

# **Militants and Martyrs: Evolutionary Perspectives on Religion and Terrorism**

**Richard Sosis<sup>a,b</sup> and Candace S. Alcorta<sup>b</sup>**

<sup>a</sup>Department of Sociology and Anthropology  
Hebrew University of Jerusalem  
Mt. Scopus, Jerusalem, 91905  
Israel

<sup>b</sup>Department of Anthropology, U-2176  
University of Connecticut  
Storrs, CT 06269-2176  
email [richard.sosis@uconn.edu](mailto:richard.sosis@uconn.edu)  
email [candace.alcorta@uconn.edu](mailto:candace.alcorta@uconn.edu)

## **Abstract**

Recent theoretical developments in the evolutionary study of religion focus on four cross-culturally recurrent features of religion: communal participation in costly ritual, belief in supernatural agents and counterintuitive concepts, separation of the sacred and the profane, and adolescence as the critical life phase for the transmission of religious beliefs and values. These four characteristics constitute an adaptive complex that evolved to solve problems of group cooperation and commitment, problems faced by all terrorist organizations. In this chapter we examine how terrorists employ these features of religion to achieve their goals and argue that evolutionary analyses of religion are essential for understanding current trends in terrorist activity. Terrorists utilize costly rituals to conditionally associate emotions with sanctified symbols and signal group commitments. These sanctified symbols are emotionally evocative and motivationally powerful, fostering in-group solidarity, trust, and cooperation. Religious beliefs, including promised rewards in the afterlife, further serve to facilitate cooperation by altering the perceived payoffs of costly actions, including suicide terrorism. Patterns of brain development unique to adolescence render this the ideal developmental stage to attract recruits, expose them to sacred beliefs, and enlist them in high-risk behaviors. We conclude by offering areas for future research and policy recommendations based on our evolutionary analysis.

**For *Natural Security: A Darwinian Approach to a Dangerous World*, eds. Rafe Sagarin & Terrence Taylor, University of California Press.**

The main argument of this chapter is that evolutionary studies of religion are vital for understanding the proliferation, patterns, and logic of current trends in terrorist activity. The importance of this message is becoming increasingly evident. As Simon and Benjamin (2000:59) prophetically warned before 9/11, the threat of terrorism will “intensify, because the old paradigm of predominantly state-sponsored terrorism has been joined by a new, religiously motivated terrorism...” Indeed, in recent years there has been a rise in the proportion of terrorists motivated by religious concerns and there is a significant correlation between religious motivation and lethality (Hoffman 1998). Simon and Benjamin argue that state-sponsored terrorism is somewhat constrained since states do not want to undercut their claims of legitimacy and alienate potential supporters who would revile indiscriminate violence against civilians. In contrast, the new religiously motivated terrorists “want a lot of people watching and a lot of people dead” (Simon and Benjamin 2000:71). Why is religiously motivated terrorism becoming more common? And why is it more deadly? What governmental policies can stem religiously motivated violence? We believe evolutionary research on religion can provide novel insights and timely answers to these pressing questions.

In this chapter we first examine the relationship between religion and terrorist activity and clarify religion’s role in causing, motivating, and facilitating terror. Next we present recent work on the evolution of religion and show how this research can help us understand current patterns of terrorism. The chapter concludes with future research questions and policy implications derived from our evolutionary approach.

### **What is the Relationship between Religion and Terrorism?**

While the literature on terrorism offers widely divergent opinions on almost every topic, one matter is clear; not all terrorists are religious fanatics, or even religious. Nonetheless, it is also apparent that religiously motivated terrorism is on the rise and it is alarmingly more lethal than other forms of terrorism. One possible explanation for the lethality of religious terrorism is that it is more closely linked to suicide terrorism, which accounts for only 3% of all terrorist activity from 1980 through 2003, but 48% of the fatalities (Pape 2005:6). Some researchers have indeed argued that religious motivations are more commonly associated with suicide terrorism (Berman and Laitin 2005; Hoffman 2003), although others have rejected this connection (Bloom

2005; Pape 2005). In support of the latter position, it has been widely observed that the Liberation Tigers of Tamil Eelam (LTTE), a Marxist-Leninist group demanding independence from Sri Lanka, were the world leaders in suicide terrorism prior to the current insurgency in Iraq. Furthermore, Pape's (2005:210) analysis of data on suicide terrorism from 1980 to 2003 found that less than half of the suicide bombings documented during this period were religiously motivated. However, even if religiously motivated suicide bombers are not more common than their secular counterparts, they may be more successful in causing fatalities, as Berman and Laitin's (2005) data suggest. Below we argue that religion can institutionally and individually facilitate suicide attacks and other forms of terrorism, and that specific evolved elements of religion differentially contribute to these effects. We also contend that these evolved elements of religion are employed by both secular and religious terrorists alike in order to achieve their goals and create a committed and cohesive following.

The media may be responsible for the popular belief that religion and terror are strongly associated. Terrorists, especially suicide terrorists, are often depicted in the media as delusional religious fundamentalists, hopelessly brainwashed and out of touch with reality. The picture that is emerging from recent research, however, is far different. For example, Berrebi (2003) has shown that Palestinian suicide bombers have above average education and are economically better off than the general population. Krueger and Maleckova (2002) also demonstrate that poverty is not a predictor of participation in political violence or support for terrorism. Moreover, Sageman (2004) found no evidence of psychopathology in an international sample of Muslim terrorists. Leaders of terrorist organizations are clear that recruits may not be depressed or suicidal. As one spokesman for the Palestinian Islamic Jihad explains, "to be a martyr bomber you have to want to live" (Richardson 2006:117). Terrorists themselves point out that even suicide bombers have plenty of hope, otherwise there would be no point in killing themselves (Atran 2003).

If terrorists in general, and suicide bombers in particular, are not crazed religious zealots, what then is the relationship between religion and terrorism? Various researchers have argued that terrorists have political, not religious goals (Bloom 2005; Juergensmeyer 2003; Pape 2005). Religion is not the root cause of conflicts, but is rather a tool used by terrorists to achieve their goals. Recast in evolutionary terms, religious beliefs, rituals, and institutions are proximate

mechanisms that facilitate otherwise improbable behavioral outcomes. Here we review four main reasons why religion serves as an effective mechanism for terrorists.

*Framing the conflict.* Juergensmeyer (2003) argues that while religion is not the cause of most conflicts involving terror, religion is the means by which terrorists translate a local political struggle into a cosmic war. In other words, terrorists often frame their disputes in religious rather than political terms. This has various advantages, most significantly in motivating others to sacrifice themselves for the cause. This transformation from political to religious struggle encourages actors to perceive that they are participating in something of divine significance that transcends individual self-interest. Among Sikh militants in the Punjab, Juergensmeyer describes joining the struggle as “motivated by the heady sense of spiritual fulfillment and the passion of holy war” (2004a:2). It is remarkable how successful contemporary terrorists have been in shaping world views so that they are consistent with their own views. Bin Laden, for instance, has been particularly successful in transforming his local grievance (getting U.S. troops off “Muslim” soil) into a cosmic clash between civilizations. The use of religion to transform local power struggles into cosmic conflicts benefits terrorist groups who may otherwise be viewed as economically and politically self-serving. In an age of instantaneous electronic communications, such religious framing of essentially local conflicts serves to broaden both the ideological and geographic base of terrorism. A second consequence of the religious framing of political conflicts is the extension of the horizon for victory. Terrorists perceive that they are fighting a cosmic war in divine time, thus eliminating incentives to “win” within one’s own lifetime. Commenting on an interview with Hamas leader Abdul Aziz Rantisi, Juergensmeyer observes that “[i]n his calculation, the struggles of God can endure for eons” (2004b:35).

*Moral justification.* Religion also facilitates terrorists’ goals by providing moral legitimacy to their cause (Juergensmeyer 2004c). All contemporary world religions impose a moral framework upon their adherents, thereby enabling terrorists to present their conflicts in morally absolute dichotomies, such as good versus bad or righteous versus evil. While legitimizing ones’ own cause, religions are particularly effective at demonizing those with opposing views. The history of religion is replete with examples in which in-group passions are aroused and out-group hatreds are dangerously ignited. Indeed, one consistent predictor of suicide terrorism is a

religious difference between the perpetrator and victim (Pape 2005). This occurs even when the terrorist group appears to have secular motivations, such as the LTTE, who are Hindus fighting a Buddhist majority. In Berman and Laitin's (2005) extensive sample of suicide terrorism, almost 90% of the attacks were aimed at victims of a different religion.

*Spiritual and eternal rewards.* Religion not only provides a divine dimension and moral legitimacy to terrorist activity; it also defines the rewards that combatants can attain. After considering the benefits that Sikh militants attain, Juergensmeyer concluded that "[t]he reward for these young men was the religious experience in the struggle itself: the sense that they were participating in something greater than themselves" (2004a:2). In addition to such spiritual rewards of transcendence, religion may also explicitly offer benefits in the afterlife that can rarely be matched in this world. The 9/11 hijackers all believed that they "would meet in the highest heaven" (Lincoln 2003:98), which we can assume helped them rationalize their actions.

*Religious symbols, myths, and rituals.* Religion's most significant role in terrorism may be its incorporation of emotionally evocative and highly memorable symbols, myths, and rituals that serve to individually motivate and collectively unify diverse individuals under a common banner. All terrorist groups face the challenge of creating group commitment and individual devotion to a common cause. Anthropologists have long noted that fundamental "faith-based" elements of religion, that is symbols, myths, and rituals, foster this in-group commitment better than any other social institution. Not surprisingly, secular and religious terrorists alike maintain communal rituals and initiation rites that communicate an individual's level of commitment to the group (Atran 2003). For religious terrorists, cohesiveness is further fostered through powerful religious symbols, which "often become focal points in occupations involving a religious difference" (Pape 2005:89). And of course, martyrdom itself means to sacrifice one's life for one's faith. Religion provides the rituals and symbols to both motivate and memorialize these local heroes, thereby affording them an otherwise unattainable status that is also eternal. Pape observes that "[s]uicide terrorist organizations commonly cultivate 'sacrificial myths' that include elaborate sets of symbols and rituals to mark an individual attacker's death as a contribution to the nation" (2005:29).

## Terrorism and Evolutionary Research on Religion

Evolutionary studies of religion further our understanding of these elements of terrorism and provide important insights that can benefit the development of anti-terrorist policies. There is unfortunately great misunderstanding among many social scientists concerning the merit of evolutionary analyses of religion. For example, Zuckerman claims that recent data on the high rates of atheism in many parts of the world “delivers a heavy blow” (2006:13) to evolutionary theories of religion. Zuckerman mistakenly equates evolutionary theory with genetic determinism and falsely assumes that recent evolutionary research, which reveals psychological biases toward supernatural belief (e.g., Bering 2006), must be inaccurate since plenty of people appear to not exhibit these biases. Evolutionary theory does not endorse genetic determinism. On the contrary, evolutionary theory assumes that environmental input during ontogeny is critical for the expression and adaptive functioning of many traits, including religious belief (Alcorta and Sosis 2005; Wilson 2002). In the absence of such input, genetic predispositions remain latent. Such environmentally-cued gene expression permits broad adaptive lability while ensuring optimal allocation of limited resources. The development of religious beliefs and behaviors is likely to reflect such interactive, ontogenetic processes.

While we obviously cannot review all of the burgeoning evolutionary literature on religion, we encourage interested readers to see books by Atran (2002), Boyer (2001), and Wilson (2002), review articles by Bulbulia (2004a) and Sosis and Alcorta (2003), and the wide literature cited therein. Here we focus on recent theoretical developments that synthesize much of the existing literature. Alcorta and Sosis (2005) propose that religion may best be understood as an evolved complex of traits incorporating cognitive, affective, behavioral, and developmental elements. Central to this complex are four cross-culturally recurrent features of religion:

- *Communal participation in costly ritual*
- *Belief in supernatural agents and counterintuitive concepts*
- *Separation of the sacred and the profane*
- *Adolescence as the critical life phase for the transmission of religious beliefs and values*

Alcorta and Sosis (2005) argue that these traits derive from pre-human ritual systems and were selected for in early hominid populations because they contributed to the ability of individuals to overcome ever-present ecological challenges. By fostering cooperation and extending the communication and coordination of social relations across time and space, these traits served to

maximize the potential resource base for early human populations, thereby benefiting individual fitness. In contemporary societies, these four elements continue to provide adaptive benefits and generally co-occur within “religion”, but not always. Consequently, Western distinctions between the “secular” and the “religious” are often difficult to discern. For example, the adoption of communal rituals and initiation rites by nominally secular terrorist groups, such as the LTTE, and their quasi-deification of Marxist-Leninist ideals blur the line between what is secular and what is religious. These groups engage important elements of the above described religious adaptive complex and reap many of the adaptive benefits achieved by religion.

### *Communal participation in costly ritual*

Among the most significant challenges terrorists face is ensuring that fellow insurgents are trustworthy and will not defect on the cause (Berman 2003). How can a prospective terrorist guarantee that he will not reveal the locations of hidden conspirators, secret codes of communication, and that he will not turn aside when asked to carry out a risky or suicidal attack? At first glance, evolutionary theories of religion would appear to hold little promise for answering these questions, or understanding terrorism at all. Natural selection favors genes that get themselves into the next generation, yet terrorists often take great risks with their lives and some of course intentionally sacrifice themselves for their ideological beliefs. Such actions seem to contradict evolutionary expectations. The solution to this puzzle lies in understanding religion as an evolved system of communication, which offers mechanisms that can promote in-group trust and overcome commitment problems (Alcorta and Sosis 2005; Atran 2002; Atran and Norenzayan 2004; Bulbulia 2004b; Irons 2001; Rappaport 1999; Sosis 2003). Irons (2001), for example, posits that the primary adaptive benefit of religion is its ability to foster cooperation and overcome problems of collective action that humans have faced throughout their evolutionary history. The costliness of religious activities, or specifically what Sosis (2006) refers to as the four “B’s” – religious belief, behavior (rituals), badges (such as religious attire), and bans (taboos) – enables them to serve as reliable and honest signals of group commitment. Only those who are committed to the group will be willing to incur the time, energetic, and opportunity costs of religious belief and performance. In other words, adherents pay the costs of religious adherence, but by doing so they demonstrate their commitment and loyalty to the

group, and can thus achieve a net benefit from successful collective action and other status benefits available to trusted signalers (see Bulbulia 2004b; Sosis 2003; Sosis and Alcorta 2003).

Surprising to many observers, costly religious demands are today increasing in many communities throughout the world. Indeed, the global rise in religious terrorism has been paralleled by a worldwide growth in religious fundamentalism. Fundamentalism typically refers to a religious ideology that embraces scriptural literalism and traditional religious values. 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 edible food) among Ultra-Orthodox Jews are more stringent now than at any time in Jewish history (Sosis in press). Signaling theory suggests three factors that may be motivating the fundamentalist trend toward increasing ritual requirements. First, the rising costs of membership may be a direct response to increases in perceived risk of apostasy faced by religious groups; a risk generated by the rapid improvement in mass media technologies, which expose wide audiences to Western secular values and culture. Second, and somewhat paradoxically, the multicultural openness of Western societies may also contribute to fundamentalist trends. While the celebration of multiculturalism has yet to embrace aggressive fundamentalism, in societies where group differences are tolerated and even encouraged, maintenance of in-group cohesion requires that groups increase their distinctiveness in order to preserve the relative costliness of the group's previous bans and badges. Thus, multiculturalism may actually initiate movements toward fundamentalism, even while vehemently rejecting fundamentalism's message of possessing life's only true path. Notably, Juergensmeyer (2002) observes that one of the universal features of religious terrorists is a strong rejection of Western multiculturalism. Third, signaling theory predicts an increase in signal costs as resource competition escalates. In highly-competitive modern multicultural nation-states, the higher costs incurred by religious fundamentalism are likely to be offset by the economic and political gains achievable through religious consolidation and organization of group membership.

The evolutionary signaling theory of religion assumes an inverted-U shaped relationship between the costliness of religious activity and in-group cooperation. Since imposing costly requirements upon group members is challenging and greater than optimum costs are expected to negatively impact group cohesion, most groups are predicted to impose less than their optimal level of costly requirements, and thus be observed on the increasing side of the U-shaped



distribution. Experimental, cross-cultural, and ethnohistorical research evaluating this prediction has been largely supportive (Ruffle and Sosis 2006; Sosis 2000; Sosis and Bressler 2003; Sosis et al. 2006; Sosis and Ruffle 2003, 2004). Religious terrorists of course employ religiously defined costly requirements to signal commitment, resulting in high levels of in-group cohesiveness and trust that are essential for carrying out their clandestine activities (e.g., Hassan 2001). As Pape describes, terrorists have “a close bond of loyalty to comrades and devotion to leaders; and they have a system of initiation and rituals signifying an individual’s level of commitment to the community” (2005:8). Interestingly, among many terrorist cells these rituals also include the recording of a video testament prior to an attack (Atran 2003). Such video testaments not only serve to immortalize the suicide terrorist and his cause among followers; they also create undeniable contracts, as well. Defecting on a mission after declaring and documenting one’s intentions would result in severe psychological, social, and presumably spiritual costs.

Evolutionary signaling theory assumes that the short-term costs of displaying a signal are repaid through individual gains. This creates a particular challenge for understanding suicide terrorism from a signaling theory perspective since individuals are obviously not around to reap any benefits from their actions. How can suicide terrorism possibly constitute an individually adaptive response? There would appear to be three non-competing alternative explanations. First, while the individual faces the ultimate sacrifice, suicide terrorism is likely to benefit the group, and Pape’s (2003, 2005) analysis showing that groups deploying suicide terrorists tend to achieve their goals would support this interpretation. Suicide terrorism may offer the most promising example of strong selective pressures operating at the group level (Villarreal this volume). Second, it is possible that suicide bombers recoup their losses through benefits to their kin. For example, the families of Palestinian suicide terrorists receive financial payments (up to \$10,000) for their martyred sons and daughters. However, Israel’s policy of destroying suicide bomber’s homes would appear to counterbalance these indirect fitness gains and be a strong negative incentive to sacrifice oneself for one’s family. Noting Krueger and Maleckova’s (2002) finding that Hezbollah suicide bombers attained above average education, Azam (2005) argues that suicide bombers may be investing in future kin generations (their higher educations makes them appreciate the importance of investing in the future). However, this poses a significant collective action problem and it would appear that under most conditions one would be better off

letting someone else make the investment (i.e., sacrifice one's life for future generations). A third possibility is that the payoffs motivating suicide bombers are not material but rather otherworldly. Indeed, when applying evolutionary signaling theory to religious activity both Sosis (2003) and Bulbulia (2004b) incorporate *perceived* gains into their models, which include payoffs attained in the afterlife. They independently found that afterlife payoffs can dramatically alter the dynamic of the game and favor costly religious activity. Moreover, we suspect that not only do martyrs expect to reap their heavenly rewards, but that they also include the reputational benefits they expect to receive as a martyr into their calculations (e.g., Richardson 2006:124), even though they will of course not be around to enjoy their newly attained status. If afterlife rewards and concerns of post-mortem reputation are motivating suicide bombers, such beliefs are likely to be maladaptive, unless kin significantly benefit from being related to a martyr.

#### *Belief in supernatural agents and counterintuitive concepts*

The second feature of the adaptive religious complex that Alcorta and Sosis (2005) describe concerns supernatural agents and counterintuitive concepts. Evolutionary cognitive scientists have shown that the supernatural agents of religious belief systems are “full access strategic agents” (Boyer 2001). They are “envisioned as possessing knowledge of socially strategic information, having unlimited perceptual access to socially maligned behaviors that occur in private and therefore outside the perceptual boundaries of everyday human agents” (Bering 2005:418). Furthermore, accumulating research indicates that humans exhibit a developmental predisposition to believe in such socially omniscient supernatural agents, appearing in early childhood and diminishing in adulthood. Cross-cultural studies conducted with children between the ages of 3-12 indicate that young children possess an “intuitive theism” that differentiates the social omniscience of supernatural agents from the fallible knowledge of natural social agents, such as parents (Kelemen 2004). By late childhood supernatural agents are not only socially omniscient; they are regarded as agents capable of using such knowledge to reward and punish deeds that are now viewed within a moral framework. Several evolutionary researchers have emphasized the role that supernatural punishment plays in promoting community-defined moral behavior, and specifically in-group cooperation (Bulbulia 2004b; Johnson 2005; Johnson and Kruger 2004; Johnson et al. 2003; Sosis 2005). Recent experimental evidence indicates that “even subtle unconscious exposure to religious ideas can dramatically

encourage prosocial over selfish behavior” in theists and atheists alike (Shariff and Norenzayan in press).

Evolutionary cognitive scientists have further noted that the counterintuitive concepts that characterize religious beliefs, such as bleeding statues and virgin births, are both attention arresting and memorable (Atran 2002; Boyer 2001). These features make them particularly effective for both vertical (across generations) and horizontal (within generations) transmission and can help explain why religious ideologies, including those of terrorists, often spread quickly through populations. In addition to their mnemonic efficacy, they comprise almost unbreakable “codes” for the uninitiated. Counterintuitive concepts are not readily generated on the basis of intuitive concepts, thus the chances of spontaneously re-creating a pre-existent counterintuitive concept are exceedingly low. By incorporating counterintuitive concepts within belief systems, religion creates reliable costly signals that are difficult to “fake”. Sosis (2003) has argued that repeated ritual performance fosters and internalizes these counterintuitive beliefs, which typically include a nonmaterial system of reward and punishment, including expectations about afterlife activities.

The promise that 72 virgins await a *shahid* is often joked about, but afterlife rewards are a critical feature of successful ideologies that enable terrorist organizations to motivate recruits to carry out their missions. As a Hamas member describes, “We focus his attention on Paradise, on being in the presence of Allah, on meeting the Prophet Muhammad, on interceding for his loved ones so that they, too, can be saved from the agonies of Hell, on the houris [virgins], and on fighting the Israeli occupation and removing it from the Islamic trust that is Palestine” (Hassan 2001:39). Female martyrs are promised to be the chief of the virgins and exceed their beauty (Richardson 2006:122). Even kamikaze pilots were assured that they would be “transcending life and death” (Atran 2003:1535). Detailed experiments by Bering (in press) demonstrate that humans have a natural inclination to believe that some element, typically a soul, survives death. Indeed, most of us, including atheists, have difficulty conceiving of a complete cessation of mental and social activity following death. Nobody knows what it is like to be dead so people attribute to dead agents the mental traits that they cannot imagine being without. Religious and other cultural beliefs serve to enrich or degrade beliefs in the afterlife, but Bering’s work suggests that appeals to rational arguments about the irrationality of afterlife beliefs are likely to face strong resistance. As we discuss below, if it is strategically important to alter

terrorists' beliefs about the afterlife, the greatest success can be achieved by exposing children and adolescents to alternative belief schemas *before* they are exposed to the afterlife rewards promised by terrorists.

### *Separation of the sacred and the profane*

The separation of the sacred and profane and the emotional power of sanctified symbols are critical for understanding how terrorists utilize religion for their benefit. Religious ritual is universally used to define the sacred and to separate it from the profane (Durkheim 1995; Eliade 1959). As noted by Rappaport (1999), ritual does not merely identify that which is sacred; it *creates* the sacred. Holy water is not simply water that has been discovered to be holy, or water that has been rationally demonstrated to have special qualities. It is, rather, water that has been *transformed* through ritual. For adherents who have participated in sanctifying rituals, the cognitive schema associated with that which has been sanctified differs from that of the profane. Of greater importance from a behavioral perspective, the emotional significance of holy and profane water is quite distinct. Not only is it inappropriate to treat holy water as one treats profane water; it is emotionally repugnant. While sacred and profane things are cognitively distinguished by adherents, the critical distinction between the sacred and the profane is the emotional charging associated with sacred things (Alcorta and Sosis 2005).

It is the emotional significance of the sacred that underlies "faith", and it is ritual participation that invests the sacred with emotional meaning. Extensive research indicates that emotions constitute evolved adaptations that weight decisions and influence actions (Damasio 1994). The ability of religious ritual to elicit both positive and negative emotional responses in participants provides the substrate for the creation of motivational communal symbols. Through processes of incentive learning, as well as classical and contextual conditioning, the objects, places, and beliefs of religious ritual are invested with emotional significance. The use of communal ritual to invest previously neutral stimuli with deep emotional significance creates a shared symbolic system that subsequently weights individual choices and motivates behavior.

It is noteworthy that the sacred may most commonly be encountered as physical space (Eliade 1959). Pape (2005) argues that at the root of each suicide terror campaign is a dispute over land; an occupying power that must be removed from the homeland. Such conditions are ripe for religious symbolism and indeed, homelands in these conflicts are always publicly

perceived as sacred. Pape (2005:85) comments that “[a]lthough boundaries may be ambiguous and history may be contested, the homeland is imbued with memories, meanings, and emotions.” Religious rituals sustain memories, shape meanings, and foster these emotions. Religion’s reliance on such emotionally evocative symbols also explains why religious terrorist groups are more successful than secular ones in mobilizing their forces (Bloom 2005). Religious terrorists do not appeal to rational political arguments to win public approval; they rely on sacred symbols imbued with emotional power to enlist followers in their cause.

Once recruits are secured, group solidarity can be further enhanced through negative affect rituals. Neuropsychological research has shown that negatively valenced stimuli are both more memorable and have greater motivational power than positive stimuli (Cacioppo et al. 2002). As a result of this “negativity bias”, negatively valenced elements of religion provide a more reliable emotionally anchored mechanism for the subordination of immediate individual interests to cooperative group goals (Alcorta and Sosis 2005). Research on the rituals that terrorist cells employ is scant, but apparently deprivation, such as lengthy fasts, is not uncommon (Friedland 1992; Hassan 2001).

#### *Adolescence as the critical life phase for the transmission of religious beliefs and values*

Adolescent rites of passage comprise one of the most consistent features of religions across cultures. Through rites of passage initiates learn what things constitute the sacred. Rites of passage purposefully engage unconscious emotional processes, as well as conscious cognitive mechanisms. The conditioned association of such emotions as fear and awe with symbolic cognitive schema achieved through these rites results in the sanctification of those symbols, whether places, artifacts, or beliefs. Because such symbols are deeply associated with emotions engendered through ritual, they take on motivational force. When such rites are simultaneously experienced by groups of individuals, the conditioned association of evoked emotions with specific cognitive schema creates a cultural community bound in motivation, as well as belief.

The human brain demonstrates great plasticity during development. Infancy, childhood, adolescence, and adulthood are marked by differentiated growth patterns in various brain cortices and nuclei (Alcorta 2006). The differential patterns of brain growth across the life course create sensitive periods for particular types of learning. The unique changes occurring in the adolescent brain render this a particularly sensitive developmental period in relation to social,

emotional, and symbolic stimuli, precisely the types of stimuli of greatest importance in adolescent rites of passage. Adolescence is also marked by heightened emotional response, and a shifting of the brain's reward circuitry. Adolescence thus comprises a critical period for the learning of emotionally valenced symbolic systems and for integrating these systems into the brain's reward circuitry. Increased risk taking during adolescence affords additional inputs into this system (Alcorta and Sosis 2005). It is therefore not surprising that most terrorists begin their militant life during adolescence. Victoroff (2005:28) suggests that the "typical development of terrorist sympathies perhaps follows an arc: young adolescents are plastic in their political orientation and open to indoctrination. Positions harden later in adolescence...[and] many retired "terrorists" reveal a mellowing of attitude." Of course, by the time those raised in a culture of martyrdom reach adolescence they are already prepared to sacrifice themselves without further indoctrination (Atran 2003; Brooks 2002). Bloom observes that by age six Palestinian boys and girls report that they wish to grow up and become *isitshhadis* (martyrs). "By the age of 12, they are fully committed and appreciate what becoming a martyr entails" (2005:88). As a senior member of the Palestinian group al-Qassam declares, "it is easy to sweep the streets for boys who want to do a martyrdom operation" (Hassan 2001:39). Nonetheless, the profile of those who actually carry out suicide attacks may be somewhat older (Hassan (2001) reports a range of 18-38 among Palestinians), suggesting that the enthusiasm of youth must be balanced with training and the development of trust to carry out such a mission.

### *Secular terrorism and the evolution of religion*

One advantage of the evolutionary approach we offer here is that by delineating the core adaptive features of religion that facilitate cooperation we can avoid definitional quagmires concerning what constitutes religion. This is important because we suspect that similar to their religious counterparts, successful secular terrorists employ some of these core features, such as emotionally evocative symbols, rituals, and myths. For example, although the Tamil Tigers are not religious, they in fact use "Hindu symbols for purposes of recruitment...and rely on the language of religious martyrdom to justify and reward the sacrifice" (Berman and Laitin 2003:28). And similar to the function of video testaments, prior to suicide missions Tamil Tigers partake in a "ritual dinner" with their leader, obviously sealing their commitment to carry out the attack (Gambetta 2005). Furthermore, thousands attend the yearly "Heroes' Day" ritual

celebration held on July 5, commemorating the LTTE martyrs, whose shrines are adorned with flowers and trees (Pape 2005:193). Therefore, the secular-religious distinction made by Western societies with institutionalized religious systems may not be a useful paradigm for examining the determinants of terrorist activity. Rather, analyses would be better served by concentrating on how terrorist organizations use the particular characteristics of the human religious adaptive complex we have outlined here to inspire group commitment and individual action.

### **Future Areas of Research**

Our brief review of the emerging evolutionary literature on religion and its relation to terrorism leaves many questions unanswered and points to the need for considerable research. We consider a few areas that we believe deserve particular attention.

1. Various researchers note the vital role that charismatic leaders play in shaping recruits' opinions and motivations. For example, Atran (2003:1537) argues that terrorist leaders manipulate "emotionally driven commitments" of their recruits for the "benefit of the organization rather than the individual." Evolutionary theories of religion have yet to fully address the role of leadership in coordinating behavior within religious groups, but recent evolutionary work on the dynamics of leaders and followers should provide valuable insights (Van Vugt 2006).
2. Argo (2003) contends that in martyrdom cultures individual risk is positively correlated with status benefits. We suggested that martyrs include in their cost-benefit assessments the status benefits they expect to receive following their death, even though they will of course not be around to enjoy their newly attained status. This needs to be studied as it is likely to be important for understanding some of the benefits that martyrs believe their actions will produce, and offer clues into how those perceived payoffs can be altered.
3. Ritual is a vital mechanism that terrorists employ to secure commitment, but detailed studies on the ritual lives of terrorists are limited. Furthermore, our analyses suggest that adolescence is the critical development phase during which terrorists are created, and thus adolescents should be the focus of considerable terror-related research.
4. Selectionist logic suggests that high risk behaviors, such as terrorism, are more common in high fertility populations (e.g., Daly and Wilson 1988). We are not aware of any research that links terrorism, religiosity, and fertility decisions, but this would be a worthwhile pursuit. If there

is a positive relationship between terror and fertility, encouraging demographic transitions through such means as expanded female educational and economic opportunities may be one means of reducing terror activity.

5. While adherents generally view religious dogma as unchanging and even eternal, religions are in fact flexible and they do adapt to socio-ecological circumstances (Rappaport 1999). Rigorous studies that examine the determinants of religious change, especially among extremist forms of religion, are urgently needed.

### **Policy Implications**

A number of policy implications previously recommended by other researchers are consistent with our evolutionary analysis.

1. As noted above, terrorists have been successful in bringing the world to view their conflicts through a cosmic lens. While it is tempting for governments to rely on absolute moral dichotomies in order to rally their own public in support of whatever military actions they must take, this serves to endorse the terrorists' position and facilitates terrorist recruitment efforts. As Juergensmeyer recommends (2004c), and we concur, governments should avoid depicting conflicts as a cosmic clash between civilizations. Because of the emotional strength of religious symbols, religion is a potent mobilizer of public support, but it is not a vital tool for Western societies and may, conversely, be detrimental given the multicultural constituency of Western societies. Framing conflicts as cosmic clashes is far more valuable for terrorist organizations. Any gains that Western governments achieve by casting the conflict in religious terms will be offset by gains terrorists receive from framing the conflict in this way.

2. Berman and Iannacone (2005) argue that fostering an open market of religious expression will reduce religious violence. We agree. Trying to eliminate religion, as some recent authors have proposed, is pointless. Evolutionary work not only affirms the empirical resilience of religion; it offers an explanation for why religion endures even in the face of persecution and indicates that the components of religion are highly effective human adaptations. Terrorists are ideologically motivated, which means that to effectively fight terrorism, it is necessary to compete ideologically as well as militarily. Our analysis highlights the features that make some ideologies more successful than others. While a diversity of ideas can undermine extremist positions, it is critical that new ideas not be perceived as foreign, and that the symbols used to



convey these ideas be consistent with existent symbolic systems. As we note, religious fundamentalists believe they are returning to *their* tradition and will reject anything they perceive as not stemming from their past. Moreover, liberal religious ideologies are not compelling substitutes for those seeking an all-encompassing religious life. The goal is not to eradicate fundamentalism, which will not succeed; rather, the policy strategy should be to encourage an open market of religious expression in which non-violent forms of religious fundamentalism can successfully compete, as can be observed throughout North America.

3. While we agree with much of Atran's (2003) critique of rational choice explanations of suicide terrorism, there is actually considerable overlap between evolutionary and rational choice approaches. The club goods model offered by Berman (2003), Berman and Laitin (2005), and Berman and Iannaccone (2005) is similar to the evolutionary signaling model of religion (relying on rational choice rather than evolutionary assumptions), and is in fact more fully developed and more rigorously tested. Here we concur with Berman and colleagues that it is critical to recognize religious requirements as commitment signals since governmental policies can unintentionally undermine these signals, forcing fundamentalist groups to generate even costlier signals (e.g., Berman 2000). The primary difference between the rational choice and evolutionary approach is that evolutionists, such as Atran and ourselves, maintain that emotions are vital for making sense of terrorism. Recent neuropsychological research underscores the critical, though frequently unconscious, role of emotions in individual decision-making (Cardinal et al. 2002). We view the ability of terrorist groups to shape the emotions of their supporters and recruits as a critical element in their success. As Victoroff notes, "passion often trumps rationality" (2005:17).

Evolutionary research on religion also suggests several policy recommendations we have not previously seen in the literature.

1. Our analysis indicates that religious emotions run deep. Therefore, once conflicts have been framed in religious terms, religious groups must be represented in negotiations. We echo Bloom's warning that religious groups "are more complicated and dangerous negotiating partners" (2005:98). However, without their participation and endorsement of a solution, negotiated peace between secular groups will not satisfy aggrieved parties and will not endure.

2. Signaling theory suggests that in-group members who live in communities that demand costly badges of identity will be best able to detect terrorists posing as group members. For example, Hoffman (2003) describes Palestinian suicide bombers who dress as Ultra-Orthodox Jews in order to penetrate deep into civilian areas. We recommend training Ultra-Orthodox security guards to assist Israeli soldiers already posted at strategic locations (bus stations, market entrances, etc.).
3. We agree with Atran's (2003) conclusion that the best defense against terrorism is to prevent potential recruits from joining terrorist organizations. Our analysis further points to the importance of adolescence as the critical time in which individuals will be receptive to such groups. To prevent adolescents from joining terrorist organizations alternative adolescent youth activities must be developed, funded, and encouraged. We view this as essential.
4. The ideological battle cannot be waged only among adults. Our analysis emphasizes the importance of childhood exposure to religious ideas and concepts and the importance of early ritual activity in fostering long term belief. Alternative forms of religious expression that are publicly perceived as traditional must be fostered and made available to children and adolescents. This will mean developing youth activities as suggested above, and also funding attractive schools that can draw students away from terrorist funded schools and provide them with both ideologies and opportunities for a non-terrorist future.
5. From an evolutionary perspective, religion can be seen as an adaptive proximate mechanism for creating cohesive, cooperative groups. Modern nation-states with educational, economic, and political policies that equitably integrate their multicultural constituencies and effectively sanction policy transgressions reduce the competitive need for religious fundamentalism and increase the opportunity costs such fundamentalism incurs. Building the economic resource base of developing nations, and creating equitable and effective political structures to insure equal access to that base are fundamental steps in eradicating religious terrorism throughout the world.

## **Conclusion**

Evolutionary studies of religion are critical for understanding the current world of terror. The novel insights offered by evolutionary theories of religion are not limited to religiously motivated terrorism, but they do explain why religiously motivated terrorism is on the rise and is particularly lethal. While there is considerable overlap between evolutionary and rational choice

approaches to terror, we believe that evolutionary approaches may fill in significant gaps that have remained unexplained by the dominant rational choice paradigm. The reach of evolutionary logic has extended to studies in history, literature, art, and recently religion; the time is ripe to apply the insights of evolutionary theory to terrorism as well.

### **Acknowledgements**

We thank Dominic Johnson, Bradley Ruffle, and Rafe Saragin for valuable comments on earlier drafts of this manuscript.

### **Box 1: Future Research Questions**

- How do terrorists employ communal rituals to enhance group commitments?
- Is there a link between high fertility and terrorism, and if so, will a reduction in fertility reduce terrorist activity?
- Does membership in terrorist cells increase mating opportunities for self or kin?
- Are secular terrorists employing the core features of religion to achieve their goals?
- How do secular and religious ideologies change?
- How does the death of a charismatic leader influence ideological change?

## References

- Alcorta, C. 2006. *Youth, Religion, and Resilience*. Doctoral dissertation. University of Connecticut.
- Alcorta, C. & R. Sosis 2005. Ritual, emotion, and sacred symbols: the evolution of religion as an adaptive complex. *Human Nature* 16:323-359.
- Argo, N. 2003. The banality of evil: understanding today's human bombs. Policy paper. Preventative Defense Project. Stanford University.
- Atran, S. 2002. *In Gods We Trust: The Evolutionary Landscape of Religion*. Oxford: Oxford University Press.
- Atran, S. 2003. Genesis of suicide terrorism. *Science* 299:1534-1539.
- Atran, S. & Norenzayan, A. 2004. Religion's evolutionary landscape: counterintuition, commitment, compassion, communion. *Behavioral and Brain Sciences* 27:713-730.
- Azam, J-P. 2005. Suicide-bombing as intergenerational investment. *Public Choice* 122:177-198.
- Bering, J. 2005. The evolutionary history of an illusion: religious causal beliefs in children and adults. In *Origins of the Social Mind: Evolutionary Psychology and Child Development*, B. Ellis and D. Bjorklund, eds., Pp. 411-437, New York: Guilford Press.
- Bering, J. 2006. The cognitive psychology of belief in the supernatural. *American Scientist* 94:142-149.
- Bering, J. in press. The folk psychology of souls. *Behavioral and Brain Sciences*.
- Berman, E. 2000. Sect, subsidy and sacrifice: an economist's view of ultra-orthodox Jews. *Quarterly Journal of Economics* 115:905-953.
- Berman, E. 2003. Hamas, Taliban, and the Jewish underground: an economist's view of radical religious militias. NBER WP 10004.
- Berman, E. & L. Iannacone. 2005. Religious extremism: the good, the bad, and the deadly. NBER Working Paper 11663.
- Berman, E. & D. Laitin. 2005. Hard targets: theory and evidence on suicide attacks. NBER WP.
- Berrebi, C. 2003. Evidence about the link between education, poverty, and terrorism among Palestinians. Princeton University mimeo.
- Bloom, M. 2005. *Dying to Kill: The Global Phenomenon of Suicide Terror*. New York: Columbia University Press.

Boyer, P. 2001. *Religion Explained: The Evolutionary Origins of Religious Thought*. New York: Basic Books.

Brooks, D. 2002. The culture of martyrdom. *The Atlantic Monthly* 289:18-20.

Bulbulia, J. 2004a. Religious costs as adaptations that signal altruistic intention. *Evolution and Cognition* 10:19-38.

Bulbulia, J. 2004b. Area review: the cognitive and evolutionary psychology of religion. *Biology and Philosophy* 18:655-686.

Cacioppo, J.T., W.L. Gardner, & G.G. Berntson. 2002. The affect system has parallel and integrative processing components: form follows function. In *Foundations in Social Neuroscience*, J.T. Cacioppo, G.G. Berntson, R. Adolphs, et al., eds. Pp. 493-522. Cambridge: MIT Press.

Cardinal, R., J. Parkinson, J. Hall, & B. Everitt. 2002. Emotion and motivation: the role of the amygdala, ventral striatum and prefrontal cortex. *Neuroscience and Biobehavioral Reviews* 26:321-352.

Daly, M. & M. Wilson. 1988. *Homicide*. New York: Aldine de Gruyter

Damasio, A. 1994. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Avon Books.

Durkheim, E. 1995. *The Elementary Forms of the Religious Life*. New York: The Free Press.

Eliade, M. 1959. *The Sacred and the Profane: The Nature of Religion*. New York: Harcourt Brace Jovanovich.

Friedland, N. 1992. Becoming a terrorist: social and individual antecedents. In *Terrorism: Roots, Impact, Responses*, L. Howard, ed. Pp. 81-93. New York: Praeger.

Gambetta, D. 2005. *Making Sense of Suicide Missions*. Oxford: Oxford University Press.

Hassan, N. 2001. An arsenal of believers: talking to the "human bombs." *The New Yorker*. November 19:36-41.

Hoffman, B. 1998. *Inside Terrorism*. New York: Columbia University Press.

Hoffman, B. 2003. The logic of suicide terrorism. *The Atlantic Monthly* 291:40-47.

Irons, W. 2001. Religion as a hard-to-fake sign of commitment. In *Evolution and the Capacity for Commitment*, R. Nesse, ed. Pp. 292-309. New York: Russell Sage Foundation.

- Johnson, D. 2005 God's punishment and public goods: a test of the supernatural punishment hypothesis in 186 world cultures. *Human Nature* 16:410-446.
- Johnson, D. & O. Kruger. 2004 The good of wrath: supernatural punishment and the evolution of cooperation. *Political Theology* 5:159-176.
- Johnson, D., P. Stopka, S. Knights 2003 The puzzle of human cooperation. *Nature* 421:911-912.
- Juergensmeyer, M. 2002. Religious terror and global war. Global and International Studies Program, Paper 2. <http://repositories.cdlib.org/gis/2>.
- Juergensmeyer, M. 2003. *Terror in the Mind of God: The Global Rise in Religious Violence*. Berkeley: University of California Press.
- Juergensmeyer, M. 2004a. From Bhindranwale to Bin Laden: The Rise of Religious Violence. Presentation at Arizona State University, October 14-15.
- Juergensmeyer, M. 2004b. Holy orders: opposition to modern states. *Harvard International Review* 25:34-38.
- Juergensmeyer, M. 2004c. Is religion the problem? *Hedgehog Review* 6:21-33.
- Kelemen, D. 2004. Are children "intuitive theists"?: reasoning about purpose and design in nature. *Psychological Science* 15:295-301.
- Krueger, A. & J. Maleckova 2002. Education, poverty, political violence and terrorism: is there a causal connection? NBER WP 9074.
- Lincoln, B. 2003. *Holy Terrors: Thinking about Religion after September 11*. Chicago: University of Chicago Press.
- Pape, R. 2003. The strategic logic of suicide terrorism. *American Political Science Review*. 97:343-361.
- Pape, R. 2005. *Dying to Win: The Strategic Logic of Suicide Terrorism*. New York: Random House.
- Rappaport, R. 1999. *Ritual and Religion in the Making of Humanity*. Cambridge: Cambridge University Press.
- Richardson, L. 2006. *What Terrorists Want*. New York: Random House.
- Ruffle, B. & R. Sosis. 2006. Does it pay to pray? Evaluating the economic return to religious ritual.

Sageman, M. 2004. *Understanding Terror Networks*. Philadelphia: University of Pennsylvania Press.

Shariff, A. & A. Norenzayan. in press. God is watching you: supernatural agent concepts increase prosocial behavior in an anonymous economic game. *Psychological Science*.

Simon, S. & Benjamin, D. 2000. America and the new terrorism. *Survival* 42: 59-75.

Sosis, R. 2000. Religion and intragroup cooperation: preliminary results of a comparative analysis of utopian communities. *Cross-Cultural Research* 34:70-87.

Sosis, R. 2003. Why aren't we all Hutterites? Costly signaling theory and religion. *Human Nature* 14:91-127.

Sosis, R. 2005. Does religion promote trust? The role of signaling, reputation, and punishment. *Interdisciplinary Journal of Research on Religion* 1:1-30 (Article 7).

Sosis, R. 2006. Religious behaviors, badges, and bans: signaling theory and the evolution of religion, in *Where God and Science Meet: How Brain and Evolutionary Studies Alter Our Understanding of Religion, Volume 1: Evolution, Genes, and the Religious Brain*, Patrick McNamara, ed. (pp. 61-86). Westport, CT: Praeger Publishers.

Sosis, R. in press. Why are synagogue services so long? An evolutionary examination of Jewish ritual signals. In *Judaism and Bio-Psychology*, ed. Rick Goldberg.

Sosis, R., & Alcorta, C. 2003. Signaling, solidarity and the sacred: the evolution of religious behavior. *Evolutionary Anthropology* 12:264-274.

Sosis, R., & Bressler, E. 2003. Cooperation and commune longevity: a test of the costly signaling theory of religion. *Cross-Cultural Research* 37:211-239.

Sosis, R., & Ruffle, B. 2003. Religious ritual and cooperation: testing for a relationship on Israeli religious and secular kibbutzim. *Current Anthropology* 44:713-722.

Sosis, R., & Ruffle, B. 2004. Ideology, religion, and the evolution of cooperation: Field tests on Israeli kibbutzim. *Research in Economic Anthropology* 23:89-117.

Sosis, R., Kress, H., & Boster, J. 2006. Scars for war: evaluating alternative signaling explanations for cross-cultural variance in ritual costs.

Van Vugt, M. 2006. Evolutionary origins of leadership and followership. *Personality and Social Psychology Review* 10:354-371.

Victoroff, J. 2005. The mind of the terrorist: a review and critique of psychological approaches. *Journal of Conflict Resolution* 49:3-42.

Villarreal, L. this volume. From bacteria to belief: evolution of immunity and its consequences for security.

Wilson, D. 2002. *Darwin's Cathedral: Evolution, Religion, and the Nature of Society*. Chicago: University of Chicago Press.

Zuckerman, P. 2006. Atheism: contemporary rates and patterns. In *Cambridge Companion to Atheism*, ed. M. Martin. Cambridge: Cambridge University Press.