CHAPTER 38

RITUAL, RELIGION, AND VIOLENCE

AN EVOLUTIONARY PERSPECTIVE

CANDACE S. ALCORTA AND
RICHARD SOSIS

Archaeological and ethnographic evidence suggests that violence and conflict with outsiders has been a central element of religion since its emergence in human evolution. While the recent rising global tide of religious violence has shocked and perplexed many observers, such violence is neither new nor exclusively directed at external foes. Anthropologists have recorded a wide array of torturous and terrifying ritual practices that are both self-inflicted and performed on other members of one's own religious group. Such practices occur in totemic, animistic, ancestral, polytheistic, and monotheistic religions alike. The adolescent rites of passage found in nearly three-quarters of traditional cultures throughout the world frequently include kidnapping, isolation, food and sleep deprivation, scarification, and other psychological and physical ordeals, including genital mutilation. In New Guinea, Ilahita Arapesh men dressed as frightening boars traditionally lacerated the penises of young boys with bamboo razors and pig incisors as part of initiation rites, and men publicly incised their own genitals after marriage (Tuzin 1982: 337–339). Male elders dressed as masked ancestral spirits kidnapped, tortured, and circumcised youth in the traditional Mukanda ceremony of the African Ndembu (Turner 1967: 151–279). Sticks and eagle claws were used to rip open the flesh of adolescent male initiates of many Native American plains cultures (Glucklich 2001: 147–149).

Such practices are not confined to traditional, non-Western societies. Religious violence and "sacred pain" have been important elements in the mythology and ritual of Western religious traditions since their inception. Terrible gods, hideous demons, and bloody sacrifice are all recurrent themes of the animistic and polytheistic religions of early Europe, Greece, and Rome. One observer described first-century rituals at the temple in Uppsala, Sweden:

> Of all the living beings that are male, nine head are offered; by whose blood it is the custom to appease the gods. Their bodies, however, are hung in a grove which is beside the temple. The grove is so sacred to the heathen that the individual trees in it are believed to be holy because of the death or putrefaction of the sacrificial victims. There, even dogs and horses dangle beside people, their bodies hanging jumbled together. (Ewing 2008: 5)

Violence has also typified monotheistic traditions (Armstrong 1993: 19). The god of early Judaism, Islam, and Christianity commanded Abraham to sacrifice his son in order to prove his faith. Sacrifice and trials by ordeal were commonplace throughout medieval Europe; the Spanish Inquisition refined torture and violence to a fine art. From the Crusades to the witch trials of the colonial United States to the recent bloodshed in Bosnia-Herzagovina, Western Christianity has been awash in sacrifice, blood, and holy terror.

The type, extent, and targets of violence perpetrated in the name of religion vary greatly both across and within religious traditions over space and time. Yet most religions require some sacrifice of adherents, and many mandate self-inflicted violence through acts of penitence, deprivation, and self-mutilation. For example, male circumcision is required in both Islam and Judaism. Fasting is common to all the world religions. Christian penance has historically included acts of self-mortification, including corporal punishment. During the annual Ashura festival, Shia Muslims commemorate the death of Muhammad's grandson Hussein through bloody rites of self-flagellation. Religiously inspired suicide bombers inflict violence and terror on infidels, but they also inflict such violence on themselves. Clearly, the relationship between religion and violence is complex (Purzycki and Gibson 2011: 24). Paradoxically, religions that at times inspire joy, love, and awe also inspire fear, pain, and terror.

Examining religion from an evolutionary perspective can offer insights into these paradoxes. This requires that we first deconstruct religion in order to identify its constituent components and then compare those components with the ritualized displays of nonhuman species. Such a comparison allows us to situate religion within a larger framework of signaling theory. It also highlights a critical difference between human and nonhuman signaling systems; while the ritualized displays of nonhuman species incorporate evolved motivational signals, human religious ritual creates motivational symbols by investing social abstractions with emotional meaning. Examining how religion creates such symbols and invests them with motivational force provides significant insights into the relationship between religion and violence.

Signaling theory also offers insights into the broader causal questions of why religion first emerged in human evolution and what functions it serves. Numerous researchers have argued that one of the primary functions of religion is the promotion of group solidarity (Durkheim 1969: 62–63; Rappaport 1999: 417; Wilson 2002: 45–46). More recently, costly signaling theorists have proposed that such solidarity facilitates intragroup cooperation and alliances (Sosis and Alcorta 2003: 266–268). For early human populations inhabiting rapidly changing environments, the ability to create large, cohesive, cooperative male-based groups would have provided a competitive advantage, particularly in relation to warfare. That same advantage is likely to explain the role of religion in the recruitment of contemporary suicide terrorists. To understand why suicide terrorists are willing to give their lives for their life-affirming religions, we must first understand religion itself.

What Is Religion?

There are almost as many definitions of religion as there are researchers who study it, but the definition offered by sociologist Emile Durkheim nearly a century ago is still valuable today. Durkheim proposed:

> "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 that unite into one single moral community called a Church, all those who adhere to them." (1969: 62)

Durkheim's definition encompasses universal elements of religion, including supernatural beliefs, communal ritual, and moral values. It is the sacred, however, that constitutes the heart of Durkheim's definition. Examining what constitutes the sacred and how it is created can tell us much about the paradoxical relationship between religion and violence and the functions served by each.

The Sacred: The Heart of Religion

At the heart of all religions is the separation of the sacred from the profane (Durkheim 1969: 462). In contrast to the profane, or ordinary, the sacred is both mystical and extraordinary. Sacred places, objects, symbols, and beliefs comprise the core of religion; it is the sacred that instills faith and inspires the devotion of the faithful (Alcorta and Sosis 2005: 332). Sacred things are powerful; they are charged with symbolic significance and moral meaning. It is not just inappropriate to treat sacred things profanely; it is viscerally repugnant. This strong autonomic response to the profanement of the sacred is apparent in American veterans' reactions to

protest burnings of the American flag as well as in recent worldwide Muslim response to the proposed burning of the Qu'ran. In both instances the destruction, or even threatened destruction, of cloth and paper elicited intense emotional reactions far in excess of their material worth. For Americans and Muslims, respectively, Old Glory and the Qu'ran are not simply a flag and a book; they are sacred symbols that evoke deep emotional and social meaning. To profane them is not simply the destruction of a material object; it is the violation of a group's most sacred values and beliefs.

Sacred things do not exist in nature waiting to be discovered. There are no inherently sacred flags, books, or beliefs. Objects, places, and beliefs considered sacred by one individual may be deemed utterly worthless and profane by another. Since sacred things do not occur naturally, they must be created. The means for creating sacred things is communal ritual. It is through such ritual that people, places, objects, and beliefs are imbued with sacred meaning, rendering them powerful, awesome, and dangerous (Rappaport 1999: 279). Participation in communal ritual transforms myths into holy doctrine, channels self-reflection into prayer, and renders abstract objects as emotionally evocative symbols of shared communal values. Once sanctified, these beliefs, practices, and symbols become potent motivators and reinforcers for individual choices, judgments, and behaviors.

Communal Ritual and the Creation of the Sacred

How does ritual create the sacred and invest it with properties of awe, power, and danger? Ritual clearly does not conjure up sacred objects nor does it transform the object; holy water and tapwater share the same chemical formula and are, to the nonadherent, equally good to drink. What communal ritual changes are the perceptions and emotional valuations of participants in relation to that which is sanctified. Once this occurs, both the cognitive classification and emotional valuation of the sacred person, place, object, or belief is forever changed in the mind of the adherent (Alcorta and Sosis 2005: 332).

Anthropologist Roy Rappaport has described ritual as "the ground from which religion grows" (1999: 26). He notes "religion's major conceptual and experiential constituents, the sacred, the numinous, the occult and the divine, and their integration into the Holy, are creations of ritual" (1999: 3). How does religious ritual create the numinous, the occult, the divine, and the sacred?

Religious rituals differ widely across cultures. Some are as simple as the Mbuti *kumamolimo* in which adult males sing together around a campfire as a sacred trumpet sounds (Turnbull 1962: 87–89). Others are as elaborate as the Christian sacrament of Communion in which specially robed religious specialists perform the transubstantiation of wine and bread into blood and flesh for communal consumption. Regardless of the complexity of religious rituals, however, all share a

common "deep" structure. All involve "the performance of more or less invariant sequences of formal acts and utterances not entirely encoded by the performers" (Rappaport 1999: 24). Communal religious rituals are formal, patterned, sequenced, and repetitive. These features clearly distinguish them from ordinary, mundane behaviors and move such rituals outside ordinary conceptions of time and meaning.

Simultaneously, the formality, patterning, sequencing, and repetition of ritual frame, exaggerate, and enhance the signals, symbols, and actions embedded within the ritual structure. These same structural elements of religious ritual are found in the structure of ritualized displays in nonhuman species as well. Understanding the purpose and impacts of these elements in the ritualized displays of nonhuman species can provide insights into the functions they serve in religious ritual.

The Roots of Ritual

Like religious ritual, the ritualized displays of nonhuman species constitute one end of a continuum of signals that communicate important information between conspecifics (Laughlin and McManus 1979: 82–84; Smith 1979: 54–55). This continuum includes signals as simple as body size and as complex as the colorful and elaborate nest constructions in the courtship behaviors of bowerbirds. The simplest signals are indexical, deriving directly from physical properties. The croaking pitch of frogs is an indexical signal that communicates the body size of the signaler since the laws of physics dictate that the larger the frog the deeper the pitch. Other signals convey information in regard to a signaler's state. The musth signature of bull elephants provides potential mates and competitors with important information about the reproductive state, testosterone levels, and potential aggression of the sender. Signals may also convey information about intent. Intent signals frequently involve the transference of behaviors from an originally evolved context to a ritualized one. The incorporation of these transferred behaviors, or releasers, is intended to elicit in the receiver the same autonomic and neurophysiological responses associated with the signal's original functions. Food begging displays in bird courtship rituals provide an example of such transference. The embedding of food begging behaviors in many courtship displays has evolved to elicit the same neurophysiological approach responses in potential mates as those evoked by dependent offspring (West-Eberhard 2003: 245).

In nonhuman species, ritualized displays are among the costliest of signals. The formalization, patterning, sequencing, and repetition of ritualized displays differentiate them from "ordinary" behaviors, setting them apart and dramatically framing both the embedded signals and the sender's message. The structural features of ritual are not arbitrary; laboratory experiments show that the formality, patterning, sequencing, and repetition of ritual have important neurophysiological effects on participants. These elements alert and focus attention, engage

and enhance memory, and improve associational learning (Rowe 1999: 927–928). They prime the receiver to more effectively attend, analyze, and assess the signals embedded within the ritual display and they elicit neuroendocrine responses, as well (Wingfield et al. 1999: 255–284). Ritualized displays require significant expenditures of time, energy, and/or resources and often incur significant predation and aggression risks. It is, therefore, not surprising that they occur most frequently in contexts in which fitness stakes are high, such as courtship and competition.

Ritual and Symbolic Culture

Humans also employ a wide range of signals and ritualized behaviors for conspecific communication. Panhuman social signals of affiliation, dominance, and submission—including such behaviors as kissing, bowing, and prostration—occur worldwide and likely predate language. Many human rituals, like the rituals of our nonhuman kin, incorporate numerous signals and action releasers intended to convey important information and influence conspecific responses. In contrast to most nonhuman rituals, however, human ritual further amplifies and enhances the effects of embedded signals and innate releasers through the creation and use of cultural artifacts. Modern human courtship behaviors often include female use of lipstick to exaggerate and redden lips and provocative clothing to direct attention to breasts, hips, and other sexually arousing body parts. These cultural artifacts are used to exaggerate innate indexical signals and engage evolved neuroendocrine responses. Anthropologist Camille Power has argued that the South African red ochre comprising the earliest known evidence of human symbolic behavior served just such a function (1999: 92).

We will probably never know precisely how red ochre artifacts were used by our early ancestors or what they symbolized, but such crafted pieces, including body paint, art, and architecture, appear to have co-evolved with and been prominent elements of human symbolic ritual for more than 100,000 years (Henshilwood et al. 2001: 668). Similar to the use of lipstick in contemporary courtship, many of the artifacts that feature prominently in religious rituals throughout the world are intended to elicit autonomic and emotional states in participants by mimicking, exaggerating, or distorting natural stimuli that evoke innate evolved responses. Candlelight processions that cast flickering shadows, masks that distort and disfigure faces, and statues that bleed all engage innate responses to particular classes of stimuli that heighten, intensify, and enhance the emotions of ritual participants (Alcorta and Sosis 2005: 338). These cultural artifacts help to differentiate between an order, realm, mood, or state of being that is mundane, ordinary, or "natural" and one that is unusual, extraordinary, or "supernatural" (Dissanayake 2001: 49).

The cultural artifact likely to be of greatest significance for ritual's ability to differentiate the extraordinary from the ordinary is music. More than six centuries ago, Sufi mystic al-Gazzali observed:

> The heart of man has been so constituted by the Almighty that, like a flint, it contains a hidden fire which is evoked by music and harmony, and renders man

> beside himself with ecstasy. These harmonies are echoes of that highest world of beauty which we call the world of spirits, they remind man of his relationship to that world, and produce in him an emotion so deep and strange that he himself is powerless to explain it. (qtd. in Becker 2001: 145)

Music, Ritual, and the Sacred

Music is a fundamental feature of religion in every culture known (Levitin 2008: 2). It is intimately interconnected with a sense of the sacred, the numinous, and the divine (Alcorta 2008: 231). Ethnomusicologist Judith Becker notes that "most, if not all, societies have some form of institutionalized, religious trance ceremonies that also include music" (2004: 1). Music has an inherent ability to evoke powerful emotional responses in listeners (Koelsch 2010: 131; Wendrich and Staudinger 2010: 144). Musically evoked emotions impact and enhance the subjective experience of other sensory stimuli as well (Baumgartner et al. 2006: 151).

Listening to music alters autonomic functions, including heart rate, blood pressure, respiration, immunological function, and neuroendocrine responses (Hirokawa and Ohira 2003: 189; Kuhn 2002: 30). Like food and sex, music has innate reward value for humans. Listening to music activates the brain's reward circuitry, releasing the neurotransmitter dopamine (Blood and Zatorre 2001: 11822; Menon and Levitin 2005: 175), a "feel good" chemical critical for reward processing, memory (Shohamy and Adcock 2010: 464), and reinforcement learning (Daw 2007: 1505; Hurlemann et al. 2010: 4999).

Humans are one of only a few species capable of synchronizing to the beat of music (Patel et al. 2009: 827). This ability to synchronize to music allows us to entrain our autonomic and emotional responses with others. Music also increases oxytocin release (Levitin 2008: 50–51; Nilsson 2009: 2153). Oxytocin is critical to interpersonal trust (Ross and Young 2009: 534) and affiliation (Israel et al. 2008: 435) and has been linked with altruistic behaviors (ibid.). Oxytocin reduces background anxiety (Missig et al. 2010: 2607), enhances the stress-buffering effects of social support (Pierrehumbert et al. 2010: 168), and suppresses the body's hypothalamic-pituitary-adrenal (HPA) "stress response" (Neumann 2008: 858; Pierrehumbert et al. 2010: 168).

Music has the ability to activate reward processes, evoke strong emotions, elicit and entrain autonomic responses, and enhance oxytocin production. These attributes render it an extremely powerful social tool. Musicologist Ian Cross has noted that "music is not only sonic, embodied, and interactive; it is bound to its contexts of occurrence in ways that enable it to derive meaning from, and interactively to confer meaning on, the experiential contexts in which it occurs" (2003: 108). Music takes us outside ourselves; it elicits inexplicable emotions of joy, awe, and ecstasy while increasing trust, empathy, and cooperation among participants. It also provides a symbolic mnemonic capable of readily evoking both cognitive and emotional memories. When music is embedded in religious ritual, these capacities of music heighten and intensify the ritual experience, transforming the ordinary into the extraordinary and laying the foundation for creation of the sacred.

Terror, Violence, and Sacred Pain

Music offers a portal to the sacred through its ability to evoke feelings of ecstasy and awe and to elicit powerful emotional and autonomic responses in listeners. There is, however, another side to religious ritual and another way to elicit powerful autonomic and emotional responses in participants. The counterpoint to the joy, ecstasy, and awe elicited by music-based communal ritual is the fear, terror, and sacred pain that are prominent elements of many religions, even as the music plays. Hideous masks, demonic statues, and other compelling "agent" representations are common elements across religions. The dissonant and malevolent faces of Bebuten witches in the trance festivals of Bali, the leering gargoyles of Roman Catholic cathedrals, and the fantastic demons that populate the artwork of numerous religious traditions throughout the world all seize our attention and evoke evolved neurophysiological responses of disgust, fear, and terror. Such stimuli are emotionally powerful and highly memorable, particularly when intensified by music and framed within the multisensory experience of ritual.

Fear and revulsion are not the only negative responses evoked by religious ritual. Pain is also a prominent component of religion. Prolonged kneeling, standing, and prostration; fasting; sleep deprivation; dancing to exhaustion; self-flagellation; and bodily mutilation are common practices across religious traditions. Pain alters body states and, in doing so, alters our perceptions of time, space, and self (Damasio 1999: 79). Glucklich views "sacred pain" as "the mediating force that makes the acquisition of third-level (spiritual) reality possible" (2001: 151). Drawing on the work of Lazarus (1991) and others, Glucklich asserts "strong feelings induced by pain affect our capacity to perceive and know reality" (2001: 150). Anthropologist T. O. Beidelman describes the pain in traditional East African Kaguru initiation ceremonies as "so incontestably real that it seems to confer its quality of 'incontestable reality' on that power that has brought it into being" (1997: 179). Self-inflicted suffering and pain are required of adherents by many faiths. There is, however, one category of religious ritual in which the use of violence to induce such "sacred pain" is particularly prevalent: adolescent rites of passage.

Adolescent Rites of Passage

Throughout human history and across the vast majority of cultures throughout the world, religion has been the preferred means of shaping our social and moral brains. Adolescence has been the preferred life stage for doing so (Alcorta 2006: 72–73). Children everywhere hear the narratives and witness the rituals of their culture's sacred beliefs, while childhood rites, such as infant baptism and eighth-day circumcision, effectively signal the individual's membership in the community. Such rites do little to initiate the child into the sacred, however, since there is neither individual choice nor understanding involved. Adults occasionally convert to

new faiths, but it is adolescents who are regularly initiated into "the sacred." Nearly three-quarters of all cultures throughout the world conduct adolescent rites of passage. These rites have the explicit purpose of inculcating sacred values deemed necessary to transform children into socially responsible adults.

Adolescent rites of passage differ considerably from culture to culture. They may involve a single individual or an age-related group. Group rites are more commonly conducted for males, with approximately 30 percent of societies throughout the world conducting male group initiations as compared to about 10 percent for female group initiations. Conversely, individual rites are more frequently conducted for females; individual female initiation rites are found in 50 to 60 percent of societies throughout the world, compared to 30 to 40 percent for males (Lutkehaus and Roscoe 1995: xiv). The rites of some cultures are relatively simple, consisting of little more than the oral transmission of knowledge. Such simple rites are recorded for the Yamana and Halakwulup of Tierra del Fuego and are also prevalent in most contemporary Western religions. In other societies, however, rites were traditionally lengthy, intense, and often violent.

There is considerable variation in adolescent rites of passage across cultures, but all such rites exhibit a similar three-phase structure (van Gennep 1960). In the first phase, the initiate is separated from society and stripped of his previous identity. The second, or liminal, phase involves the ritual resocialization of the initiate into a new identity. In the last phase, the individual is reincorporated into a defined group bearing a new adult social identity with associated economic, political, and reproductive responsibilities and benefits.

The psychological and social transformation of the initiate occurs during the liminal phase. This phase may be as benign as memorizing and publicly reciting sacred texts or as intensely painful as undergoing food and sleep deprivation, torture, and genital mutilation. The use of violence and pain to transform the initiate during the liminal phase is not uncommon. Numerous researchers have examined the psychological and symbolic mechanisms by which such transformation occurs (Beidelman 1997; Glucklich 2001; McCauley 2001; Turner 1967; Whitehouse 2004). More recently, the neurophysiological impacts of such rituals have received increased attention. Cognitive scientist Robert McCauley's description of Baktaman initiation rituals notes the impacts of violent and painful rituals on initiates' emotional arousal:

> [T]he initiations bombard initiates' senses in order to arouse their emotions. They are routinely deprived of food, water and sleep. They are repeatedly beaten and tortured. They are forced to eat what are, in their own estimation, all sorts of disgusting concoctions. They are forced to dance to the point of utter exhaustion.... Stimulating ritual participants' senses is the most straightforward, surefire means available for arousing their emotions. The intuition is that the resulting levels of emotional excitement are often at least roughly proportional to the levels of sensory stimulation a ritual contains. These emotional responses are virtually always involuntary, and with particularly intense sensory stimulation, they are often difficult to control. (2001: 119)

Such emotional responses and changes in autonomic state are also apparent in the traditional sun dance rites of many Native American plains cultures. These rituals require initiates to fast, dehydrate, and dance to exhaustion. The chests of initiates are then pierced by elder males using sticks or eagle claws fastened to a central ritual pole. As the community watches, the adolescent males are required to break free of the pole by tearing their own flesh. Manny Twofeathers, a ritual initiate, describes the experience:

> I lay there on the ground, looking up into the sky. Then I handed Lessert my piercing bones. He got down on his knees next to me, and his father knelt by my left side. I felt both of them grab my chest and rub it with some dirt, because I was sweaty and slippery. This way their thumbs and fingers wouldn't slip. They pinched my skin, and I felt as the knife went into my flesh. I felt a sharp, intense pain in my chest, as if somebody had put a red-hot iron on my flesh. I lost all sense of time. I couldn't hear any sounds. I didn't feel the heat of the sun. I tried to grit my teeth, but I couldn't.... I prayed to the Creator to give me strength, to give me courage.... When I stood up, I did feel pain. I felt pain, but I also felt that closeness with the Creator.... The pain did not compare to what I was receiving from this sacred experience.... I was tied to the tree with that rope as securely as a child is tied to its mother by the umbilical cord. The only way off that cord was by ripping myself off. Every time I leaned back on my rope, I felt intense pain in my chest. It became a raw ache that reached all the way down to my toes.... It felt glorious and explosive. The energy was high and brilliant.... I went back, back. I looked at the tree and said silently, "Grandfather, please give me strength." I ran faster and faster and faster. I hit the end of the line. I heard my flesh tear, rip, and pop. I saw the rope bouncing way up in the tree. It dangled there for a second, then dropped. While this was going on, I fell backwards. I had broken loose.... I was so happy, I let out a big yell. (qtd. in Glucklich 2001: 147–148)

Violence was even more pronounced in the Mukanda rites of the Ndembu of Africa. Young adolescent males were kidnapped from their mothers and siblings and secluded and sequestered in the forest for months. During their seclusion, they were subjected to dietary restrictions, sleep deprivation, and numerous psychological and physical tortures. The final and central component of the rites was the circumcision of the initiates in a communal ceremony accompanied by incessant drumming and terrifying symbolism. Red-stained elders, the "killers" of the boys, performed the circumcision with knives as participants watched (Turner 1967: 181–182). Such painful, violent, and terrifying rites of passage sometimes result in physical mutilation or impairment or even death (Pinto and Baruzzi 1991: 821–822). Boys who successfully complete these initiations, however, are transformed physically, psychologically, and socially. They carry with them both the visible signal of circumcision as well as the invisible but equally powerful sacred symbols created through participation in this violent and painful ritual. Glucklich notes: "The sharp pain of the cut leads to a fairly strong psychological dissociation and triggers extremely powerful emotions.... There is also a strong cognitive learning process, which is enhanced by pain" (2001: 143).

The sacred pain and ritualized violence that occur in many adolescent rites of passage elicit strong autonomic responses and evoke intense emotions that may subsequently be suppressed but are nearly impossible to erase (LeDoux 1996: 124). Clinical, experimental, and neuroimaging findings independently demonstrate that emotions are critical to our daily behaviors and choices. Emotions do not simply influence our social judgments and personal choices; they are absolutely essential to them (Bechara, Damasio, and Damasio 2000: 305–306; LeDoux 2002: 253–254). Emotions learned through past experiences weight our present choices. In the absence of these emotional weights, we may be able to accurately solve problems in the abstract, but we are simply incapable of making appropriate personal choices (Damasio 1994: 52–82). This is true not only for social and moral choices but for "rational" economic decisions as well (Frank 1998: 254–259). Understanding this critical role of emotion in our judgments and behaviors provides important insights into the centrality of the sacred to religion and the role of violence in the creation of the sacred.

The use of violence and pain in communal ritual to evoke strong emotions and alter autonomic states provides an effective tool for investing symbols, beliefs, and other social abstractions with emotional significance. When these abstractions are also counterintuitive and supernatural, they are more arresting and memorable. Most significantly, they are also unfalsifiable (Rappaport 1999: 428). The reward value of music and the positive emotions evoked by participation in communal ritual provide opportunities to invest social symbols with positive emotional weighting through reinforcement learning. However, negative emotions are more salient than positive emotions and longer lasting (Vaish, Grossmann, and Woodward 2008: 384). As a result, the conditioned association of sacred symbols with violently evoked negative emotions and painful body states through terror, violence, and sacred pain is motivationally powerful and nearly impossible to extinguish. The costs associated with such violence are considerably greater than those incurred through participation in joyous rituals. No initiate has ever died from too much music, but food deprivation, torture, and genital mutilation can and do disable and kill. The greater longevity and motivational force of classic fear conditioning makes violence a powerful and effective tool when group values and sacred symbols require high personal sacrifice and risk.

Violent rites of initiation comprise one end of a spectrum of religious rituals. Such highly charged and emotionally intense ritual experiences not only transform initiates physically, psychologically, and socially; they also sculpt indelible neurophysiological changes.

Various researchers have noted a positive relationship between stress levels and the incidence of religious ritual. Victor Turner reported that among the Ndembu "there is a close connection between social conflict and ritual at the levels of village and 'vicinage'" (1969: 10), and Rappaport also observed that spacing of the ritual kaiko cycles of the Maring was contingent on interhousehold stress levels (1999: 154). Moreover, cross-cultural research shows that the degree to which painful

and dangerous elements are incorporated in initiation rites is positively and significantly correlated with the incidence of warfare in preindustrial societies (Sosis, Kress and Boster 2007: 234).

Violent initiation rites invest group symbols and values with strong motivational force. They also prime initiates' response systems for threat, thereby producing higher levels of aggression (Niehoff 1998). When violent rites of initiation involve groups of initiates, they create bonded "brothers," as well. Recent research shows that individuals who have previously experienced a life-threatening situation during childhood or adolescence exhibit higher levels of oxytocin production in response to stressful events (Pierrehumbert et al. 2010: 168). Violent and painful initiation rites sanctify group values, increase levels of aggression, and neurophysiologically bond "brothers in arms." As a result, such rites are likely to produce the most cohesive groups and the most effective warriors. Military boot camps and paramilitary terrorist training camps effectively employ violence and pain to the same end (Nesser 2008: 234–256). Adolescents who participate in such rites are changed forever. Advances in our knowledge of the adolescent brain explain why this is so.

Changes that occur in the human brain during adolescence make this developmental period particularly receptive to the neurophysiological effects of religious ritual, in general, to rites of passage, in particular, and to violent and painful rites most specifically (Alcorta 2008: 111–116). Neuroimaging indicates "greater involvement of the amygdala in processing of emotional stimuli in human adolescents than adults" (Spear 2000: 445). During adolescence, the reward value of inherently pleasurable stimuli, such as food, sex, drugs, and music, peaks and the brain's dopaminergic systems undergo substantial reorganization. At the same time, the prefrontal cortex and the temporal cortex mature (Spear 2000: 439–445). The prefrontal cortex is the brain region responsible for impulse inhibition, social judgment, personal decision making, and abstract reasoning; the temporal cortex functions in face recognition, music, language, and the integration of other social stimuli. Neuroscientist Sarah-Jayne Blakemore notes that brain areas involved in social cognition, including the medial prefrontal cortex, the anterior cingulate cortex, the inferior frontal gyrus, the superior temporal sulcus, the amygdala, and the anterior insula experience considerable change during adolescence (2008: 267). She notes that medial prefrontal cortex and the superior temporal sulcus, involved in face recognition and mental state attribution, "undergo structural development, including synaptic reorganization during adolescence" (2008: 267). The shift in the adolescent brain's dopaminergic system occurs in tandem with the maturation of these cortices as reward and emotional processing structures more closely integrate with and increasingly come under control of the prefrontal cortex, the brain's "executive" processing center (Spear 2000: 440–441). This synaptic reorganization in social and executive processing regions of the brain occurs in tandem with heightened adolescent reward salience and emotional responsivity (Spear 2000: 440–441). These changes in the structures and circuitry of the adolescent brain provide a unique developmental window for linking social experiences with

abstract, symbolic representations and investing those representations with emotional significance and reward value capable of influencing subsequent social judgments and behavioral choices (Dehaene and Changeux 2000: 219–230; Feenstra 2000: 133–164). Religious ritual appears to be optimally designed to do just that. Rappaport presciently described such effects of ritual:

> When that sign is carved on the body the abstract is not only made substantial but immediate…and if the mark is indelible, as in the case of the subincision, the excised canine, the lopped finger, the scarified face, chest or back, it is ever-present. As the abstract is made alive and concrete by the living substance of men and women, so are men and women predicated by the abstractions which they themselves realize. (1999: 149)

Religion and Suicide Terrorism

What can this tell us about suicide terrorists or religious violence in general? Many contemporary Western stereotypes cast religiously motivated terrorists as either desperate or deranged madmen. Substantial psychological research, however, indicates that suicide terrorists are neither psychopaths nor sociopaths. Terrorist expert Scott Atran reports that "study after study demonstrates that suicide terrorists and their supporters are not abjectly poor, illiterate, or socially estranged" (2004: 75). Nor is there a distinctive suicide terrorist psychological profile or personality. Sociologist Mark Juergensmeyer notes that the vast majority of recruits to extremist religious organizations are young, unmarried males who perceive themselves to be marginalized by the dominant culture (2003: 193–194). In his governmental report, *The Sociology and Psychology of Terrorism: Who Becomes a Terrorist and Why?,* Rex Hudson makes a similar observation: "Terrorists are generally people who feel alienated from society and have a grievance or regard themselves as victims of an injustice" (1999: 50). Maajid Nawaz, a former leader of the radical Islamic group Hizb ut-Tahrir, states that he originally joined the movement "out of disaffection with the racism and discrimination that poisoned his teenage years in southeast England" (qtd. in Rice-Oxley 2008). For Nawaz, the organization's secret meetings, conversion missions, and evangelistic forays to university campuses and foreign countries created a sense of importance, community, and purpose. Mamoun Fandy of the International Institute for Strategic Studies in London asserts: "There remains in London a problem of assimilation for outsiders. The society is closed. The city is open, but the people are not" (qtd. in Marquand and Quinn 2009). Such closure is likely to be felt particularly acutely by young unattached adolescent and young adult males who are actively seeking meaningful social relationships. These young men who have spent their childhood in traditional societies are literally caught between worlds that diverge sharply in social structure, intersexual relations, and the sacred values that intermediate between

these and personal behaviors (Alcorta 2010). A Pakistani expert on militant Islam notes, "I've felt for a long time that if radical Sharia law comes to the rest of the world it will start on the streets of London.... Young Muslims are smart, raised as British citizens. If they come from abroad, many have great hope and are often disillusioned. They live between worlds, in the cracks. When they go home to their families they are often more radical than their friends" (qtd. in Marquand and Quinn 2009). According to Atran "more than 80 percent of known jihadis currently live in diaspora communities, which are often marginalized from the host society and physically disconnected from each other" (2006: 135).

For such individuals, membership in religious extremist groups is likely to be particularly appealing. These groups afford marginalized youth a sense of community within a larger alien culture. They provide a network of social support within a structure and value system that is familiar and "moral." For marginalized immigrants, religious extremist groups offer cultural familiarity and endorse the values and worldview instilled through early socialization. These groups provide a sense of order within the perceived chaos of the foreign culture and reaffirm personal worth and meaning through social identity. Their reaffirmation of the individual's indigenous values reduces the cognitive dissonance and sense of anomie experienced by many marginalized youth.

In contrast to secular social groups such as school clubs and athletic teams, religious groups provide marginalized youth with a sense of shared moral values, individual purpose, and existential meaning. Marginalized youth who join these congregations are no longer merely anonymous cogs in a global economic system; they are valued individuals in the eyes of both their fellow adherents and in the eyes of God. Extremist militant religious organizations offer adherents the additional promise of power (Juergensmeyer 2008: 175). Recruits are not only brothers but brothers in arms, many of whom receive training in isolated, rigorous, and physically demanding terrorist training camps (Nesser 2008: 234–256; Yousafzai and Moreau 2010: 30–37). Juergensmeyer notes, "The nineteen men who volunteered for the al Qaeda suicide mission on September 11, 2001 were...participants in semisecret male societies" (2003: 223). Like other adolescent rites of passage, these semisecret societies employ pain, violence, and ritual to reshape the psychological, political, and social identities of initiates.

Religion, Social Groups, and the Social Contract

Humans are one of many social species that create and maintain large social groups. Such groups provide individual members with fitness benefits in relation to vigilance, reproduction, and defense. From an evolutionary perspective, however, social groups also introduce problems of competition, defection, and cooperation (Krebs

and Davies 1993: 120–133). These inherent problems have been resolved in various ways by different species. In many species, group membership is based primarily on genetic relatedness. This ensures that the inclusive fitness of all group members is enhanced by cooperative behaviors. Other species, such as bats, live in large colonies of unrelated individuals and share resources with "friends." Such reciprocal altruism depends on a "tit-for-tat" approach to secure cooperation. Reciprocal altruism extends cooperation to unrelated individuals but necessarily confines the extent of cooperative interactions to those that can be remembered.

Human social groups rely on both kinship and reciprocal altruism to achieve and enhance cooperation. Although there is considerable variation across cultures, in most traditional human societies, as in the societies of our closest cousins, the chimpanzees and bonobos, kinship is male based (Wrangham and Peterson 1996: 24). Females leave the natal group upon reaching adolescence and join an unrelated group. Such fraternal societies are less common than female-related societies across species but are advantageous when intermale cooperation provides significant benefits. For chimpanzees, group hunts and intergroup raids are predominantly male enterprises that depend on intermale cooperation for success (Wrangham and Peterson 1996: 24–25). Male cooperation would have benefited early human groups in both hunting and intergroup raiding as well. Most significantly, cooperative male groups would have wielded a distinct advantage in preindustrial intergroup warfare (Alexander 1987: 79–81). These large groups would have afforded early human populations additional advantages as well.

The major environmental shift that has been documented for early human environments certainly posed challenges in relation to both resource competition and exploitation (Marean 2010: 54). Environmental changes would have altered traditional resource bases and increased competition among groups for the resources remaining. Under such circumstances, larger groups would have realized a number of competitive advantages.

For the relatively small early human populations of Africa, one of the major advantages to larger group sizes was likely to be a demographic one. Larger groups represent a broader, deeper gene pool for dampening demographic fluctuations (Hammel 2005: 2251–2252) and avoiding genetic bottlenecks (Marean 2010: 55). Such groups also enjoy an information advantage in regard to widely spaced, clumped, and cyclical resources and an innovative advantage in regard to resource utilization and exploitation. Across primate species, including our own, it is predominantly older individuals that constitute the repository for group information, and it is predominantly younger members who engage in innovation. In traditional hunter-gatherer societies such as the Kung San, it was the group elders who provided critical information in regard to the location of scarce water holes and long-term cyclical resources (Moore 1998: 119). Alternately, across societies, it is primarily juveniles who engage in innovative "play," trying out novel resources and behaviors that may subsequently be adopted by the group (Diamond 1997: 118). Groups large enough to maintain wide demographic diversity during times of environmental stress are more likely to benefit from both the greater information

of elders and the broader innovation of juveniles. In preindustrial societies, groups that also include large numbers of adolescent and young adult males realize significant competitive advantages in intergroup raiding and warfare.

Given all of the advantages of larger groups, it is reasonable to ask why all social groups are not large. The most obvious answer to this question is that resources limit the size that groups can grow. Yet even when the resource base is sufficient to sustain larger groups, increasing group sizes introduce new problems that must be solved.

The Costly Signaling Theory of Religion

As human social groups increase in size, new problems of free riding, control, and cooperation emerge. Proponents of the costly signaling theory of religion view religion as an important human adaptation to solve these problems by facilitating intragroup cooperation (Irons 2001: 292; Sosis 2003: 92–94). Anthropologist William Irons views the primary adaptive benefit of religion to be its ability to promote cooperation and overcome problems of collective action, including food sharing, hunting, defense, and warfare (2001: 292–293). When social groups are small and closely related, collective action problems are relatively limited by the operation of kin selection and reciprocity. However, as group size increases and genetic relatedness decreases, there is increasing incentive for individuals to free ride on the efforts of others. Group members who can benefit from the cooperative efforts of others with no costs to themselves realize the greatest gains. This is particularly true in high risk, high cost endeavors such as hunting, defense, and, particularly, warfare. While everyone may gain if all group members invest in the cooperative goal, actually attaining such cooperation is often difficult without social mechanisms that limit the ability of some group members to free ride on the efforts of others. As the risks associated with cooperative endeavors increase, the greater incentive there is for individuals to defect and free ride. As a result, whenever an individual can falsely claim cooperation and then successfully defect, the most credible signals of cooperative intentions are those that entail costs and are difficult to fake.

Costly signaling theorists posit that religious behaviors and rituals have evolved in human groups as hard-to-fake signals that advertise an individual's level of commitment to the goals and ideals of the group, both to oneself and to others (Sosis and Alcorta 2003: 267). Participation in such rituals promotes ingroup cooperation through the neurophysiological mechanisms previously discussed, and it also signals group commitment to others. Observers of religion have long noted the costliness of religious obligations (Sosis 2006: 61–68). Even relatively simple, joyous religious rituals such as the *molimo* ceremony of the African Mbuti entail time, energy, and resource costs. Many religious rituals include joyous elements

but also incorporate fearful elements as well. The costliest rituals add to this sacrifice, violence, and pain. Initiation rites are among the costliest of religious rituals and frequently include beatings; tattooing; isolation; food, water, and sleep deprivation; consumption of toxic substances; psychological and physical torture; genital mutilation; and risk of death. The performance of these costly behaviors has significant neurophysiolgoical effects on initiates, reinforcing the cognitive and emotional substrates of individual commitment to group ideals and values. Such performance also provides a powerful signal of commitment and loyalty to the group and the beliefs of its members. Enhanced trust and commitment among group members is essential to collective enterprises and enables groups to minimize costly monitoring mechanisms that are otherwise necessary to overcome the free rider problems that typically plague collective pursuits.

Empirical research conducted over the last decade has demonstrated that religious ritual is an effective tool for increasing group cooperation and cohesion. Cross-cultural research has shown a significant positive correlation between participation in religious ritual and group longevity (Sosis and Bressler 2003: 225–228). Experimental studies conducted on Israeli kibbutzim show a significant positive correlation between participation in religious ritual and cooperation as well (Sosis and Ruffle 2003: 718–719). Although overcoming challenges of cooperative production and consumption were undoubtedly important in human evolution, warfare and defense likely posed even greater challenges due to the life and death consequences of cooperation and defection. Cross-cultural studies suggest that violent and painful rites may serve to bond males in societies where warfare is most prevalent (Sosis, Kress, and Boster 2007: 243–245). Research further indicates that the costliest religious requirements in terms of pain, violence, and bodily harm occur in preindustrial societies that exhibit the highest rates of warfare (ibid.). Under such circumstances, individual incentive to defect and free ride is particularly great. Participation in costly initiation rites leaves indelible traces on both the minds and bodies of initiates, signaling both to themselves and one another their commitment to the group.

Origins of Religion

Early human populations inhabiting Africa 100,000 years ago faced significant challenges introduced by the major environmental shift occurring at that time (Marean 2010: 54). Climate change diminished traditional resources, thereby increasing competition over those remaining. For many early human populations, this meant extinction. Yet along the coastal regions of South Africa several early human groups appear to have successfully outcompeted their contemporaries and overcame the challenges brought about by climate change. These South African coastal dwellers used sophisticated tools to exploit new resources, including mussels

and other marine life as well as hard-to-find and difficult-to-extract tubers. These populations lived in large, relatively sedentary groups at a time when their nomadic contemporaries were quickly disappearing (Marean 2010: 54–61).

The coastal populations were successful when most other early human populations were not. Larger group size and all the associated advantages such size confers was undoubtedly an important key to their success. The information of elders, the innovation of juveniles, and the aggression of adolescent and young adult males were all likely factors in the group's ability to explore and exploit new resources and outcompete their contemporaries. Sophisticated tool kits associated with these groups are evidence of technological innovation. Alongside these tools is evidence of another innovation that may have been equally fundamental to their success: red ochre.

In association with the sophisticated tool kits of the South African coastal populations, archaeologists have found ground red ochre and worked red ochre lumps incised with abstract etchings (Henshilwood et al. 2001: 668; Marean 2010: 58–59). Based on ethnographic analogies, archaeologists have concluded that these artifacts are evidence of symbolic ritual in these populations. If so, symbolic ritual—the roots of religion—emerged much earlier in human evolution than previously believed and may have been a critical factor in the ability of the South African coastal populations to overcome the problems of cooperation and free riding associated with increasing group size and sustain the large populations that contributed to their survival. Selective pressure for an adaptation that afforded early human groups a means of enhancing intermale cooperation would have been strong given the high levels of competition that were undoubtedly induced by environmental change at the time. The emergence of symbolic ritual coincides with both increasing sedentism and a significant increase in group size. For these populations, symbolic ritual may have constituted the solution to the large group problems of free riding, social control, and intermale cooperation.

Biological anthropologist Terrence Deacon has argued that communal religious ritual originated as a way to socially signal sexual exclusivity through marriage in multimale groups (1997: 405–407). Other researchers have proposed that music-based communal ritual evolved as a mechanism for creating intergroup alliances (Hayden 1987: 83–84). Combining these two hypotheses may offer the best model for understanding the origins of symbolic ritual. In many traditional cultures, the exchange of women between groups both creates and cements intergroup alliances that are consummated and signaled through ritual (Lévi-Strauss 1963: 22). Such ritual publicly acknowledges pair bonds and the sexual exclusivity of mates within multimale social groups while simultaneously forging flexible, cooperative intermale bonds both within and between groups.

Mounting evidence suggests that the evolution of religion is closely associated with the emergence of large social groups in early human populations. The oldest evidence of symbolic ritual occurs during a period of significant environmental change. Intergroup competition is likely to have been a potent selective force at this time. Adaptations that facilitated the creation of large social groups through

cooperative intermale alliances would have been advantageous in both warfare and defense. Such groups would also have realized advantages in relation to technological innovation and a broader gene pool during demographic shifts. The evolution of symbolic ritual as a costly signaling system would have provided early human populations with a flexible mechanism for enhancing intermale cooperation, increasing group size and cohesion, and controlling problems of sexual exclusivity, social order, and free riding within the social group. The ability to alter the individual and social effectiveness of symbolic ritual through the incorporation of violent and painful practices makes this adaptation particularly advantageous under conditions of increasing intergroup competition, decreasing intragroup male relatedness, and escalating environmental stress. In early human environments, as in the globalizing world of today, violence is likely to have been both a component of and catalyst for religion.

Conclusion

The relatively recent emergence of the secular nation-state has been accompanied by the ongoing marginalization of religion across Western societies and in communist nations throughout the world. In these societies, the validation and inculcation of social behaviors are no longer religiously mandated and sanctioned but are instead monopolized by the legal and educational powers of the state. Enforcement is transferred from punishing moral gods and their divine warriors to specialized professionals trained and controlled by the secular state. As the power of the secular nation-state has risen, that of organized religion within these states has declined (Norris and Inglehart 2004: 25). While this decline has been state mandated and enforced in communist nations, it has been a gradual development in the democracies of western Europe and the United States. Church attendance in nearly all Western nations has steadily decreased over the past two decades (Norris and Inglehart 2004: 72). The United States constitutes an anomaly with some 43 percent of American respondents reporting regular weekly church attendance (Newport 2010a). Other surveys have found a consistently lower US church attendance figure, however, and a 2010 Gallup poll indicates that "Americans have become increasingly less tied to formal religion in recent decades, with the percentage saying they do not have a specific religious identity growing from near zero in the 1950s to 16 percent this year" (Newport 2010b). Nearly 20 percent of Americans consider religion as not very important in their lives, while close to 30 percent view religion as "largely old-fashioned" (ibid.).

This decline of organized religion in developed industrial nations has been accompanied by a growing incidence of suicide and depression (Miller 2006: 459; WHO 2001). Sociologist Phil Zuckerman notes that suicide rates are "the one indicator of societal health in which religious nations fare much better than secular

nations" (2006: 59). At the same time, Pentecostalism and other charismatic religions have grown rapidly throughout the world and particularly in developing nations (Pew Research Center 2006). For many, these "renewalist" religions provide social support, purpose, and meaning as the institutions and values of traditional cultures are marginalized and eroded by globalization. For others, however, religion serves a different purpose. For many young, unattached males who perceive themselves to be marginalized by a dominant, hostile, foreign culture (Juergensmeyer 2008: 220–223), religion provides both a welcoming community and an effective tool for forging the cohesive, cooperative intermale alliances necessary to challenge the hegemony of the secular nation-state and its global impacts.

As in our nonhuman primate kin, adolescent males in human societies constitute both the periphery and the front guard of the social group. From a reproductive standpoint, they are the most expendable group members and from a neurophysiological perspective, they are the most vulnerable. Whether as migrants to foreign urban cities or military recruits, these young males most frequently constitute the "first wave" of intergroup contact (Alcorta 2010). From a proximate perspective, their greater propensity for novelty seeking and risk-taking behaviors predispose them to assume this role, while their social powerlessness relative to older group males may compel them to do so (Thayer 2008: 130–132). For many, however, the stress, cognitive dissonance, and culture shock they experience results in anxiety, depression, psychosis, and suicide. The incidence of adolescent depression and suicide throughout the world has escalated tremendously over the past several decades and is particularly pronounced among adolescent males in marginalized cultures such as American Samoa (McDade, Stallings, and Worthman 2000: 792), Micronesia (Ran 2007: 80; Rubinstein 2002: 33), and Native American populations (CDC 2007; Health Canada 2002; Inuit Tapiriit Kanatami 2009). Religious conversion to Mormonism, Pentecostalism, and other forms of Christianity has provided some of these individuals with the new purpose, values, and social support necessary to successfully assimilate within the dominant Western culture. For a growing number of marginalized young males throughout the world, however, religion is not a mechanism for integration within the larger global culture but rather an effective tool for violent confrontation against it. For the young male members of al Qaeda, Hezbollah, Aum Shinrikyo, the Christian Identity movement, and a score of other extremist groups, religion offers purpose, values, beliefs, and social support, but it also offers something more; for these adherents religion offers the promise of power through the justification and glorification of violence (Juergensmeyer 2008: 220–223).

Religious ritual appears to be an effective evolved mechanism for shaping the adolescent brain and creating cohesive, cooperative intermale groups. Violence is and has been an integral component of such ritual across widely diverse human cultures throughout human history. Advances in our understanding of the human brain help explain why this is so on a proximate level; advances in our understanding of religion as an evolved adaptation help explain why selection has favored religious violence under diverse conditions. Understanding both the proximate and

evolutionary mechanisms that link religion and violence is an important first step in understanding and hopefully eradicating the religious violence that has become so prevalent in the modern world.

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