

Sacrifice and Sacred Values: Evolutionary Perspectives on Religious Terrorism

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Abstract

Evolutionary theories of religion and sacred values are essential for understanding current trends in terrorist activity. We clarify religion's role in facilitating terror and outline recent theoretical developments that 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. We examine how terrorists employ these features of religion to achieve their goals and describe how 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 ingroup 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, inculcate sacred beliefs, and enlist them in high-risk behaviors. We conclude by offering insights, based on our evolutionary analysis, concerning conflict resolution when sacred values are in dispute.

Key Words: cooperation, religion, ritual, sacred values, terrorism

Introduction

In recent years there has been a rise in the proportion of terrorists motivated by religious concerns. This trend is particularly troubling because there is a significant correlation between religious motivation and the lethality of terrorist attacks (Benjamin & Simon, 2002; Hoffman, 2003). Data collected by the US State Department on 3,932 terrorist attacks between 1968 and 2007 indicate that attacks by religious groups were four times as lethal as attacks by secular groups (Berman, 2009). One reason religious terrorism is so deadly is the increased use of suicide attacks, which have risen from an average of 4.7 per year from 1981 to 1990, to 16 per year from 1991 to 2000, to an average

of 180 per year from 2001 to 2005 (Atran, 2006). At least 70% of suicide attacks from 2000 to 2003 were religiously motivated (Atran, 2004). From 1980 to 2003 suicide attacks accounted for only 3% of all terrorist incidents, but (excluding 9/11) they inflicted 48% of the fatalities, and 73% if 9/11 is included (Pape, 2005).

Some scholars have argued that secular state-sponsored terrorism is somewhat constrained because states do not want to undercut their claims of legitimacy and alienate potential supporters who would revile indiscriminate violence against civilians (Richardson, 2006). In contrast, "religious terrorists often seek the elimination of broadly defined categories of enemies and accordingly regard such

large-scale violence not only as morally justified but as a necessary expedient for the attainment of their goals” (Hoffman, 2006, pp. 88–89). Religiously motivated terrorists “want a lot of people watching and a lot of people dead” (Simon & Benjamin, 2000, p. 71). Why would religious terrorists not feel as constrained as secular political actors? Why would they want more people watching? Why is religiously motivated terrorism becoming more common? Why would anyone become a suicide bomber? And what governmental policies can stem religiously motivated violence?

In this chapter we explore how the evolutionary sciences can inform us about religious terrorism. The dominant approach to the study of terrorism, by academic, intelligence, and military researchers, is grounded in rational choice models. We argue, however, that rational actor approaches cannot explain why individuals sacrifice their lives for lands lacking material wealth, abstract ideological causes, insults to intangible values such as honor, and other seemingly irrational motivations. We believe evolutionary research on religion and sacred values can explain such sacrifices.

This chapter will proceed as follows. We begin by defining religious terrorism. Then we clarify religion’s role in causing, motivating, and facilitating terror. Next we examine how recent work on the evolution of religion and sacred values can help us address the questions posed earlier. We conclude with a discussion about the adaptability of religion and how our approach can inform conflict resolution.

What Is Religious Terrorism?

Religious terrorism is a concept not without controversy. The controversy concerns whether religious terrorism exists at all. Some argue that terrorism is never religious per se because political motives are always the root cause of terrorist activity (Bloom, 2005; Pape, 2005). Moreover, it is unclear how to distinguish between secular and religious terrorism (Nardin, 2001). Others, such as terrorist expert Bruce Hoffman, maintain that the “radically different value systems, mechanisms of legitimation and justification, concepts of morality, and worldview” (2006, p. 88) explain why religiously motivated terrorism is so lethal, and thus it justifies distinguishing religious terrorism as a distinct category. While Hoffman is likely correct, those who emphasize that it is difficult to distinguish religious terrorism from other types of terrorism are also justified in their concern; religious terrorism is an ambiguous category,

consisting of two words that are both notoriously difficult to define. To demarcate the scope of our inquiry into religious terrorism, we begin by clarifying what these concepts, religion and terrorism, mean. We believe that our definitions, derived from an evolutionary approach, can help distinguish religious terrorism from other forms of violence and cast light on specific elements of religion that render it particularly efficacious for achieving terrorists’ objectives.

Defining Terrorism

What constitutes terrorism is not straightforward and may depend on one’s vantage point; there is truth to the adage “one person’s terrorist is another’s freedom fighter.” Not surprisingly, many definitions of terrorism have been offered. The US Department of State defines terrorism as “Premeditated, politically motivated violence perpetrated against noncombatant targets by subnational groups or clandestine agents” (<http://www.state.gov/s/ct/>). The Federal Research Division of the Library of Congress considers terrorism to be “the calculated use of unexpected, shocking, and unlawful violence against noncombatants (including, in addition to civilians, off-duty military and security personnel in peaceful situations) and other symbolic targets perpetrated by a clandestine member(s) of a subnational group or a clandestine agent for the psychological purpose of publicizing a political or religious cause and/or intimidating or coercing a government(s) or civilian population into accepting demands on behalf of the cause” (Hudson, 1999, p. 164).

There are four prominent features that recur in most definitions of terrorism (Jongman & Schmid, 1983). First, terrorism involves violence and/or destruction. Second, the attack has a political motive. Third, there is an intention to strike widespread fear in the attacked community. Fourth, the victims of the attack are civilians. We will consider terrorism to be attacks that exhibit these four features.

Defining Religion

Similar to “terrorism,” there are likely as many definitions of “religion” as those who study it. Even the Latin origins of the English word remain obscure and do not provide guidance. According to the *Oxford English Dictionary*, “religion” is either derived from *relegere* (to read over again) or *religare* (to bind), but even if the latter as some scholars contend, it is unclear whether the binding is to the gods, community, or both. James Frazer, in his

classic study *The Golden Bough*, defined religion as “a propitiation or conciliation of powers superior to man which are believed to direct and control the course of nature and of human life” (1915/2010, p. 53). In the most influential sociological examination of religion in the 20th century, Emil Durkheim wrote that “a religion is a unified system of beliefs and practices relative to sacred things, that is to say, things set apart and forbidden—beliefs and practices which unite into one single moral community called a Church, all those who adhere to them” (1912/1995, p. 44).

These definitions, and the hundreds of others that have been offered by scholars, either fail to incorporate some aspects of what others believe to constitute religion, or they are unable to distinguish religion from other cultural institutions. If religion is anything at all, it is an inherently fuzzy category with unclear boundaries. Therefore, rather than offer a descriptive definition of religion, many scholars have concluded that religion can be best defined and studied by considering its constituent parts (Alcorta & Sosis, 2005; Atran & Norenzayan, 2004; Bering, 2005; Bulbulia, 2005; Molloy, 2008; Whitehouse, 2008).

Essentialist definitions of religion, which break religion down into its more easily definable core elements, have two particular advantages for the study of religious terrorism. First, essentialist definitions avoid endless debates concerning whether Marxism, patriotism, atheism, and so on are religions. It is clear that religion shares some core elements with other cultural institutions, and indeed, this approach clarifies that most of religion’s core elements are not unique to religion. Ritual, myth, music, and taboo, to consider a few examples, are also manifest in other cultural institutions, including politics and sports. Not surprisingly, as we’ll discuss later, so-called secular terrorism shares many features with religious terrorism. Second, by breaking religion down into its core elements it becomes obvious that these elements did not evolve together. Ritual, for example, has antecedents in many other species (Alcorta & Sosis, 2005, 2007; D’Aquili, Laughlin, & McManus, 1979) and presumably has a much deeper evolutionary history in our lineage than many other core elements, such as myth. Religion, therefore, did not simply appear in the human lineage; its evolution consisted of uniting cognitive processes and behaviors that for the most part already existed. Although these elements evolved separately, they coalesce in similar ways across all cultures and at some point in human evolution they began to

regularly coalesce. Examining how the elements of religion interrelate is important for understanding how terrorists effectively employ religion to further their political goals.

We have previously argued that religion may best be understood as an evolved complex of traits incorporating cognitive, affective, behavioral, and developmental elements (Alcorta & Sosis, 2005). 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

Later we examine these features of religion and show how terrorists use each of these features to solve inherent problems they face in achieving their objectives.

Defining Religious Terrorism

We consider religious terrorism to be politically motivated violent and/or destructive attacks aimed at civilians that seek to strike fear in the victims’ communities and that employ an ideology usually transmitted during adolescence that encompasses costly ritual behavior, beliefs in supernatural agents, and separation of the sacred and profane.

Notice that in contemporary societies, our four core elements of religion co-occur within secular contexts as well. For example, the adoption of communal rituals and initiation rites by nominally secular terrorist groups, such as the Liberation Tigers of Tamil Eelam (LTTE), and their quasi-deification of Marxist-Leninist ideals, blurs the line between what is secular and what is religious (Roberts, 2005). These groups engage important elements of the previously described religious adaptive complex and reap many of the adaptive benefits achieved by religion. Thus, despite avowing secular ideals, their behavior falls within our definition, and indeed, we can gain a much better understanding of their success by examining them through the lens of religious terrorism.

It is also worth emphasizing that religious terrorism is never exclusively religiously motivated; there is always some political motivation as well (Juergensmeyer, 2004b; Pape, 2005). The balance between religious and political motivation differs between terrorist groups; some groups rely on religious motivation more than others. For example,

Judge Zvi Cohen, who presided over the trial of members of the Jewish Underground, a terrorist network that sought to blow up mosques on the Temple Mount (see Gorenberg, 2000), described three motivations for these convicted terrorists: “The first motive, at the heart of the Temple Mount conspiracy, is religious. The second motive—the security of settlers in the West Bank . . . A less prominent motive is that of relations among friends” (Pedahzur & Perliger, 2009, p. 46). Not only will the balance between religious and political motivations differ between terrorist groups, but as Judge Cohen noted for the Jewish Underground, motivations will vary within a single operation. Moreover, some religious terrorists act alone, but as we will discuss later, relations and commitments among friends are also a powerful motivator for many terrorists.

The Landscape of Contemporary Religious Terrorism

It has been claimed that terrorism is probably as old as *Homo sapiens* (Atran, 2010, p. 91), but the story of contemporary terrorism, especially the religious variety that we will explore here, begins with the forces of globalization. Globalization is often lauded for bringing people together and increasing the knowledge we have of one another. But for many, globalization is perceived as the uncontrollable spread of Western norms and values—norms and values that are believed to be at odds with their own (Ruthven, 2004). While some view globalization as a means to bring about peace and understanding, at times globalization may fuel cultural conflict (Schneider et al., 2003). In addition to conflicting cultural values, those living in underdeveloped regions of the world can witness via mass media technologies, particularly the Internet, the extraordinary economic disparity between themselves and the West.

Immigrants to Western societies and their descendants, who seek to maintain their traditional cultural ways, can find themselves being pulled in two divergent directions. For those in such a situation, intercultural contact can result in “social ambiguity, role conflicts, and status inconsistencies and incongruities” (Alcorta, 2010), fostering cognitive dissonance, feelings of powerlessness, and a sense of anomie. Even ambitious men from immigrant communities, who are well educated and financially secure, often find limits to what they can achieve in Western society. Such experiences of anonymity, devaluation, and powerlessness can have very real and severe psychological and physical affects.

Intercultural contact is certainly not new; social and cultural changes initiated by such contact constitute a dominant theme throughout human history (Wolf, 1982). What is new about the advent of global industrialization, however, is the scope and rate of change it has initiated. Social change introduced by industrial urbanization has been identified as a major factor in the global health transition (World Health Organization [WHO], 2001). Increased blood pressure, elevated cortisol levels and changes in cortisol profiles, as well as escalated EBV antibody levels, have been documented in populations worldwide as they are integrated into a global industrial economy (Dressler & Bindon, 2000; Flinn & England, 1995; McDade, 2002; McDade, Stallings, & Worthman, 2000). These markers all indicate activation of the body’s “stress system.” Although adaptive as a short-term response to immediate environmental threats, long-term activation of this system can be deadly (Sapolsky, 1996). Escalating rates of depression, schizophrenia, and other psychoses (Krabbendam & van Os, 2005; McGrath et al., 2004; Sundquist, Frank, & Sundquist, 2004; van Os, 2004), as well as an unprecedented incidence of suicide, particularly among adolescents, have all accompanied the urban industrial transition (Desjarlais et al., 1995). The World Health Organization (2001) reports that mental and neurological disorders make up 11% of the global disease burden and are expected to rise to 14.6% by 2020. Depression, a precursor for 80%–90% of all suicides, is currently among the top 10 causes of death in most countries that report rates, and it is among the top three causes of death in the population aged 15–34 years (WHO, 2001). These escalating rates of depression, schizophrenia, and suicide within urban environments are particularly pronounced among adolescent males (see Alcorta, 2010).

The stress and anxiety of rapid cultural change has not gone unnoticed by religious commentators. Sayyid Qutb, leader of the Egyptian Muslim Brotherhood in the 1950s and 1960s, described the “hideous schizophrenia” of modern life. He argued that this schizophrenia was a product of the Christian West’s separation of religion from the physical world, the distinct compartmentalizing of religion and science (Qutb, 2007). In a discussion on Qutb’s writings, Paul Berman insightfully observes that Qutb “put his finger on precisely the inner experience that Salman Rushdie described in *The Satanic Verses* many years later—the schizophrenia or alienation, the feeling of being two instead

of one, the pain of living in two worlds at once, the experience that Muhammad Atta and suicide soldiers of 9/11 must surely have felt in their everyday existences in the West” (2004, p. 76).

Muslim Jihad

Terrorism is a political tool that has been employed, with varying success, by all the world religions (Hoffman, 2006). Because of its geopolitical impact, considerable media and scholarly attention has focused on Islamic terrorism with the unfortunate consequence that in the West terrorism is often implicitly (and sometimes explicitly) associated with Islam. There is no inherent relationship, however, between Islam and terror. The causal factors behind the rise of terrorism in the Islamic world are varied but include perceptions of injustice, colonization, and the disparity in economic and technological development (Lewis, 2003). The Islamic world in the Middle Ages was philosophically and scientifically more advanced than the Christian world; only China was comparable among civilizations (Lewis, 2002). And the military power of the Islamic world was unparalleled (Karsh, 2007). The contrast in the Islamic world between then and now, however, could not be more striking. The annual Arab Development Reports (<http://www.arab-hdr.org/>), which do not include data on the considerable Muslim populations throughout South East Asia, describe a remarkable gap between the West and the Arab world in literacy, book translations, scientific research productivity, Internet use, and other indicators of human development. The reports further highlight the significant economic gap between the Arab world and the West. While the glory of Islamic civilization has passed and been supplanted by Western civilization and imperialism, this history has not been forgotten in the Islamic world and often serves as a source of animosity toward the West.

In this context it is not surprising that many Muslims have turned toward their faith for answers, comfort, and stability. Yet, as globalization expands Western cultural and economic influence, Muslim hegemony and sacred values are perceived to be threatened. Western values, including democracy, are viewed by some as inferior to Muslim values that, it is believed, derive from Allah. Muslim law, *sharia*, must be protected and prevented from being subjugated to human law. Accordingly, democracy is viewed as inherently flawed because humans are limited in their wisdom and may not willingly choose to live by *sharia*. Therefore, these laws must

be imposed on populations, even by force, for their own good (Atran, 2010).

Marc Sageman (2008) has shown that global jihad terrorism has occurred in three major waves. The first wave consisted of those who fought against the Soviets in the 1980s. They were upper- and middle-class college-educated Egyptian professionals, and most were married. The second wave spanned the 1990s and ended with the US-led military invasion of Afghanistan after 9/11. The second-wave jihadis were mostly middle-class Europeans and Saudis. Many of them held advanced degrees in science or medicine, and overall they were materially and educationally better off than their populations of origin. The third wave began after the United States and British invasion of Iraq in 2003. Many of these jihadis were either second-generation or infant immigrants from the West, and they were primarily lower or middle class. Atran (2010) has found these jihadis, in contrast to previous waves, to be more marginalized, underemployed, and have a history of prior criminal activity unrelated to jihad. They often find religion in their early 20s and are more likely to be single.

Why has the profile of jihadis changed from educated, economically well-off men to petty criminals who are newly religious? Atran argues that US counterterrorism efforts forced “would-be terrorists to rely on local, low-cost, underground, and informal methods of financing. In addition, the elimination of Al Qaeda’s training facilities in Afghanistan and the disruption of its networks for supplying expertise in logistics, bomb making, and so forth, meant that jihadis would have to find new means for executing terrorist operations” (2010, pp. 207–208). Petty criminals, who live at the edge of cultural contact and personally experience the impacts of anomie and devaluation discussed earlier, have been well situated to fill that niche. Moreover, because they are disenfranchised and looking for a moral cause to take up, they are “even more altruistically prone than others are to give up their lives for their comrades and a cause” (Atran, 2010, pp. 207–208).

The Relationship Between Religion and Terror

The media may be responsible for the popular belief that religion, especially Islam, and terror are strongly associated (on the US State Department’s list of foreign terrorist organizations, less than half are religious). Suicide terrorists in particular are often depicted in the media as delusional religious fundamentalists, hopelessly brainwashed and out of

touch with reality. This characterization, however, is inaccurate. The terrorist career itself is extraordinary, but individuals who eventually become terrorists are otherwise quite ordinary. As Atran observes, “Anthropologically and psychologically, terrorists usually are not remarkably different from the rest of the population” (2010, p. 36). Berrebi (2007), for example, has shown that Palestinian suicide bombers have above average education and are economically better off than the general population. Krueger (2007) also demonstrates 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, “In order to be a martyr bomber you have to want to live” (Richardson, 2006, p. 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, as noted earlier, have argued that terrorists have political, not religious goals (Berman, 2009; Bloom, 2005; Juergensmeyer, 2003; Pape, 2005). Former US Ambassador Michael Sheehan commented, “A number of terrorist groups have portrayed their causes in religious and cultural terms. This is often a transparent tactic designed to conceal political goals, generate popular support and silence opposition” (<http://www.brookings.edu/events/2000/0210terrorism.aspx>). Thus, religion may not be the root cause of conflicts, but it 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. But why would religion be an effective tool for terrorists? Here we review six main reasons.

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, p. 2). Atran (2010) describes how many of the men responsible for the Madrid train bombings wanted to belong to, or lead, something bigger than themselves to feel important and influential on a cosmic scale. Fighting for Islam, or at least their understanding of it, provided them with the feeling of personal importance they had been seeking. The stress of social ambiguity and status inconsistencies, as mentioned earlier, can be alleviated by aligning oneself with a cosmic cause, releasing the person from the social and economic pressures of the material world.

It is remarkable how successful contemporary terrorists have been in shaping worldviews so that they are consistent with their own views. Bin Laden, for instance, has been particularly successful in transforming his local grievance (i.e., getting US 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, p. 35).

Moral Justification

Religion also facilitates terrorists’ goals by providing moral legitimacy to their cause (Hoffman, 2006; 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 ingroup passions are aroused and outgroup hatreds are dangerously ignited. 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 were Hindus fighting a Buddhist majority. In Berman and Laitin's (2008) extensive sample of suicide terrorism, almost 90% of the attacks were aimed at victims of a different religion. Data from the ongoing situation in Iraq would undoubtedly lower this percentage, as Muslim suicide bombers are killing other Muslims, but that conflict also highlights that categories such as Muslim, Buddhist, or Hindu are too broad. Enemy "outgroups" can exist within these broad categorical labels. Indeed, religious extremism typically emerges concomitantly with secularism and begins with intrareligious conflict, such as the rise of the Muslim Brotherhood in Egypt and ultimate incarceration and execution of many of its members and leaders, including aforementioned Sayyid Qutb (Armstrong, 2000).

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, p. 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, p. 98), which we can assume helped them rationalize their actions.

Adaptability

While religions are often viewed as a conservative social force, they are in fact highly responsive to social, political, and economic conditions. We return to the misconception of religion as inflexible later; here we simply emphasize that the vast sacred writings and mythical traditions of contemporary religions play an important role in religion's flexibility, a quality that makes religion an effective tool for terrorists. Religious texts that endure do so because they are open to multiple interpretations. Extensive use of metaphor and poetry in religious texts and oral traditions engages subconscious processes of

personal significance to create contextual meaning (Belanger, Baum, & Titone, 2009; Sidtis, 2006). As a result, each new generation reinterprets religious texts in relation to their own meaningful experiences, thereby keeping them living, relevant, and fresh. Past interpretations are not necessarily rejected per se, but they are transformed or ignored by the community. They remain available, however, should cultural change make their message relevant again.

The sacred writings of contemporary religious traditions are vast repositories that leaders draw upon at various points in history, emphasizing aspects that are socially and politically expedient, and disregarding those that are not. Terrorists often rely on these repositories, including alternative interpretations of sacred texts that have been largely forgotten by mainstream adherents. Consider, for example, the Jewish Underground, mentioned earlier. They sought rabbinical sanction for their operation, as is common among religious terrorists (Hoffman, 2006, p. 89), but no prominent rabbis would endorse their plans. Since they were unable to gain approval from living rabbis, "they sought justification for attacking the Temple Mount mosques in the teachings and adjudications of rabbis who were no longer living. For example, Dan Be'eri scoured the writings of Rabbi Zvi Yehuda Kook for some reference to a possible endorsement of the plan for exploding the mosques" (Pedahzur & Perliger, 2009, pp. 60–61).

Extended Communities of Support

As we discuss later, terrorist networks exploit religion's ability, typically through intense ritual and shared counterintuitive beliefs, to create tight social bonds. But many religions, especially contemporary world religions, also create extended communities. Whitehouse (2004) argues that repetitive rituals provide a cognitive foundation for abstract communities. Infrequently performed rituals that are highly evocative and emotionally arousing create strong bonds among performers. Whitehouse claims that these experiences are stored in episodic memory and have long-term neurological effects. In contrast, the memories of low-arousal repetitive rituals, such as daily prayer, are stored in semantic memory. While performers of a painful initiation rite will recall who participated in the ritual, regular churchgoers would be unable to recall who attended church on any particular Sunday, unless there was a notable event to help recall. However, regular churchgoers would be able to describe in detail what happened on any particular Sunday because

the same rituals are performed in the same manner every week. Whitehouse argues that the storing of ritual knowledge in semantic, rather than episodic, memory leads to anonymous religious communities. What makes someone a Christian, for example, are abstract properties of belief and performance that do not need to be witnessed by the entire population for one to be considered a member of the religious community.

Terrorists rely on extended anonymous communities, which are created by frequent ritual performance, for political and material support. Those willing to take the risk of a terrorist operation are generally few in number; it is the support of the extended community that is vital for terrorists to achieve their political aims (Merari, 1993). Thus, it is the larger public rather than the victims who are the real targets of terrorist activity. It is the publicity of spectacular terrorist attacks that serves as the oxygen that feeds the fire of modern terrorism (Ginges, Hansen, & Norenzayan, 2009). And increasing media technologies, of course, have only added fuel to this fire. Menachem Livni of the Jewish Underground, for example, “was so preoccupied with public support for the underground that he followed the public opinion polls in the newspapers measuring the support for their terrorist attacks” (Pedahzur & Perliger, 2009, p. 56). Attacks do not have to successfully injure or kill anyone to be successful in the eyes of the perpetrators. As Atran notes, “With publicity, even failed terrorist acts succeed in terrorizing; without publicity, terrorism would fade away” (2010, p. 278).

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 ingroup 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; Dingley & Kirk-Smith, 2002; Roberts, 2005). For religious terrorists, cohesiveness is further fostered through powerful religious symbols, which “often become

focal points in occupations involving a religious difference” (Pape, 2005, p. 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, p. 29).

The bonding that occurs through religion does not always have to be strong to be effective for terrorists. As Atran (2010) shows in numerous contexts, terrorism often begins on the football pitch; friends are simply recruiting friends and the commitments are ones that have been built by growing up and playing together. On the other hand, some terrorist networks are loosely organized collectives of virtual strangers. For example, most members of the Jewish Underground did not even know each other and most people involved simply did one aspect of an operation, such as driving somewhere or fixing something, without knowledge of the plans for the entire operation (Pedahzur & Perliger, 2009). Although members did not have strong bonds, they did share similar religious commitments, which facilitated being drawn into various activities at the requests of friends. Indeed, given the loose connections in the social network of the Jewish Underground, it is unclear how they could have accomplished any of their goals (they murdered three Arab mayors) without their shared religious identity and commitment. As Berman remarks on the Jewish Underground’s failure to carry out their primary attack, bombing the Temple Mount, “Their strong theological commitment to their cause must have been necessary for the Underground’s members to attempt such dangerous and severe acts of destruction, yet it was not sufficient for their conspiracy to succeed” (2009, p. 9).

Terrorism and the Core Elements of Religion

We defined religious terrorism earlier to include four cross-culturally recurrent features of religion. We have previously argued (Alcorta & Sosis, 2005) that these elements of religion derive from ritual systems selected for in early hominin 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. Here we explore how these four characteristics make religion an effective tool for terrorists.

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, 2009). 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 ingroup trust and overcome commitment problems (Alcorta & Sosis, 2005; Atran & Norenzayan, 2004; Bulbulia, 2004a; Henrich, 2009; 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 energetic, time, 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 & Alcorta, 2003).

The increased commitment and trust resulting from religious signaling provides strategic advantages for religious terrorists over other militant groups, enabling them to reduce the threat of defection. Signaling models also offer insight into a

curious feature of religious terrorist organizations, such as Hamas and Hizbollah; in addition to their violent operations, these terrorist organizations serve as mutual aid societies, providing resources and services that weak and ineffective governments are unable to supply. In an insightful analysis employing economic signaling models, Berman argues that the cooperation needed to produce these collective services benefit terrorist actions by reducing the likelihood of defection: “Having already weeded the cheaters and shirkers out of their mutual aid operations, they can be confident that the remaining members are loyal” (2009, p. 17).

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, 2009). 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 ingroup 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 ingroup 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 (Ginges et al., 2009; Ruffle & Sosis, 2007; Soler, 2008; Sosis & Bressler, 2003; Sosis, Kress, & Boster, 2007; Sosis & Ruffle, 2003, 2004). Religious terrorists of course employ religiously defined costly requirements to signal commitment, resulting in high levels of ingroup 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, p. 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. 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 adaptive response? There would appear to be four noncompeting alternative explanations.

First, while the individual faces the ultimate sacrifice, suicide terrorism is likely to benefit the group, and Pape’s (2005) analysis showing that groups deploying suicide terrorists tend to achieve their goals supports this interpretation. Suicide terrorism may offer the most promising example of strong selective pressures operating at the group level (Villarreal,

2008). Atran, for example, maintains that Hamas benefits from sacrificing its high-quality youth: “[t]hrough spectacular displays involving the sacrifice of their precious ‘human capital’ (educated youth with better-than-average prospects), they also signal a costly commitment to their community, which the community honors by providing new volunteers and added funding” (2010, p. 363). Second, it is possible that suicide bombers recoup their losses through benefits to their kin (Qirko, 2009). For example, the families of Palestinian suicide terrorists receive financial payments (up to US \$10,000) for their martyred sons and daughters. However, Israel’s policy of destroying suicide bombers’ homes would appear to counterbalance these indirect fitness gains and be a strong negative incentive to sacrifice oneself for one’s family. Noting research that Hezbollah suicide bombers attained above-average education, Azam (2005) argues that suicide bombers may be investing in future kin generations (their higher education 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). Third, life history theory predicts that risk aversion decreases when life expectancy is low, particularly among adolescents, and there is considerable empirical work supporting this prediction (e.g., Bulled & Sosis, 2010; Hill & Hurtado, 1996; Wilson & Daly, 1997). High-risk responses to dangerous and uncertain environments are often adaptive, although it is unclear how suicide bombers could individually benefit from their actions. A fourth 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, p. 124), even though they will of course not be around to enjoy their newly attained status. If afterlife rewards and concerns of postmortem reputation are motivating suicide bombers, such beliefs are likely to be

maladaptive, unless kin significantly benefit from being related to a martyr.

Not only are costly rituals effective for creating the trust and close bonds needed for successful suicide missions, but they are also effective at instilling the individual motivation and building the coalitional support necessary for terrorists to achieve their political aims. Ginges et al. (2009) argued that religion's relationship to suicide attacks may derive from religion's ability to enhance individual commitment to coalitional identities via collective ritual. In a series of experimental and survey studies, Ginges et al. showed that support for suicide attacks was related to attendance at worship services. Their findings were consistent among Palestinian and Israeli samples, as well as a cross-cultural sample of six religions in six countries. In their studies, support for suicide attacks were unrelated to religious beliefs or prayer frequency, but attending community services at a house of worship was a highly significant predictor of support for martyrdom and measures of outgroup hostility. Attending worship services is likely to reinforce individual emotional commitment to group symbols, including beliefs, while signaling coalitional commitments and generating the popular support terrorists need to thrive.

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, p. 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 and 12 years 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 ingroup cooperation (Atkinson & Bourrat, 2010; Bulbulia, 2004b; Johnson, 2005; Schloss & Murray, 2011; 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 & Norenzayan, 2007).

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 preexistent 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.

Although afterlife rewards are rarely a prime motivator of suicide terrorism (Atran, 2010; Berman, 2009), they 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, p. 39). Female martyrs are promised to be the chief of the virgins and exceed their beauty (Richardson, 2006, p. 122). Even kamikaze pilots were assured that they would be "transcending life and death" (Atran, 2003, p. 1535). Experimental studies demonstrate

that humans have a natural inclination to believe that some element, typically a soul, survives death (Bek & Lock, 2011; Bering, 2006). 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. 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, 1912/1995; 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 & 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 almost always publicly perceived as sacred. Sosis (2011) argues that the sacralization of land is an adaptive strategy aimed at increasing coalitional commitment. Pape (2005, p. 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, Gardner, & Berntson, 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 & 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).

One of the most productive areas of evolutionary analyses of terror is the work by Ginges, Atran, and colleagues on sacred values. Psychologists have shown that people find it insulting when monetary prices are placed on their sacred values (e.g., McGraw, Tetlock, & Kristel, 2003; Tetlock, McGraw, & Kristel, 2003). Tetlock (2003) argues that some categories of mental operations are off

limits because they require the assignment of finite appraisals to values that our moral communities treat as unquestionable and absolute commitments. To mix the sacred with the profane and consider sacred values in finite terms is to commit a taboo, and those who do so generally feel impure and desire to morally cleanse themselves. A belief that martyrdom is a means of symbolic moral cleansing leads some down the path toward suicide terrorism (Bodansky, 2007).

Commitments to a sacred and higher cause enable terrorists to achieve greater sacrifice than is typically possible with traditional reward structures that are based on material incentives. As Atran keenly observes, the “jihad fights with the most primitive and elementary forms of human cooperation, tribal kinship and friendship, in the cause of the most advanced and sophisticated form of cultural cooperation ever created: the moral salvation of humanity” (2010, p. 35). In a survey of Palestinian support for suicide bombings, support was not based on a belief that Jews or Israelis are inherently bad or evil; it was a perceived sense of injustice that predicted a belief that Islam sanctions martyrs (Atran, 2010), an injustice committed against the group. Another survey (Atran, 2010) found that people are distrustful of polls showing that the other side wants an “open society” or peace; sacred values are preserved and protected even in the face of empirical evidence.

In a study on reactions to compromises aimed at ending the Israeli-Palestinian conflict, Ginges et al. (2007) found that there was some anger and disgust, as well as some propensity for violence, when respondents were asked to compromise over a sacred value. These responses actually increased for individuals deemed “moral absolutists” when the compromises included an additional instrumental incentive, such as money. As a guest of the Pashtun tribes in Afghanistan, Osama bin Laden was the beneficiary of sacred values associated with hospitality. These sacred values, based on group identity and forms of cooperation, override the rational choice of receiving the millions of dollars that have been offered for the capture of bin Laden. Atran argues that the “[d]evotion to some core values may represent universal responses to long-term evolutionary strategies that go beyond short-term individual calculations of self-interest but that advance individual interests in the aggregate and long run” (2010, p. 345). Sacred values can surface for issues with comparatively little importance or historical background when they become tangled up with conflicts over collective identity. The fusion of sacred values

and group identity can mean that “[m]atters of principle, or ‘sacred honor,’ are enforced to a degree far out of proportion to any individual or immediate material payoff when they are seen as defining ‘who we are’” (Atran, 2010, p. 345).

Group identities can be firmly established early in life. Psychologist Brian Barber, who studies youth experiences with violence and war, explains that personal experiences with violence shape how youths respond to the conflict in which they are raised. According to Barber, “much of identity can be sourced externally, in that political conflict can literally divide and define who one is (ethnically, religiously, politically, culturally, etc.)” (2008, p. 306). Collective identity can be critical for youths, and living through an intense conflict can bind a population together. For Palestinian youth, for example, the “extensive engagement in the struggle, and their willingness to sacrifice for it—even their childhood—was thoroughly informed by a realm of meaning that comprehensively detailed for them their identity and justified and legitimized the goals and tactics of their fight” (Barber, 2008, p. 307).

Adolescence as the Critical Life Phase for the Transmission of Religious Beliefs and Values

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. Social stimuli assume increased importance as the adolescent enters into sexual, competitive, and coalitional nonkin relationships. Risk taking and novelty seeking escalate, particularly in males, and human sensation-seeking scores peak (Steinberg, 2007). At the same time, mental processing speeds increase, the ability to focus on task-relevant information improves, and abstract, symbolic reasoning develops (Dahl, 2004; Kwon & Lawson, 2000). The brain changes that occur during adolescent development drive the social and sexual behaviors of the teen years (Dahl, 2004; Steinberg, 2007). The higher impulsivity, increased risk taking, and enhanced novelty seeking of adolescent males are related to the changes occurring in the dopaminergic pathways of the brain. The resultant behaviors motivate adolescent males to move from the

security of their kin networks to the less predictable and more competitive arena of nonkin interactions (Alcorta, 2010).

In addition to the heightened sociality and emotional responsivity of adolescence, this developmental period is also marked by the ongoing maturation of both the social processing region of the brain, the temporal cortex, and the abstract, “executive” processing region, the prefrontal cortex. A shift in the brain’s reward circuitry to greater prefrontal dominance occurs concomitantly with the ongoing maturation of this region. These simultaneous changes in the adolescent brain provide a unique window of opportunity for the creation of emotionally weighted and socially meaningful symbolic schemata, and for integrating these schemata into the brain’s reward circuitry (Alcorta, 2006; Blakemore, 2008). As a result, adolescence is a time when communal ritual performance is likely to be particularly influential (Alcorta & Sosis, 2005).

Adolescent rites of passage comprise one of the most consistent features of religions across cultures (Lutkehaus & Roscoe, 1995). Rites of passage not only teach initiates the social and cultural mores of the group as embodied in unfalsifiable beliefs; they also imbue these beliefs with emotional significance and motivational force. Participation in rites of passage engages unconscious emotional processes, as well as conscious cognitive mechanisms. Such rites frequently evoke intense emotions of love, anger, fear, and awe and associate these emotions with socially significant symbols and beliefs. Because such symbols are deeply associated with emotions engendered through ritual, they take on motivational force. The use of communal ritual to evoke emotions and conditionally associate them with socially salient symbols can be expected to be particularly effective during adolescence as a result of the brain changes occurring during this time. Abstract social mores are thus not only cognitively instantiated; they are also imbued with motivational salience through sanctification. When such rites are simultaneously experienced by groups of individuals, the conditioned association of evoked emotions with socially relevant cognitive schema creates a cultural community bound in motivation, as well as belief.

It is therefore not surprising that most terrorists begin their militant life during adolescence. Victoroff 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” (2005, p. 28). 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 the age of 6, 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, p. 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, p. 39). Nonetheless, the profile of those who actually carry out suicide attacks may be somewhat older (Hassan [2001] reports a range of 18–38 years among Palestinians), suggesting that the enthusiasm of youth must be balanced with training and the development of trust to carry out such a mission. Indeed, Benmelech and Berrebi (2007) found that older and more educated Palestinian suicide bombers were assigned more important targets, caused more casualties in their attacks, and were less likely to fail.

Secular Terrorism

While some have questioned whether religious terrorism exists (e.g., Nardin, 2001), it might be more appropriate to ask whether secular terrorism exists. 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 it is claimed that the LTTE movement is “secular and is eager to maintain its secular status” (Schalk, 2003, p. 395), there is considerable evidence that they employ the same features of religion that religious terrorists use to achieve their aims. The LTTE, for instance, use Hindu symbols for purposes of recruitment and rely on the language of religious martyrdom to justify and reward the sacrifice. 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, the annual “Heroes’ Day” ritual celebration, commemorating the LTTE martyrs, inspires the masses and mobilizes support (Roberts, 2005). In a detailed

ethnographic study, Roberts shows that these rites for martyrs “parallel the manner in which they approach the deities [and] enables those Tamils who are so inclined to appeal to the divine forces and convince themselves that their actions, and those of the LTTE, are in harmony with the cosmological arrangements” (2005, p. 83). 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.

Religion as an Adaptive System

Aside from the four core features of religion discussed earlier, another aspect of religion that makes it a valuable tool for terrorists is its adaptability. This may seem surprising. Terrorists who profess strong religious commitments are viewed as inflexible and resistant to change. Because of their religious commitments, it is believed, there is no possibility of the compromise necessary for successful negotiation. Their own statements would seem to attest to inflexibility. For example, Osama bin Laden’s mentor, Abdullah Yusuf Azzam, regularly repeated his trademark slogan, “Jihad and the rifle alone: no negotiations, no conferences, and no dialogues” (Rubin & Rubin, 2002).

Religious sanctity is often conceived by insiders and outsiders to be permanent and eternal. But this is simply incorrect, and the error has been made by scholars and laypeople alike. Pioneering scholars of religion, such as Durkheim, repeatedly asserted that “there is something eternal in religion” (1912/1995, pp. 429 and 432) and modern commentators have made similar claims (e.g., Berman, 2010, p. 205). In describing the sacralization of space, Hassner (2003, p. 6) states, “Once a religious presence, a hierophany, has been identified in a place, it grants the place permanent sanctity.” But religions are not eternal and sanctity is not permanent; religions are flexible, malleable, and often respond adaptively to changing environmental conditions, and Hassner is fully aware of this. For example, in other work Hassner (2006) carefully describes how mosques in Iraq were targeted and recklessly destroyed when US troops were inside, suggesting a temporary suspension of their sanctity. Also during the first Gulf War, despite laws preventing Jews from entering Saudi Arabia because their presence would defile

the sacred land, Jewish-American soldiers were reluctantly permitted to enter Saudi Arabia. To replace their Jewish dog tags, Jewish soldiers were given dog tags labeled “Protestant B” (Darvick, 2003). Pragmatism trumped sacred values. And since 1972, successive Israeli governments have consistently proclaimed Gaza as eternally united with Israel (Lustick, 1993); nonetheless, governance was transferred to the PLO in 1993 and in 2005 Israeli settlements were dismantled and the remaining settlers relocated to Israel.

Religion is not inflexible, and sacred values are not eternal. But why does religion appear to be resistant to change? One of the remarkable features of religion is its ability to adapt to local environmental conditions while adherents experience partaking in an eternally consistent and changeless tradition. Rappaport (1999) argues that religion achieves this through a hierarchy of religious discourse. He claims there is an inverse relationship between the material specificity of a religious claim and the durability of the claim. Religious ideas are hierarchically organized within communities and at the apex of a community’s conceptual hierarchy is what Rappaport refers to as ultimate sacred postulates, such as the *Shahada*, *Shema*, or *Vandana Ti-sarana* for Muslim, Jewish, and Buddhist communities, respectively. These ultimate sacred postulates lack material specificity and are highly resistant to change. However, below ultimate sacred postulates in the religious hierarchy are various cosmological axioms, ritual proscriptions, commandments, directives, social rules, and other religious assertions that do experience varying levels of change, depending on their material specificity.

Religious norms and practices change all the time, but it is understood by those who experience such changes as an intensification of acceptance (Purzycki & Sosis, 2009; Rappaport, 1999). Religions rarely invalidate the old completely; change occurs by adding to previous practices and beliefs and elaborating upon them, while other beliefs and practices slip away unnoticed. Once sacralization is internalized, it is indeed very difficult to convince adherents that something consecrated is no longer holy. Hence, when undergoing change, religions often retain the most sacralized elements and augment them. Missionaries often retain the dates of pagan celebrations, Jewish prayers appear in the Catholic Mass, and many indigenous populations have held onto their pantheon of gods and ancestral spirits by incorporating them into the Biblical myths that are now prominent in their lives.

Two other misconceptions about the inflexibility of religion are worth mentioning. First, religious communities, even fundamentalist communities, are not homogeneous in their beliefs. In interviews one of us (R. S.) conducted among Israeli Ultra-Orthodox Jews, some have confided that they are agnostics or atheists, but they remain in their communities despite their lack of belief because they view the Ultra-Orthodox way of life positively, or at least better than the alternatives. Other researchers have reported similar experiences (e.g., Margolese, 2005; Winston, 2005). Goody (1996) has shown that doubt is widespread in world and indigenous religions and he argues that doubt is an inherent part of religious belief; theologians have made similar claims (Lamm, 1985). Second, outsiders expect religious actors who have articulated and ritually displayed their priorities—typically implying that their religious commitments are their ultimate concern—to behave in ways that directly reflect this ordering of priorities. Religious cognition, however, appears to be strongly encapsulated, preventing most religious actors from pursuing fitness-destroying behaviors (Bulbulia, 2005). Thus, while many may express extreme commitments to their sacred values, even martyrdom, the actions of most who articulate such views do not match the enthusiasm of their rhetoric.

To summarize, viewing religion as inflexible is not only inaccurate, but it impedes productive conflict resolution (Gopin, 2002). Religions are complex adaptive systems that respond effectively to changing socioeconomic and ecological conditions (Alcorta & Sosis, 2005; Purzycki & Sosis, 2009; Sosis, 2009). One of religion's vital adaptive features is its ability to appear timeless and unchanging to adherents yet be responsive to varying circumstances (Rappaport, 1999). Religions achieve this slight of hand by retaining core religious elements while readjusting social rules to accommodate new realities. Music, metaphors, poetry, and unfalsifiable postulates all contribute to this adaptability. Change for adherents is not experienced as something radically new; it is experienced as increased acceptance of eternal and personally relevant truths that have always been part of their religious tradition.

Conclusions

Dingley and Kirk-Smith suggest that “positing a rational and causal ‘means-end’ calculation may not be a sufficient explanation for all terrorist acts by themselves. An understanding of how terrorists think on a subjective and culturally determined

level is also required, where visions, images, emotional states and experiences overlap and induce each other and find their representation in symbols” (2002, pp. 103–104). By and large we agree, but we would add that describing how terrorists think at a cultural level is not sufficient either. We maintain that an evolutionary analysis, at the proximate and ultimate levels, that explains why symbolic images and sacred values are such effective motivators is also needed. Evolutionary explanations of terrorist actions can address shortcomings of the rational choice models, particularly in analyzing sacred values, and provide us with a powerful approach to understand, and ultimately combat, terrorism.

While sacred values are used by terrorists to secure coalitional support, they also hold the key for resolving difficult conflicts that have been framed in religious terms (Sosis & Alcorta, 2008). For example, Ginges et al. (2007) have shown how symbolic concessions with little economic value, such as apologies, carry significant weight among conflicting parties. Using an evolutionarily stable strategies (ESS) approach, Sosis (2007) has shown how in territorial conflicts, sacralizing land can outperform other strategies; it appears that strategies that sacralize land can only be defeated by other sacred strategies. He has argued that to solve sacred land conflicts, the hierarchy of sacred values needs to be reordered. Fortunately, life is sacred in all the world religions (e.g., Deuteronomy 30:19, Koran 4:29), providing the possibility of a sacred life strategy outcompeting a sacred land strategy. Although it is difficult for the sacred life strategy to emerge when embraced by only a few within a population, it can stabilize if it is able to achieve high frequency. The key is convincing disputants that life has greater sanctity than land. Such debates are ongoing among theologians. In Judaism, for example, the sanctity of life is captured by the concept *pikuach nefesh*, and some prominent Orthodox rabbis, such as Joseph Soloveitchik, have argued that saving human lives has greater sanctity than the Land of Israel. Ovadia Yosef, former Sephardi Chief Rabbi of Israel and spiritual mentor of the Ultra-Orthodox Shas political party, used this argument in 1979 to justify returning the Sinai to Egypt, and regarding the conflict with the Palestinians he stated:

If the heads of the army with the members of the government declare that lives will be endangered unless territories in the Land of Israel are relinquished, and there is the danger of an immediate declaration of war by the neighboring Arab [states]... and if

territories are relinquished the danger of war will be removed, and that there are realistic chances of lasting peace, then it appears, according to all the opinions, that it is permissible to relinquish territories of the Land of Israel... [according to the principle of]

pikuach nefesh.

(Rosenfeld & Tabory, 1990)

It is clear that successful conflict resolution will need to operate in the currency of sacred values. Tragically, however, sacred values are rarely taken seriously by negotiators and policy makers. Representatives of religious communities, for example, have been left out of the majority of negotiations between Israelis and Palestinians. As conflict specialist Marc Gopin remarks, “Religious figures are generally considered part of the problem, but not part of creative solutions by most people in the public policy arena. Religion itself is seen as so explosive politically that to even touch upon it lays the president and high officials vulnerable to intense attack” (2002, p. 46). Ironically, although evolutionary science is often viewed as an enemy of religion, our analyses suggest that religious and sacred values must be taken seriously for conflicts to be resolved and peace sustained.

We have focused our discussion on how evolutionary theories of religion and sacred values can inform us about terrorism, but there are numerous ways in which evolutionary analyses can be productively applied to the problem of terrorism (see Sagarin & Taylor, 2008). Some scholars, for example, have posited that humans have been able to extend social relations beyond kin through an “imagined kinship” (Qirko, 2009). Political scientist Gary Johnson (1987) has explored the usage of kinship terminology as a means to inspire self-sacrifice. He posits that the purpose of employing kin terms is to elicit altruistic behavior among nonkin. Poets, orators, and writers use kin terms when they seek to evoke or create an emotional bond with a human group to which an individual is not otherwise naturally bonded. Examples include American patriotic speeches of “brotherhood,” the 1970s feminist movement’s usage of the word “sisters,” and frequent use of kinship terminology in Christianity. Atran suggests that friends in terror networks often use familial terms and act as substitute families, while many real families are unaware that their children or siblings are involved in terrorist activities until it is too late. Islam, he argues, is a potent ideology for terrorist recruiters because “[n]early all major ideological movements, political or religious, require

the subordination or assimilation of the real family (genetic kinship) to the larger imagined community of ‘brothers and sisters.’ Indeed, the complete subordination of biological loyalty to loyalty for the cultural cause of the Ikhwan, the ‘Brotherhood’ of the Prophet, is the original meaning of the word *Islam*, ‘submission’” (Atran, 2010, p. 13).

There are some scholars, including prominent evolutionary scientists such as Dawkins, who have attacked religion because of its alleged association with violence (see Purzycki & Gibson, 2011). It is argued that a humanistic science should replace religion or at least that a proper scientific education could eliminate dangerous religious thinking. But as Atran points out, “An underlying reason for religion’s endurance is that science treats humans and intentions only as incidental elements in the universe, whereas for religion they are central” (2010, p. 429–430). And as mentioned earlier, many terrorists have degrees in science, so it is not clear that a scientific education would necessarily reduce levels of terrorism. What is needed, however, is a scientific understanding of how terrorists employ and manipulate religion and sacred values for their benefit. Only through such understanding can we begin to identify effective strategies for combating religious terrorism.

Future Directions for Research

Our review of evolutionary perspectives on religious 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. There is some debate among evolutionary researchers regarding the role of religious beliefs in motivating and supporting terrorist attacks. Ginges et al.’s (2009) study on support for suicide attacks, for example, has been criticized by Liddle et al. (2010) for prematurely rejecting the religious-belief hypothesis. Liddle et al. argue that Ginges et al. failed to measure religious beliefs per se but rather used measures of devotion as proxies for religious beliefs. We agree with Liddle et al. that it is important to examine the genesis of motivationally salient religious beliefs in relation to suicide terrorism. The approach we have presented here, however, suggests that such religious beliefs represent proximate mechanisms derived from and reinforced through group ritual. Ritual is a vital mechanism that terrorists employ to instill beliefs and secure commitment, but detailed studies on the ritual lives of terrorists

are limited. Comparative research that examines the relationship between group ritual, religious beliefs, and suicide terrorism is needed to productively advance discussions on the role of religious belief in motivating and supporting terror. Testing for a direct effect of religious belief on terrorist activity or support for terrorist activity, however, is not straightforward. As Ginges et al. note, “To retest the belief hypothesis empirically one needs to do so in a manner that does not measure independent and dependent variables that are so close in meaning as to make relationships between these variables entirely unsurprising—or tautological” (2010, p. 347). Evidence of post hoc religious justifications by terrorists, public testimonials of religious belief, and support for violence in sacred texts do not provide adequate data for testing the religious-belief hypothesis; sophisticated research methods that disentangle casual effects will be required.

2. The study of sacred values is in its infancy. Future work must address how sacred values arise, become internalized, and spread. Among religious communities, myths that support claims to sacred lands, for example, are often quickly embraced (Sosis, 2011), but we are not aware of any studies that systematically examine the spread of sacred values in any population. Most important, research is needed to understand the flexibility of sacred values and the social conditions under which sacred values can ignite violence and bloodshed.

3. 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. Rigorous experimental and ethnographic studies that examine the determinants of religious change, especially among extremist forms of religion, are urgently needed.

5. Selectionist logic suggests that high-risk behaviors, such as terrorism, are more common in high-fertility populations (e.g., Wilson & Daly, 1997). Recent studies by economists indicate a link between terrorism, religiosity, and fertility decisions (Berman, 2009). Such investigations are important because 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. We suspect that the predictive power of the models that have been employed by economists would be enhanced if informed by life history theory. We currently lack evolutionary models

of fertility decisions that integrate evolutionary signaling theory and life history theory, but such integrated models are likely to be important for understanding the relationship between fertility, religion, and terrorist activity.

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