in prayer. However, believers and skeptics are not likely to evaluate their net costs similarly. When performing ritual actions prescribed by the doctrine of the believers, the internal evaluation of opportunity costs will be higher for skeptics than for believers. The difference in perceived costs of performing rituals for believers and skeptics is caused by the influence that ritual performance has on belief patterns. As was argued above, the physical, formal, public, and repetitive nature of ritual performance stimulates cognitive processes for the nonbeliever that will result in either a change in belief or a discontinuation of the ritual actions. Skeptics who continue to perform rituals without a modification of belief are those who are firm in their disbelief, and will consequently evaluate opportunity costs to be much higher than those who become believers. In other words, skeptics will perceive the benefits of alternative activities forgone while performing a ritual to be higher than those who become believers through repeated ritual performance. Figure 2 depicts these conditions. The perceived opportunity costs of believers are relatively flat because the utility of activities forgone is low for true believers. An individual who genuinely believes that eating during a religiously prescribed fast results in eternal damnation will eagerly participate in the fast. Indeed, the truly costly act for this individual would be to prematurely end the fast. The costs and benefits of a behavior are always assessed with respect to a set of feasible alternatives. When eternal damnation lies in the balance, the set of feasible alternatives is quite small for a believer. The perceived opportunity-cost isoclines of the skeptics, however, are steep. Without the belief that eternal damnation awaits those who break a day-long fast, the option set for the skeptic is extensive and thus each additional hour spent forgoing food will be an increasingly burdensome task.

If believers and skeptics engage in identical behavior, we expect them to achieve identical payoffs. What differs between them is their perception of the payoffs they can attain. Figure 2 shows that the perceived optimal ritual intensity is higher for believers than for skeptics. For example, the amount of time and energy spent praying or fasting that will result in the largest perceived fitness gain is higher for believers than skeptics.

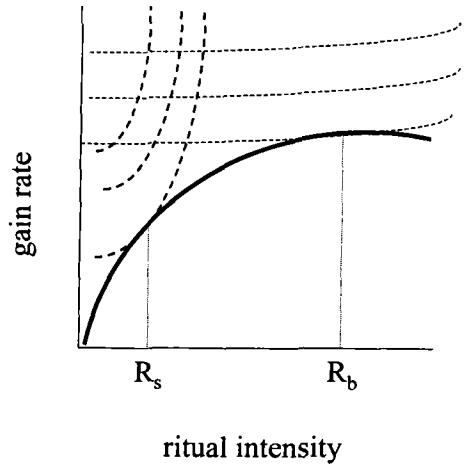

Figure 2. The gain rate as a function of ritual intensity. Perceived opportunity cost isoclines for skeptics are steep (bold), but they are flat for believers owing to differences in their set of alternative behaviors (see text). The perceived optimal ritual intensity for skeptics, R_s, is less than the perceived optimal ritual intensity for believers, R_b. The gain curve is curvilinear. Increases in ritual intensity result in decreasing marginal gains, but excessive ritual intensity results in alienating one from the group and is thus subject to increasing marginal losses.

However, groups that maintain ritual requirements generally do not permit their members to freely choose their optimal level of ritual intensity from an unlimited range. Most groups have a minimum level of ritual participation that is required if one is to achieve the benefits of group membership. Figure 3 depicts conditions in which believers and skeptics face differential perceived costs for the performance of a ritual. Believers perceive greater net gains if there is a minimum threshold of ritual activity that is required to achieve the benefits of group membership.

Figure 3 suggests that the intensity of religious belief is negatively correlated with the perceived cost of ritual actions prescribed by the religion; as one becomes more committed to the dogma of the religion, the benefits that one can achieve from alternative activities will decline. The minimum ritual requirements for group membership may also be impacted by this relationship. As commitment to the religious doctrine increases, and perceived costs to committed members consequently decrease, the minimum ritual requirements for group membership may rise. The costs to committed members will not solely determine the minimum requirements for

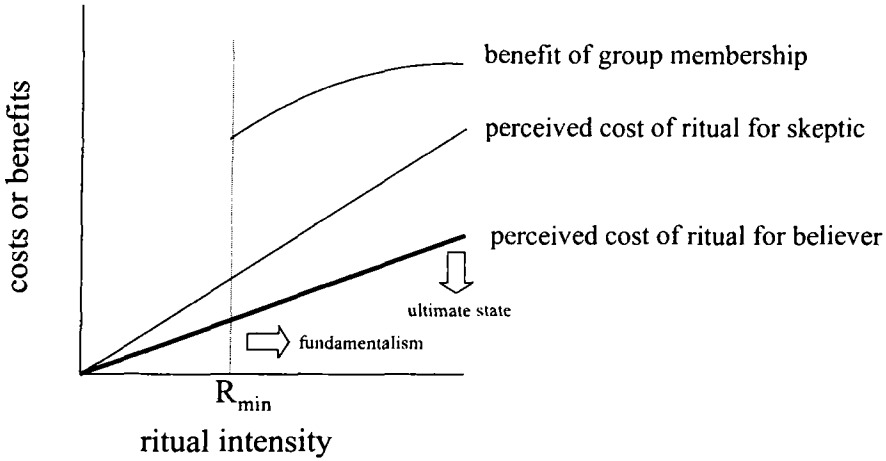

Figure 3. The perceived costs and benefits of belonging to a group of believers and skeptics as a function of ritual intensity. R_{min} is the minimal ritual requirement needed to achieve membership in a group. Believers perceive lower costs than skeptics (see text) and therefore at any R_{min} perceive higher net gains. As believers achieve an "ultimate state" (e.g., Nirvana, Brahma, Bittul), their perceived costs of ritual performance decline. Fundamentalism is characterized by increasing R_{min}.

group membership (see below), but they do impact the range of potential costs that committed members will be willing to pay.

The minimum ritual requirements of a group will actually be determined by the alternative opportunities available to potential free-riders. How costly must a ritual be for free-riding skeptics to prevent them from entering a religious group? A free-rider's perceived costs of ritual participation must be greater than the difference between the benefits that he can attain from joining the group of believers, than if he joined the group of skeptics. If the perceived costs of ritual participation for a skeptic are low enough that ritual participation results in higher net gains than not engaging in the ritual would, he is expected to join the believers and free-ride on their efforts. Of course, these conditions are not stable. Ritual requirements are expected to increase in cost until it is no longer perceived to be advantageous for a skeptic to join a group of believers. At equilibrium, skeptics will assess that it is not profitable to join groups of believers, but it will be worthwhile for believers to engage in costly ritual behavior because they perceive lower costs than skeptics. Thus, the minimum ritual requirements for group membership are not directly determined by the

cost of these requirements to the adherents; the intensity of the requirements is determined by the costs to potential free-riders.

Figure 4 depicts the conditions under which costly rituals will emerge. Here I ignore the costs of joining a group other than the costs of ritual performance. B_r denotes the benefit of belonging to a group of (religious) believers. B_s denotes the benefit of belonging to a group of skeptics.[5] An individual's investment in cooperative activities is denoted as i. It is assumed that group benefits are a function of the time, energy, and resources that individuals are willing to invest in a group. C_{ru} and C_{su} are the cumulative perceived costs for believers and skeptics, respectively, of performing the public rituals required for joining the believers, and l and h denote low and high. The perceived costs of performing private rituals are denoted as C_v. It is assumed that only believers practice private rituals because there are no costs to skeptics of not engaging in these rituals. For believers and skeptics, respectively, the payoff of joining a group of believers is:

$$f(\mathrm{b} \mid \mathrm{r}) = B_r(i) - (C_{ru} + C_{rv}) \quad (1)$$

$$f(\mathrm{s} \mid \mathrm{r}) = B_r(i) - C_{su} \quad (2)$$

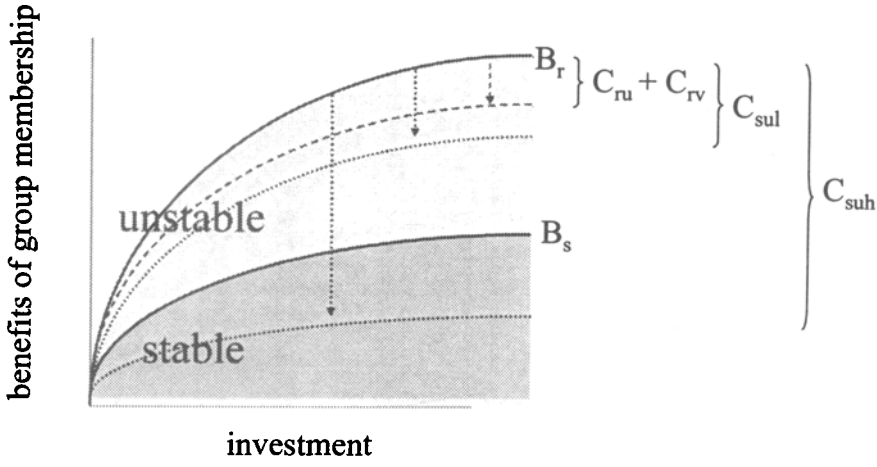

Figure 4. The perceived costs and benefits of belonging to a group as a function of investment in the group. Arrows indicate the perceived costs of ritual performance and dotted lines indicate net benefit curves. Rituals are stable when $C_{ru} + C_{rv} < B_r(i) - B_s(i) < C_{su}$. If the perceived costs of a ritual for a skeptic are C_{sul}, the ritual is unstable. If costs are C_{suh}, the ritual is stable.

If, as is depicted in Figures 1–3,

$$B_r > B_s \tag{3}$$

and the costs of performing private rituals are high, such that

$$C_{ru} + C_{rv} > C_{su} \tag{4}$$

then skeptics should engage in costly ritual behavior. This will of course be unstable; the costly rituals are ineffective deterrents of free-riders. In a stable environment we expect

$$C_{ru} + C_{rv} < C_{su} \tag{5}$$

The perceived costs to a believer of private ritual requirements must be less than the difference between the perceived costs of public rituals for skeptics and believers. Even if equation (5) holds, skeptics should join the group of believers and engage in costly ritual behavior if

$$B_r(i) - B_s(i) > C_{su} \tag{6}$$

For example, in Figure 4 if the perceived cost to a skeptic of performing the ritual requirements necessary for acceptance in the group of believers is C_{sul}, the skeptic should join the believers. These conditions however are not stable because skeptics can free-ride on trusting believers. Rituals are expected to increase in cost until it is no longer perceived to be advantageous for a skeptic to join a group of believers, in other words, until

$$B_r(i) - B_s(i) < C_{su} \tag{7}$$

Therefore, if the perceived costs to a skeptic of performing the ritual requirements necessary for acceptance in the group of believers is C_{suh}, the ritual will be stable if

$$B_r(i) - B_s(i) > C_{ru} + C_{rv} \tag{8}$$

The difference in benefits of joining the believers rather than joining the skeptics must be greater than the perceived costs of performing public and private rituals for the believer. The cost of the rituals will thus stabilize when the conditions of equations (7) and (8) are both met.

DISCUSSION

Ethologists (Crook 1970; Eibl-Eiblesfeldt 1970; Huxley 1923; Laughlin and McManus 1979) and anthropologists (Leach 1954, 1976; Rappaport 1968, 1979, 1999; Wallace 1966) have long argued that human and non-human ritual is a form of communication. The argument presented here follows in that tradition and incorporates an understanding of the psychological im-

pact of ritual performance. Ritual performers pay short-term measurable resource costs and consequently gain long-term measurable benefits, namely benefits that can be achieved through successful collective action. Individuals are able to pay the short-term costs of ritual performance because repeated ritual performance can induce belief, which creates the subjective internal sense of short-term benefits. In other words, a religiously prescribed vow of silence is only internally evaluated as costly to the nonbeliever; the genuine believer will welcome the opportunity to fulfill this obligation.

The model addresses three significant problems in the costly signaling theory of ritual. First, the model explains why skeptics do not attempt to join religious groups, even if membership in a religious group results in significant fitness gains. The routine participation in ritual activities can result in the internalization of genuine beliefs and acceptance of group values. Consequently, believers and skeptics perceive different opportunity costs; the perceived benefits forgone by skeptics while performing a ritual are greater than the perceived benefits forgone by believers. Thus, the model clarifies how costly rituals prevent potential free-riders from invading a group of believers and explains why individuals internalize religious beliefs. Without acceptance of the tenets that give meaning to the ritual, individuals cannot achieve the net gains that religious groups offer. Consider an example discussed earlier. Utilian men apparently believe that church attendance among women is an honest signal of fidelity. I questioned why women could not attend church and pursue discreet sexual choice. The argument presented here explains that women who attend church are ultimately more likely to believe the tenets of the church via either self-perception or cognitive dissonance processes, and if women continue not to believe in the teachings of the church (such as, adultery is a sin), their perceived opportunity costs for attending church will be too high to make regular church attendance worthwhile.

This does not mean that all Utilian women who regularly attend church will never engage in extramarital affairs. As Johnstone (1997) notes, a signal can achieve stability in a population even if some individuals can send the signal falsely, as long as the signal is honest "on average." The model also does not imply that one ritual, or a subset of rituals, will necessarily be too costly to be performed by skeptics. Indeed, if there are benefits to be attained from performing some portion of a community's ritual repertoire, some individuals may attempt to perform them. Psychologists have distinguished between those who are intrinsically (perform behavior for its own sake) and extrinsically (perform behavior to achieve some other goal) motivated to attend church (Allport and Ross 1967; Donahue 1985b). Those who are encouraged to attend church by family members (extrinsic moti-

vation), for example, may ignore other religious obligations but find the benefits of family stability to outweigh the costs of attending church. This suggests that believers and skeptics should not be viewed as discrete strategies, but rather as two ends of a strategic continuum. Future work should aim to develop a more sophisticated model than presented here, which treats "belief" as a continuous variable.

Second, the model clarifies how costly for respective performers a group's ritual requirements must be for them to be stable. Stability requires two conditions. First, the perceived cost of ritual performance for a skeptic must be greater than the difference between the benefit of joining the believers and the benefit of joining the skeptics. Second, the perceived cost of ritual performance for a believer must be less than that difference.[6] When these conditions are met, ritual requirements are expected to be stable in a population. For example, the benefits that a non-believing Utilian woman (skeptic) would gain by becoming a "member" of the church (joining the believers) is outweighed by the costs she discerns by regularly attending church; in her assessment, not attending church (joining the skeptics) will maximize her gains. In addition, the costs that believing women perceive must be less than the difference in benefits they could achieve by attending church (joining the believers) and not attending church (joining the skeptics).[7] In other words, the perceived costs of attending church must be outweighed by the marginal gains she achieves by attracting increased investment and a higher-quality mate.

Third, the model explains why groups require that their members engage in private rituals even though compliance can never be enforced. Private rituals ensure that there must be significant differences in the perceived costs paid by believers and skeptics in the performance of public rituals because only believers assume the costs of private rituals (since skeptics do not perform them). Thus, requiring that adherents engage in private rituals increases the stability of the entire suite of ritual requirements (public and private) because they force the perceived costs of public rituals to be significantly higher for skeptics than for believers.

Private rituals also deter free-riders and consequently promote intragroup solidarity in another yet unmentioned way. Engaging in private rituals appears to be an extremely effective method of convincing *oneself* that one believes in the doctrine that gives meaning to the rituals. If an individual engages in private ritual, he or she cannot rationalize such actions as coercion by group members. Because of the opportunity to defect on private rituals without risk of detection, engagement in such rituals is the sole responsibility of the individual.[8] Consider the strategy to engage in all public rituals but refrain from engaging in most private rituals. Some rituals are of course practiced both publicly and privately. For example, in a

number of contemporary religions prayers before meals are expected regardless of whom, if anyone, is at the table. The failure to say grace when alone may result in an increased likelihood of forgetting to say it in a public setting. In addition, individuals are more apt to question their own commitment if they are failing to perform ritual duties that others in the community are believed to be practicing, even if the rituals are never performed in public. One who engages in unobserved private rituals is signaling to himself or herself that he or she is committed to the group. Similar to Frank's argument that the best way to convince others that you are an altruist is to actually be an altruist and behave in ways that convince yourself of such (Frank 1988), the performance of private rituals reinforces group commitment by convincing their performers that they are committed to the group. Groups that successfully maintain commitment probably require members to engage in a mix of public and private rituals, although it is not currently clear how the optimal mix is determined. It is clear, however, that the costs of private rituals cannot be too high because the benefits of performance must outweigh the costs. Furthermore, the various modalities of ritual requirements serve as accurate measures of how committed members are likely to be. This may explain why religious groups make multiple and diverse demands on their adherents, rather than simply mandating one costly requirement.

The model presented here suggests that the frequency of costly signaling within a group will be impacted by the desire of outsiders to enter that group, which may seem counter-intuitive. The real threat to distinct religious communities, such as the Hutterites, does not appear to be invasion by nonbelievers. These groups appear to be at much greater risk of losing their members to the "outside world," namely mainstream secular culture. The potential threat to these communities is a function of members' opportunities to succeed in mainstream culture. Thus, costly signals are not necessarily a barrier constructed to keep nonbelievers out; they may also function as a lasso, assuring that those who remain in the society are genuine believers. Those who are attracted to the outside world and who question the group's beliefs may find it too costly to continue to engage in the minimum group requirements. Thus, skeptics in the model presented here are not necessarily individuals from an alternative group, they may be disaffected members within the group. The threat posed by the outside world is not the risk of invasion by free-riders; the primary threat is the economic, social, and reproductive opportunities that the outside world can offer.

It is not surprising that modern religious fundamentalism, which many argue is a response to Western cultural imperialism (Caplan 1987; Firth 1981; Lawrence 1989; Marty and Appleby 1991), is characterized by increasing ritual demands. Fundamentalism typically refers to a religious

ideology that embraces scriptural literalism and traditional religious values (see Marty and Appleby 1991; Marty 1992). Current fundamentalist trends however have placed higher demands on their practitioners than the traditional practices that they claim to emulate. For example, the standards of *kashrut* (laws pertaining to kosher and non-kosher food) among Ultra-Orthodox Jews are more stringent now than at any time in Jewish history (Shaffir 1998), and in various Muslim communities the restrictions imposed on women are far more severe than previously required by *shari'a*, traditional Islamic law (Afshar 1987; Kaplan 1992; Moghadam 1992). The costly signaling theory of ritual suggests that the fundamentalist trend toward increasing ritual requirements is a direct response to increases in perceived risk of apostasy faced by religious groups. Indeed, modern fundamentalism may be partially fueled by the increased perceived risk of apostasy generated by the rapid improvement in mass media technologies, which expose wide audiences to Western secular values and culture.

Some Predictions of the Model

Irons (2001) has discussed a variety of hypotheses generated by his theory of religion as a hard-to-fake sign of commitment. The model presented here suggests several additional hypotheses and directions for future research.

Risk of Free-riders. In environments where the risk of potential free-riders is low, there will be few costly signals. There are at least three conditions where the risk of potential free-riders is low: groups are isolated and members do not have the opportunity to join alternative groups, populations are distinguished by inherent physical characteristics, such as skin color, and the net benefit offered by a group is low in comparison to the net benefits offered by alternative groups. Under each of these conditions, groups are not expected to exhibit costly signals, or at least the level of costly signaling should be relatively low. Conversely, when the potential benefits of group membership are high, morphological traits are unrelated to group composition, and many groups are in close proximity; groups are expected to exhibit many costly signals. This may explain the frequent observation that religious diversity in a population increases religious participation (e.g., Finke and Stark 1988; Finke et al. 1996; Hamberg and Petersson 1994). For example, Iannaccone (1991) shows that church attendance among Protestants is positively correlated with religious diversity across a sample of European countries, North America, Australia, and New Zealand. If costly signals are a function of the alternative opportunities available for group members, we may also expect that minority groups, whose members are at higher risk of being influenced by ideologies and practices of

the majority group (Latane 1997), will exhibit more costly signals than majority groups.

Early Indoctrination. Early indoctrination will be important for groups with many costly signals. Early indoctrination minimizes the opportunity costs perceived by group members, increasing their ability to tolerate costly constraints on their lives. As a Hutterite man from Montana commented, "It seems you have to be born with the Hutterite way, to be brought up from childhood on, to abide by these rules. . . . If you are brought up like this, you're not used to all these things you see in town" (Wilson 2000:22). The Talmud, the vast compendium of Jewish law, also recognizes the importance of early indoctrination in decreasing opportunity costs. Jews who "return" to traditional Judaism are known as *ba'alei teshuva* (literally "owners of return"). In a well-known Talmudic statement the sages claim, "in the place where a penitent Jew—a *ba'al teshuva*—stands, even a perfectly righteous person cannot stand" (*Berakhot* 34b). The Rabbis suggest that those who have sinned can achieve a higher level of spirituality than those who have been righteous all their life. Without having ever tasted sin, the temptation to transgress is not as great as for those who have. Rabbi Joseph Telushkin, who was raised in an Orthodox household, states this clearly:

> The apparent rationale of the rabbis for holding the *ba'al teshuva* in such high esteem was their belief that it is a much greater struggle for a nonreligious person to become religious and to give up formerly permitted practices, than it is for a religious person to remain religious. More than a few *ba'alei teshuva* (plural of *ba'al teshuva*) have told me that they desperately miss lobster or shrimp. As a Jew who was raised in a kosher home, I confess that these foods have never tempted me (Telushkin 1991:433).

Converts. As a result of the importance of early indoctrination for minimizing opportunity costs, converts may be trusted less than those who were raised within a community. This is especially likely amongst groups that maintain high levels of costly signaling. Converts will perceive higher opportunity costs than members by birth; thus the willingness to pay the high cost of membership may be viewed with skepticism about the intentions of the convert.[9] For example, it has been well documented that *ba'alei teshuva* who enter the Ultra-Orthodox or *haredi* community are unlikely to be welcomed as equals (e.g., Levin 1986). In his book on *haredi* life David Landau writes,

> Haredism's celebration and absorption of the *teshuva* movement is not necessarily matched by a wholehearted acceptance of the individual *ba'al* or

> *ba'alat teshuva* into the *haredi* family. The litmus test is marriage, and here *ba'alei teshuva* often find their paths blocked by an informal but strongly entrenched discrimination. . . . The whispered assumption in *haredi* circles is that if a *haredi*-born boy or girl marries a *ba'al teshuva,* there must be "something wrong" with him or her: either they are poor, or they have a health disability . . . (Landau 1993:248–249).

This bias against *ba'alei teshuva* occurs despite a recurring emphasis in Jewish liturgy and law on accepting the proselytite as a full member of the community. It appears that those born into the *haredi* community recognize that the costs of membership are too high to be paid without early indoctrination. The devotion of the *ba'alei teshuva* is not doubted by the *haredi*-born; ironically it is their rationality that seems to be in question (Levin 1986).

Apostasy. Across religious groups, the costliness of ritual requirements should be positively correlated with apostasy rates among *newcomers.* In other words, groups with the highest levels of costly signaling will also exhibit the highest rates of defection among their new members, since costly rituals operate as a sorting mechanism that removes those who are not fully committed to the group. Indeed, although most cults are successful at attracting members, it has been estimated that up to 90% of all new members leave cults in the first several years (Robbins 1988). Data among Shakers also show that neophytes were about twice as likely to defect as veteran members (Bainbridge 1984). Despite these losses, groups with costly requirements probably possess the highest retention rates of members raised in the community, since these in-born members are likely to have lower potential success in alternative groups. Groups with significant ritual demands tend to be closed communities that are isolated from other segments of society. Thus, their members generally have less knowledge about alternative groups, face higher socialization costs if they were to join another group, and have fewer kin and non-kin relations in alternative groups that could assist in a transition. In addition, as a consequence of the necessary investment in learning and performing rituals during childhood, comparatively less time and energy is invested acquiring the skills that are often important to compete economically in other communities. The remarkable retention rates among Hutterites, who only lose about 2% of their members (almost all Hutterites are in-born;[10] Peter 1987), appear to support these claims. In addition to the difficulty in adapting to a radically different way of life, the formal English education of Hutterite children ends at eighth grade, making them underqualified for most jobs outside of their colonies. Van den Berghe and Peter note, "adolescent Hutterites frequently explore the outside world, especially boys, but nearly all return to the fold"

(1988:527). Among groups less extreme than Hutterites, data are also suggestive. Catholicism and Judaism in the U.S. have higher retention rates than liberal Protestant denominations (Roof and McKinney 1987).

It should be noted that the costly signaling theory of ritual does not predict that in-born members will never leave their community. The model presented above assumes that as a result of the gains achieved from intragroup cooperation, religious groups offer higher benefits to their members than non-religious groups. When this condition is not met, we expect religious groups to fail or at least face increasing rates of defection. Economic changes, either economic difficulties within the group or improved economic conditions in other groups, are likely to have a significant impact on membership retention rates. For example, Murray (1995a) has documented how Shaker populations grew during economic recessions and declined during times of prosperity. Other factors, such as changes in the sex ratio (in- and out-group), increased religious persecution, and changing membership skills, are all expected to alter the cost-benefit equation and impact decisions about whether to remain within a particular group. It should also be emphasized that the model focuses on individual decision-making, and thus membership decisions should vary predictably with individual phenotypic quality. Across religious groups there is wide variance in the phenotypic traits that are valued and rewarded. These include such traits as diligence, manual skills, scholarship, spirituality, courage, and fierceness. Within religious communities, those who are comparatively deficient in the venerated traits are most likely to defect and seek opportunities in groups that value other characteristics. For example, male Ultra-Orthodox Jewish life revolves around continual study of traditional texts. Scholars are sought after for marriage and attain the highest prestige within the community. Not surprisingly, within these communities defection rates appear to be highest among those who are less intellectually oriented (Landau 1993). Apostasy is also most likely to occur among individuals with the greatest potential success in alternative groups. For example, Murray (1995b) found that as new members increased the illiteracy rate among the Shakers, the defection rate among literate veteran members increased. He comments that those who departed "proved to be skilled craftspeople, astute business executives, creative theologians, and, not least, able leaders" (1995b:231–232).

Proselytization. Proselytization should be less frequent amongst religious groups that offer greater in-group benefits since proselytization increases the risk of invasion by free-riders. A glance across the religious landscape suggests that without refinement, this hypothesis will not be supported. Although proselytization is absent amongst some groups that engage in high

levels of costly signaling (and presumably offer significant in-group benefits), such as Jews and Hutterites, for other groups that engage in similar levels of costly signaling, such as The Church of Jesus Christ of Latter-Day Saints, missionary work is a central element of religious practice. Indeed, the two-year mission required of Mormons can be understood as a costly signal of commitment to the church. Proselytization is likely to be not only a function of absolute levels of in-group benefits, but also a function of the value of increased membership for a group. Proselytizing religions may face increasing marginal gains as membership increases; in other words, per capita benefits of group membership may increase as the number of members grows. A variety of factors could contribute to this economy of scale, such as increased political clout or lowered costs of purchasing religious material culture (via increased supply). Increasing benefits with increasing membership size may characterize The Church of Jesus Christ of Latter-Day Saints, which is currently among the fastest growing religions in the world (Stark 1994). Hutterites, on the other hand, may not be able to realize these benefits. Indeed, Hutterites divide their colonies when they reach 100 members since social control is apparently more difficult to maintain in larger communities (Hostetler 1997). Judaism was not always a nonproselytizing religion. Jews regularly proselytized prior to the first and second centuries C.E., and possibly later (Baron 1952:171–183). Eventually, the benefits that accrued to Jews through increasing membership were outweighed by the costs, typically death, for missionary activity imposed by Christian authorities, such as emperors Hadrian, Severus, and Constantine. Interestingly, in the U.S., where Jews have achieved unprecedented acceptance into mainstream society, there have been renewed discussions about proselytizing (Epstein 1994) and currently various Jewish organizations and congregations actively seek converts.

CONCLUSION

Let us return to the question posed in the title of this article: Why aren't we all Hutterites? We are not Hutterites because we do not believe in the teachings of the Hutterites, and the only way to perceive the *net* in-group benefits of the Hutterites is to truly believe in their way of life. This of course begs the question of why we do not believe in Hutterite theology. It seems that the only way to achieve this devoutness is to actually live like a Hutterite *and* initially possess either highly ambiguous beliefs or beliefs that are similar to those of the Hutterites. Otherwise, observing Hutterite religious obligations will be perceived as too costly, and hence will be avoided or discontinued if attempted. In other words, there are genuine

gains to be achieved by joining the Hutterites, but without "belief" our assessment of these potential gains suggests significant costs. Hutterites, on the other hand, are able to maintain their own faith, and consequently perceive short-term benefits, through the performance of the many rituals that fill their lives.

The argument presented here explains why belief in the tenets, myths, and cosmology of a religious community is so vital to its success. Ritual performance fosters and maintains religious beliefs, and beliefs in turn enable rituals to be effective signals of commitment by lowering the perceived costs of ritual performance, thus preventing free-riders from gaining the benefits of religious groups. Beliefs are a proximate mechanism that facilitates the production of adaptive ritual behaviors. Under conditions in which intra-group trust and solidarity can enhance members' capacity to produce resources and compete with other groups, rituals are a universal means of generating the advantages of increased group cohesiveness.

Despite the development of various neo-Darwinian approaches to understanding religion and morality (e.g., Alexander 1987; Boyer 2001; de Waal 1996; Katz 2000; O'Neill and Petrinovich 1998; Wilson 1998a, 1998b), behavioral ecologists have largely ignored the study of religion (Wilson 2002). Several authors (e.g., Cronk 1999; Smith 2000) have recently noted the importance, but lack of research, which conjoins the two major evolutionary approaches to understanding human behavior: evolutionary psychology and behavioral ecology.[11] The study of religion appears to be an ideal opportunity to pursue such collaboration. Although investigating the ecological determinants of religious behavior is critical, social psychology, as well as neuroscience (Austin 1998; d'Aquili and Newberg 1999), will be essential for understanding the relationship between the ritual actions of interest to behavioral ecologists and the physiological and psychological impact of those behaviors on the thoughts and belief patterns of ritual performers. Here I have attempted to lay the foundations of a mutual approach that I hope will motivate continuing research on ritual behavior and the evolution of religion.

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NOTES

1. Rappaport (1999:119–123) distinguishes between acceptance and belief. He maintains that regardless of whether or not one believes in the moral values encoded in ritual performance, by participating in a ritual performance an individual is signaling that he or she accepts the moral code of the community, and can be held accountable if these rules are compromised.

2. Indeed, part of the reason that religious ideologies have been so successfully transmitted across generations, especially in comparison to secular ideologies (Sosis 2000), is that repetitive ritual performance precedes exposure to the ideology. It is difficult to teach a five-year-old child the ideals of Marxism or socialism, but through ritual, religions can begin indoctrination as early as a child can speak and act.

3. As mentioned above, the model presented here is not a traditional evolutionary optimization model that seeks to understand the conditions under which selection will favor specific behavioral patterns. Irons has already convincingly argued that costly religious behaviors will be favored when there are individual gains to be achieved from collective action and free-riders need to be prevented from attaining these benefits. Here I am arguing that focusing solely on material costs and benefits raises various difficulties in understanding how systems of religious costly rituals could evolve and stabilize (e.g., as discussed above, Why doesn't everyone pay the costs of ritual performance to attain the net gains offered by religious groups?). Therefore, it is critical to examine the proximate mechanisms (i.e., the cognitive and physiological processes) that enable such a system to emerge and stabilize. This is the aim of the model.

It is also important to note that the argument presented here is agnostic concerning the phylogenetic development of these mechanisms and does not evaluate whether the mechanisms are an adaptation or an evolutionary byproduct. Although this will certainly be an important area of future investigation, here I am simply claiming that ritual performance utilizes these mechanisms to foster and maintain belief.

4. In the prisoner's dilemma, two players each have a choice to either cooperate or defect. If both players cooperate they receive R (Reward) and if they both defect they receive P (Punishment). If one player defects while the other cooperates, the defector receives T (Temptation) and the cooperator receives S (Sucker's payoff). The prisoner's dilemma requires two conditions: $T > R > P > S$ and $R > (T + S) / 2$.

5. Here I assume that actual and perceived benefits of group membership are identical and focus on differences in the perception of costs. Believers and skeptics, however, may have different perceived benefits of belonging to a religious group, especially nonmaterial benefits (e.g., rewards during afterlife). If believers and skeptics receive identical material benefits for joining a religious group (e.g., enhanced economic or mating opportunities), believers will perceive higher total benefits than skeptics because they will also assume nonmaterial benefits. When

belief increases among believers they will perceive greater benefits, and consequently, actual and perceived ritual costs can increase and remain stable. One testable implication of this result is that groups that offer greater nonmaterial benefits, such as rewards in an afterlife, can impose costlier rituals on their members.

6. If believers perceive higher gains than skeptics for joining a religious group owing to nonmaterial rewards (see endnote 5), to achieve stability the perceived cost of ritual performance for a believer still must be less than the difference between the benefit of joining the believers and the benefit of joining the skeptics.

7. Interestingly, the model presented here supports William James's (1961 [1903]) criticism of agnosticism. Because religions require ritual action it is impossible to suspend belief. By not participating in a ritual performance (such as attending church) one is denying the values of the community. The signal sent by ritual is dichotomous; one either accepts or rejects the moral values and beliefs encoded in the ritual (Rappaport 1979). Noncompliance and indifference signal a rejection of ritual's message.

8. Cialdini (2001:81) has argued that fraternity hell weeks never include charitable services for similar reasons. The pledge cannot rationalize (to himself or others) undergoing the pain of hell week by claiming that he was engaging in honorable or altruistic activities.

9. Conversion is a process that results in a change of religious community for an individual. As the example presented makes apparent, conversions occur even when changing denominations within the same institutional religion. It should be noted that most *haredi* communities are closed to mainstream Jewry (Heilman 1992).

10. Hostetler (1997:296) notes, "During a century in North America, there have been scarcely more than fifty adult converts to the Hutterites. Some who joined during the hard years of the depression later left the colonies."

11. Although not discussed here, the third major evolutionary approach to the study of human behavior, dual inheritance theory, has already begun to explore religion and morality (e.g., Boyd and Richerson 1992; Richerson and Boyd 1987).

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