

## 1 Introduction

On September 11, 2001, life in the United States was fundamentally transformed when nineteen young men hijacked four commercial aircrafts and perpetrated a multi-pronged attack on the World Trade Center in New York City and the Pentagon in Washington, DC. That attack killed nearly 3,000 unsuspecting men, women, and children in a single day and had profound impacts on both the United States and the world. The 9/11 bombings not only shattered America's perceived chimera of invincibility, they also nourished a wave of violent religious suicide terrorism across the world. Over the two decades prior to 9/11, a total of 188 suicide attacks occurred (Pape 2005); during the three years following 9/11, more than 300 such assaults killed more than 5,300 people in seventeen different countries. Unlike the earlier attacks, at least 70 percent of these more recent assaults were religiously motivated (Atran 2004:69).

Since 9/11 much scholarly research has focused on the role of religion in motivating terrorism. Predominant Western stereotypes of suicide terrorists as either desperate or deranged have been largely refuted by this research. Anthropologist and terrorism expert Scott Atran notes, "study after study demonstrates that suicide terrorists and their supporters are not abjectly poor, illiterate, or socially estranged" (Atran 2004:75). Nor do they exhibit a distinctive "suicide terrorist" psychological profile or personality (Hudson 1999). What is shared by most suicide terrorists, both secular and religious, are certain demographic characteristics – nearly all are young, male, and unattached. Religiously motivated terrorists share an additional experience, as well. Atran reports "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). In the governmental report, *The Sociology and Psychology of Terrorism: Who Becomes a Terrorist and Why?* author Rex Hudson concludes "Terrorists are generally people who feel alienated from society and have a grievance or regard themselves as victims of an injustice" (Hudson 1999:50).

Religiously motivated terrorism and the research it has engendered offer important insights into the paradoxical relationship between religion and violence. Yet, such terrorism is certainly not the only manifestation of

religious violence. The ethnographic, archaeological, and historical records portray a long and complex relationship between religion and violence across diverse cultures and societies throughout human evolution. Violent shamanic rituals aimed at dispelling demons and appeasing spirits, harrowing tribal initiation ceremonies requiring tooth ablations, painful piercings, scarifications, and genital mutilations, and the martyrdom and religious wars of monotheistic World Religions together illustrate the ubiquity, tenacity, and diversity of the religion–violence relationship.

Numerous theories have been advanced to explain the complex and persistent relationship between religion and violence. Beginning with the classic work of Emile Durkheim, sociologists and religious study scholars, including terrorism experts Mark Juergensmeyer, Michael Jerryson, and Margo Kitts, have examined religious violence vis-a-vis the norms and needs of the social group. Social theorists, including Freud, Marx, and Baudrillard, viewed religious violence through the lens of power, emphasizing both its performative and political functions. Other scholars, such as Ariel Glucklich, Victor Turner, and Harvey Whitehouse, have focused on the psychological effects of religious violence on the individual. Anthropologists Andrew Strathern and Pamela Stewart (2005) discuss the role of “the imaginary” on violence and more specifically on what Juergensmeyer (2003) has termed “the mind of God” in relation to religious violence. And prominent historians, notably Walter Burkert and Rene Girard, have argued that religion is rooted in violence, with the ritual act of sacrifice comprising the very genesis of religious systems. More recently, evolutionary scientists, such as Joseph Bulbulia, John Shaver, and the authors of this volume, have utilized the framework of evolutionary theory to examine the religion–violence relationship.

The sections that follow summarize much of this work with particular focus on evolutionary scholarship. We begin by deconstructing violence and religion separately, aiming to assess their evolutionary development and adaptive functions. We then turn toward understanding variation in religions cross-culturally by examining the socioecological factors that can explain this variation. Next, we clarify how religions work; that is, we explore the underlying mechanisms that are essential for religions to operate. Understanding how religions work and how they evolved will

provide us with a framework for understanding the complex relationship between religion and violence, which we address extensively in the penultimate section of this Element. We rely on diverse sets of data from ethnography, archaeology, primatology, psychology, neuroscience, and other fields, and in the final section we draw these data together and summarize how an evolutionary perspective helps explain the unfortunate, but real, relationship between religion and violence.

Throughout this work we employ a simple but important framework that was first introduced to evolutionary biology by the ethologist and Nobel laureate Niko Tinbergen. Tinbergen argued that when answering questions about the behavior of an organism it is vital to distinguish between what has become known as proximate-level and ultimate-level explanations. The former deals with the underlying causal mechanisms that produce behavior, including cognition, physiology, and neurology. Proximate-level explanations answer questions about *how* behaviors are produced. Ultimate-level explanations, on the other hand, answer questions about *why* a behavior evolved. They address questions about the phylogenetic history of a behavior – in other words, where a behavioral trait came from – as well as the survival and reproductive function of a behavior, that is, its adaptive value. Proximate and ultimate explanations are complementary and as will become quickly evident, we think both types of explanations are critical for understanding the religion–violence relationship.

Religion and violence have a complex and enduring history throughout human evolution. Unraveling the relationship between them requires that we first deconstruct the occurrence and function of each, both across species and throughout human evolution. This is where we begin.

## 2 What Is Violence?

Violence has long been a feature of human life. Phylogenetic studies demonstrate “a genetic component with high heritability” for human aggression (Gomez et al. 2016:233), a propensity shared with our closest primate kin, as well as with other social carnivores (Gomez et al. 2016: 233). And violence is manifest in many ways. Anthropologists, in their ethnographic fieldwork, have documented child and domestic abuse, rape,

infanticide, revenge killings, intergroup raiding, and warfare across diverse cultures throughout the world.

What is violence? The Oxford English Dictionary (1989) defines violence as “The exercise of physical force so as to inflict injury on, or cause damage to, persons or property; action or conduct characterized by this; treatment or usage tending to cause bodily injury or forcibly interfering with personal freedom.” In its *World Report on Violence and Health* (2002), the World Health Organization employs a somewhat different definition of violence: “The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation” (World Health Organization 2002:4). The OED definition focuses on behavior. The WHO definition incorporates the additional requirement of “intent,” an addition considered by some to be a critical feature separating human and nonhuman violence (Bushman 2018:iv–v).

It is, of course, currently impossible to ascertain the intent of nonhuman species engaging in aggression and violence. Nonverbal signals of aggression that convey such intent to conspecifics, however, are readily communicated across widely diverse species, including our own. Direct eye contact, bared teeth, and inflated body stance all communicate aggression in beagles, baboons, and bar brawlers alike. These aggressive behaviors are spontaneously and subconsciously motivated in response to threat and convey a clear message to potential aggressors. Neuroimaging data indicate that such signals are spontaneously and subconsciously processed by humans, as well.

### *Defining Violence from an Evolutionary Perspective*

From an evolutionary perspective, it is not what individuals intend to do but what they, in fact, do that matters. Evolutionary scientists, therefore, typically employ definitions of violence that focus on observable behaviors rather than intent. Such definitions are able to encompass nonhuman species and they situate violence within an evolutionary framework, facilitating the examination of its impacts on individual fitness. Behaviorally based

definitions offer additional advantages, as well. Observable behaviors can be empirically measured and recorded, providing the data necessary to compare aggressive and violent behaviors across individuals and species. Such data allow researchers to assess the influence of genetic, epigenetic, and environmental factors on violent behavior. This is vital for deconstructing and differentiating types of aggression and violence, as well as for identifying their proximate and ultimate causes.

Violence and aggression against conspecifics are certainly not unique to *Homo sapiens*. Numerous animals exhibit highly antagonistic behaviors, and many species engage in lethal violence, as well. Sharks cannibalize littermates in utero, axolotl amphibians eat the limbs of siblings, Nazca booby nestlings forcefully expel co-hatchlings and are, in turn, violently and sometimes lethally abused by adult males. We see similar patterns of violence among mammalian species. Wolves, for example, attack and kill other wolves in both intra and intergroup conflicts, and male lions taking over a new pride routinely commit infanticide. The primate order of which we are a part is rife with violence, from aggressive baboons to infanticidal langurs to lethally raiding chimpanzees. A survey conducted by biologist Jose Gomez and his colleagues found reports of lethal violence in 40 percent of mammalian species included in their sample of 5,020 extant and 5,747 extant and nearly extinct mammals (2016:233). While lethal violence was uncommon in some clades, including bats, whales, and lagomorphs, it was relatively frequent in others. Indeed, “even seemingly peaceful mammals such as hamsters and horses sometimes kill individuals of their own species” (2016, 233).

### Violence in Human Evolution

Violence has been a frequent and ubiquitous occurrence across human societies, as well. Hannah Arendt notes “No one engaged in thought about history and politics can remain unaware of the enormous role violence has always played in human affairs” (1970:6). Archaeological evidence suggests that violence was likely present in human societies early in the emergence of our species. Evidence of blunt instrument trauma among our Neanderthal cousins indicates that our common ancestor likely engaged in violence. At the Spanish site of Sima de los Huesos dated around

250,000 years ago several skulls show evidence of impact fractures, with one cranium exhibiting thirteen healed fractures (Zollikofer et al. 2002:6444). While some have interpreted these findings as evidence of accidental trauma, recent taphonomic-forensic analysis concluded that the type and location of the fractures indicate intentional lesions rather than accidental trauma (Sala et al. 2022). Currently, the oldest fossil evidence of possible violence in early modern humans consists of a fossilized skull from the South African site of Klasies River dated at approximately 90,000 years ago. This skull exhibits a healed fracture suggestive of blunt instrument trauma, as well (Thorpe 2003:151). The depiction of anthropomorphic figures pierced by projectiles in Upper Paleolithic European cave art, as well as 13,000-year-old fossilized skeletons from Italy and Egypt bearing embedded flint points and quartzite bladelets also suggest human violence (Thorpe 2003: 152). At the 12,000-year-old site of Jebel Sahaba in the Sudan chert projectile points are prolific, with several of the twenty-four individuals exhibiting trauma characteristics. One woman in this assemblage shows evidence of at least a dozen wounds (Thorpe 2003: 152). At the slightly later Kenyan site of Nataruk dated around 10,000 years ago women and children were again the victims of brutal violence in a single attack. Eight females, five children, and a teenager are among the twenty-seven victims, including one pregnant woman bearing a young fetus. These slain hunter-gatherers suffered a particularly horrific end, with bound and broken knees and hands, bashed-in skulls and spear-pierced bodies (Lahr et al. 2016:395–396).

More recently, ethnographers have documented a long history of warfare among small-scale societies (Keeley 1996). Numerous hunter-gatherer and horticultural societies, such as the Arunta of Australia, the Yanomamo of South America, and the Iahita Arapesh of New Guinea traditionally engaged in significant intra and intergroup violence. Violence was rife in early agricultural societies, as well. The extent of such violence is well illustrated by the Yamnaya invasion of Europe. These horsemen swept through agricultural Europe from the Eurasian steppes some 5,000 years ago. Genetic evidence shows that the Yamnaya warriors completely obliterated previous male lineages in some areas and “contributed to at least half of Europeans’ genetic ancestry” (Gibbons 2017). Subsequent empires, from

Assyria to Rome to China to Peru, were bathed in the blood of soldiers, slaves, and sacrificial victims, while feudal societies from Germany to Japan were dominated by violent warlords.

Modern era warfare has continued to expand the scope and lethality of human violence through technological innovations and military might. Child and domestic abuse, homicides, and warfare continue to plague human societies across the globe. At the beginning of the twenty-first century violence was among the leading causes of death in the age group fifteen to forty-four years worldwide (World Health Organization 2002). Since 2001, warfare in major war zones throughout the Middle East alone has directly claimed the lives of some 800,000 individuals (Crawford and Lutz 2019). According to the World Health Organization's 2002 *Report on Violence and Health*, "Each year, more than 1.6 million people worldwide lose their lives to violence" (2002).

### Violence and Aggression

Some researchers have characterized violence as pathological behavior. Several human disorders do demonstrate that violence may arise from pathology, yet the frequency and ubiquity of violence across numerous species suggest that not all violence is the product of pathology. Biologists, however, often consider violence to be an "extreme form of aggression" (Bushman 2018:v) and note that under some circumstances, "violence can be seen as an adaptive strategy, favouring the perpetrator's reproductive success in terms of mates, status or resources" (Gomez et al. 2016:233).

As primatologist Michael Wilson notes

"Early observers of primate aggression, especially infanticide, cannibalism, and intergroup killing, regarded these behaviors as pathological or dysfunctional behaviors . . . (yet) . . . current evidence indicates that in most cases aggression follows evolutionary logic. Animals attack other animals when the costs of attacking are low or when the benefits are likely to be high . . . aggression occurs when it is likely to benefit the reproductive success of the aggressor and/or the aggressor's kin" (Wilson 2003:182–183).

Infanticide in chimpanzees, langurs, and lions, as well as the intergroup raids observed in both wolves and chimpanzees illustrate such adaptive violence. In each of these cases the perpetrators of violence gain a fitness advantage. By killing the progeny of the defeated dominant male, lions and langurs simultaneously eliminate the genes of competitors and obtain increased mating opportunities by bringing previously nursing females into estrus sooner. Intergroup raids eliminate and/or weaken competitors, potentially expanding access to both resources and mates. Certainly, the surviving shark embryo, the cannibal axlotl, and the successful booby hatchling described earlier each have a monopoly on nutrients, thereby improving their respective somatic fitness. Violence, in general, and lethal violence in particular can enhance an individual's fitness through increased somatic benefits as well as expanded reproductive opportunities. Somatic and reproductive gains realized through violent behaviors may increase the fitness of close kin, as well, thereby enhancing one's own inclusive fitness.

Viewing violence as an extreme form of aggression situates it on a spectrum of increasingly agonistic behaviors. Aggression has been described as “the behavioral weapon of choice for individuals to gain and maintain access to desired resources (food, territory, mating partners), defend themselves and their progeny from rivals and predators, and establish and secure social status/hierarchical relationships” (de Boer 2018:81). This is applicable across numerous species and is true of human aggression, as well.

### Two Types of Violence

Not all aggression is alike, a fact recognized by justice systems throughout the world. Cognitive psychologist Steven Pinker notes “biologists have long noted that the mammalian brain has distinct circuits that underlie very different kinds of aggression” (2011:497). Central among these different kinds of aggression are two very distinct types that differ “in their psychological, physiological, and biological manifestations as well as in etiology” (Zhu et al. 2019:7731). The defensive aggression of a lioness protecting her cubs is intuitively different from the infanticidal violence of the male seeking to kill them, although both reflect behaviors aimed at maximizing



reproductive fitness. Biological anthropologist Richard Wrangham notes that these two distinctive “modes” of aggression activate “two different pathways in a key neural circuit underlying aggression” (Wrangham 2018:247). This circuit links limbic structures that function in threat appraisal and emotional processing with cortical areas of the brain responsible for such executive functions as social judgment, inhibition, and planning. While both types of aggression engage this corticolimbic circuit, each differentially activates specific structures within it.

The first “mode” of aggression, illustrated by the lioness defending her cubs, has been termed “reactive” or “defensive” aggression. Reactive aggression is a spontaneous emotional response to a perceived threat or thwarted objective (Zhu et al. 2019:7731). It enlists the body’s “fight or flight” response and is marked by high arousal of the sympathetic nervous system. Reactive aggression is generally deemed to be defensive, impulsive, emotional, and affective. The goal of reactive aggression is to eliminate the provocation or threatening stimulus while incurring the least possible harm. It is characterized by species-typical behaviors with strong inhibitory feedback mechanisms, including “taboos, ritualization, submission, reconciliation and appeasement” (de Boer 2018:81). These behaviors “serve to keep physical aggression in control and prevent potentially adverse (i.e., injury or death) consequences” (de Boer 2018:81).

The second mode of aggression has been termed “proactive” or “offensive aggression.” Unlike reactive aggression, proactive aggression does not occur in immediate reaction to a perceived threat, nor does it derive from activation of the “fight or flight” response. It is planned, purposeful, and goal oriented with the aim of achieving specific objectives for personal internal or external rewards. While reactive aggression is “always associated with anger, as well as with a sudden increase in sympathetic activation, a failure of cortical regulation, and an easy switching among targets” (Wrangham 2018:246), proactive aggression most frequently involves a low level of emotional and sympathetic arousal, is highly focused, with “attention to a consistent target” (Wrangham 2018:246), and is goal directed. In contrast to the “heat” and “passion” of reactive aggression, proactive aggression has been described as “cold” and “dispassionate.” The usurping male lion that targets and kills unrelated newborns of the pride he has

acquired, chimpanzees that purposefully stalk, kill, and dismember lone conspecifics from neighboring troops, and the human serial killer who carefully selects each victim and painstakingly plans each murder all engage in proactive aggression. Proactive aggression involves lower physiological arousal on the part of the aggressor, yet is likely to result in more lethal outcomes. Lack of social communication, the targeting of vulnerable body parts, and the goal-directed psychology of this type of aggression render it more akin to predation than to reactive aggression. Indeed, the same neural circuits that are activated during predatory behavior are engaged during proactive aggression (Wrangham 2018:247).

#### *Genetics, Epigenetics, Stress, and the Environment*

Laboratory research and human twin studies have shown that genetic and developmental factors significantly impact the propensity to engage in aggression, as well as the type of aggression displayed (Wrangham 2018:247). Some genotypes predispose individuals to reactive aggression when faced with adverse experiences (Lansford 2018:19). A key structure in the brain's "aggression circuit" is the orbitofrontal cortex (OFC) which is "crucially involved in responding to expectancies of social anger, (and) . . . knowledge of the other individual's position in the dominance hierarchy" (Blair and Charney 2003:26). Impaired OFC functioning, whether resulting from genetic, epigenetic, or physical injury, is associated with an increased propensity for reactive aggression (Blair and Charney 2003:23). Impacts of injury to the OFC are famously illustrated by the case of Phineas Gage, a railroad worker whose brain was damaged when a metal railroad rod shot through his skull. Following this event, the previously stolid, responsible, and conscientious railroad supervisor experienced both a loss of social inhibition and an increase in the propensity for reactive violence (Damasio 1994).

Genes that impact the brain's neurotransmitter systems alter the propensity for reactive aggression, as well. Serotonin is a key neurotransmitter in the corticolimbic brain circuit central to aggressive behavior. The serotonin system is complex with fourteen different receptor types differentially distributed across numerous brain structures. These subtypes