

PART FIVE

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# Taking Restraint against Killing Seriously



# The Evolution of Agonism

## The Triumph of Restraint in Nonhuman and Human Primates

DOUGLAS P. FRY AND ANNA SZALA

As murders, rapes, genocide, riots, rebellions, and wars regularly make the headlines around the world, not surprisingly there is a wide-reaching presumption in both academia and on Main Street that evolution has molded human agonism toward killing and warring. Konner (2006, p. 1) reflects this view when he opines, “There is in human nature a natural tendency to violence and, additionally, to war.” Evolutionary writings on aggression have consumed considerable ink discussing killing and warring as presumed adaptations (e.g., Buss, 1999, 2005; McDonald, Navarrete, & Van Vugt, 2012; Potts & Hayden, 2008; Pinker, 1997; Wrangham & Peterson, 1996). The famous proposition that “killers have more kids” (Chagnon, 1988) reflects the idea that killing has paid fitness dividends in the evolutionary past and consequently that lethal predilections have proliferated in the human gene pool.

In this chapter, we adopt an evolutionary perspective. We place human aggression in a phylogenetic context by considering the patterns of agonism not only in humans (focusing primarily on nomadic band societies) but also in other species, especially nonhuman primates. A cross-species perspective shows that intraspecific aggression among mammals in general and in nonhuman primates in particular is *not* characterized by lethal mayhem. We suggest that despite the obvious human *capacity* to make war, intraspecific agonism in humans actually reflects similar selection pressures as in other species—which might be expected given the consistency across mammalian orders of nonlethality as the pattern. In short, we argue that the standard story line about war and violence being evolutionary adaptations is wrong for a number of reasons. Such a view makes very little evolutionary sense (1) when considered in phylogenetic perspective, (2) when the patterns of agonism in an ancestral context are reconstructed using nomadic forager analogy, and (3) when, for a long-lived species, fitness costs and benefits of extreme or lethal aggression are

considered vis-à-vis those of restrained agonism. We conclude that, as in other mammalian species, the key principle in the evolution of human aggression is, in a word, *restraint*. The species-typical pattern of agonism in humans IS the use of restraint, not an evolved proclivity toward homicide or warfare.

## Natural and Artificial Environments

Natural selection acts upon traits (behavioral, anatomical, and physiological) in relationship to environmental conditions. Traits that are adaptive in one environment may not be adaptive in another. For example, a thick fur coat may be adaptive for a species living in a cold climate but maladaptive in a tropical setting. The environmental conditions under which a species has evolved and adapted via natural selection can be dubbed the *natural environment* (also called the *Environment of Evolutionary Adaptedness*, or EEA for short) in contrast to markedly variant environmental circumstances, which can be labeled *unnatural environments* (Symons, 1979). For ancestral humankind, a subsistence mode based on nomadic foraging was keyed to the natural environment that included, for example, numerous predators (Sussman, chapter 6). Given the truism that any phenotypic trait is a product of the complex and multifaceted interaction of genotype and environment over the development and life of an individual, then the species-typical behavioral traits should most regularly result within environmental conditions *natural* to that species, whereas behaviors witnessed in unnatural environments—again, conditions that differ markedly from those to which the species has adapted—*may* (or may not) vary from those regularly expressed in the natural environment (Bjorklund & Pellegrini, 2002; Symons, 1979).

As we examine human behavior, we should keep in mind, first, that *Homo sapiens* exhibits a great deal of behavioral flexibility, second, that most environmental conditions under which the species now lives are markedly different from the natural environment, or EEA, of the species, and therefore, third, that behaviors manifested in twenty-first century unnatural environments of various sorts may or may not reflect the behavioral adaptations that have evolved over many millennia in the natural EEA.

If a behavioral pattern tends to recur universally across human cultural and ecological environments, for example the use of language to communicate, a case can be made for the species-typicality of the behavior, or to use another way to express this, that such behavior is a relatively obligate or fixed adaptation (Fry, 2006; Williams, 1966). However, just because a behavior (for instance, watching television or going off to war) is widespread in the twenty-first century should not lead automatically to the claim that the behavior per se reflects an evolved adaptation (Fry, 2006; Williams, 1966). It is also necessary to consider whether televisions, computers, newspapers, *Durex*, or war—the latter even in its simplest forms—actually existed in the EEA, rather than *assuming* that behaviors often observed in a current unnatural environment, such as watching *NCIS*, surfing the Internet, reading this book, using condoms, or attempting to kill enemy combatants (not necessarily all at once) are in-and-of-themselves adaptations or simply manifestations of fortuitous effects

in a behaviorally flexible species with a great capacity for learning, which now lives almost exclusively in evolutionary unnatural environments (Fry, 2006). Thus we must also take into consideration both the natural environment (the EEA) and an evolutionary evaluation of fitness costs and benefits of particular behaviors, rather than simply assuming that the prevalence of a trait in unnatural environments means that it is an evolutionary adaptation.

A careful study of nomadic foragers can provide insights into species-typical behavior under natural or near-natural environmental conditions (Bicchieri, 1972; Boehm, chapter 16, 1999; Fry, 2006, 2011; Marlowe, 2005, 2010). As Marlowe (2005, p. 65) points out, “Contemporary foragers are not living fossils, but because they are pre-agricultural they are the most relevant analogs for at least Late Pleistocene humans.” Therefore, as we examine human agonism within the larger frameworks of nonhuman primate agonism and mammalian agonism, we will give weight to human data from nomadic forager societies—as a source of special insight into species-typical behavior within the natural environment—in comparison to behavioral data from societies and circumstances that are clearly unnatural (Narvaez, chapter 17). However, when the same behaviors observed among nomadic foragers in near-natural environmental settings also are widespread across more unnatural environments—e.g., reciprocal exchange, expressions of empathy, cooperation, reliance on language, and, we will argue, *restrained agonism*—then, in conjunction with a careful consideration of fitness consequences, an argument can be made that we are witnessing behavioral traits that have been *strongly selected* over the evolution of the species since they recur across not only natural but also a variety of unnatural environments.

## Aggression as Merely One Kind of Agonism

The agonism concept encapsulates not only physical acts of aggression, but also a variety of competitive behaviors such as dominance and territorial displays, threats, and acts of spatial displacement. The observation that agonistic behavior is widespread in the animal kingdom suggests that it has evolved to fulfill survival and reproductive functions time and again. As Sussman (chapter 6) points out, predation and intraspecific aggression are distinct behavioral systems and involve different neurophysiology. Intraspecific agonism, including physical aggression, tends to be much less bloody than predatory aggression, and is rarely lethal in mammals. There are exceptions to this generalization, such as the special case of infanticide, documented in various mammalian species, but for the most part conspecific mammals do not attempt to kill one another (Enquist & Leimar, 1990; Fry, 1980; Fuentes, chapter 5; Hrdy, 1977; Kokko, chapter 3; Popp & DeVore, 1979). Occasionally, fatalities occur due to accidents (Huntingford & Turner, 1987, pp. 46; Nagel & Kummer, 1974, p. 161).

It is well documented that curtailed or limited aggression has been favored by natural selection in many different species (Fry, Schober & Björkqvist, 2010; Kokko, chapter 3; Maynard Smith, 1974; Maynard Smith & Price, 1973). There are, as we shall see, more

continuities than discontinuities between human agonism and typical mammalian agonistic patterns. In making this evolutionary argument, we develop a comparative model of agonistic behavior based on restraint: *In nonhuman and human primates, as well as in mammals generally, natural selection clearly has favored judiciously employed aggression over escalated, severe forms of violence.*

Agonistic behaviors can be classified into categories of increasing severity: avoidant responses, non-contact display-oriented behavior, restrained physical aggression, and unrestrained physical aggression (Figure 23.1). Consideration of intraspecific competition across species reveals a variety of ways that individuals minimize the risks of injury and other costs of aggression (Fry et al., 2010). Animals practice avoidance and hence eliminate even the possibility of confrontations. Lions (*Panthera leo massaicus*), for example, avoid interacting with members of other prides (Schaller, 1972), and chimpanzees (*Pan troglodytes*) avoid periphery areas of their ranges (Stumpf, 2007; Wilson, Chapter 18). Non-contact displays are employed in substitution for physical fighting between conspecific rivals. Among northern elephant seals (*Mirounga angustirostris*), threats outnumber physical aggression by about *sixty-to-one* (Le Boeuf, 1971). When physical altercations do occur they usually consist of restrained “ritualized” aggression. For instance, competing giraffes (*Giraffa camelopardalis*) batter each other with their necks and heads until one gives up (Alcock, 2005).

As we shall see, unrestrained aggression (the last category in Figure 23.1) is exceedingly rare among mammals. An important implication of this fact is that any claim that escalated, unrestrained fighting is species-typical in humans must be strongly justified, rather than simply assumed a priori, as such a claim flies in the face of a well-documented mammalian pattern of restrained agonism. The burden of scientific proof reasonably rests with any claimants that human agonism in this regard constitutes an exception to a widespread mammalian pattern. The logical default proposition would be that human aggression fits within the typical mammalian framework of limited and controlled agonism,

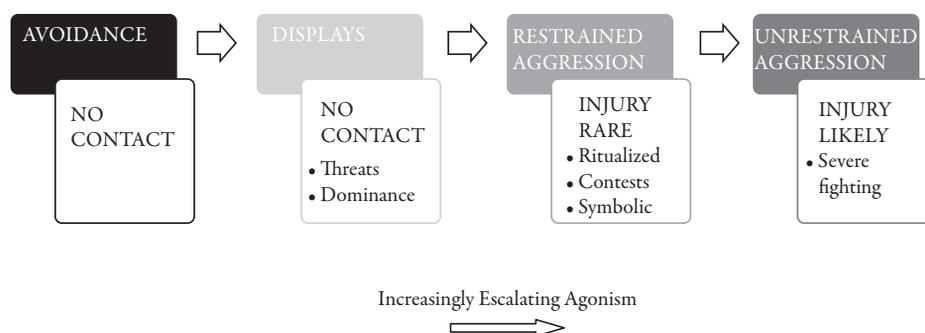


FIGURE 23.1 A model of increasing intraspecific agonism. Avoidance and Displays involve no physical contact and hence no chance of injury. Restrained Aggression is the most typical form of physical contact aggression and rarely results in injuries. Unrestrained Aggression (e.g., escalated fighting, severe fighting) occurs very rarely and can result in severe injuries and death.

rather than constitutes a reversal of selection pressures to favor homicide or war. Humans, after all, are mammals, so in an evolutionary context, let's begin with the presumption that our agonism is typically mammalian—unless proven otherwise.

## Evolutionary Costs and Benefits of Agonism

Aggression has both evolutionary costs and benefits. Fitness costs include physical injuries, mortality, harming one's own kin if they are opponents, losing friends and supporters through damaged relationships, draining time and energy away from other necessary pursuits such as obtaining food, finding mates, or being vigilant for predators, and being ostracized from the social group as a troublemaker (Arnold & Aureli, 2007; Archer & Huntingford, 1994, p. 10; Bernstein, 2007, 2008; Boehm, 1999; Hamilton, 1971; Jakobsson, Brick & Kullberg 1995; Riechert, 1998, p. 82). Although most intraspecific aggression in vertebrates is nonlethal (Alcock, 2005; Enquist & Leimar 1990; Hinde, 1974, p. 268; Kokko, 2008; Maynard Smith & Price, 1973), nonetheless, on occasion injuries sustained during a fight can result in death. Lethal conspecific aggression has been documented among such mammals as chimpanzees, white-faced capuchin monkeys (*Cebus capucinus*), spider monkeys (*Ateles geoffroyi yucatanensis*), hyenas (*Crocuta crocuta*), wolves (*Canis lupis*), and lions (Alcock, 2005; Huntingford & Turner, 1987; Gros-Louis, Perry, & Manson, 2003; Schaller, 1972; Valero, Schaffner, Vick, Aureli, & Ramos-Fernandez, 2006; White, Waller & Boose, chapter 19; Wilson, 1975, p. 246; Wilson, chapter 18; Wilson & Wrangham, 2003).

On the other hand, evolutionary benefits of aggression include obtaining resources such as food, territory, and mates, safeguarding one's offspring and oneself from attack, and achieving or maintaining dominance in a social hierarchy, which in turn correlates with access to resources or mates (Alcock, 2005; Archer, 1988; Jolly, 1985; Wilson, 1975, pp. 242–243). Aggression serves a variety of evolutionary functions that vary from species to species (Alcock, 2005; de Waal, 1989; Wilson, 1975). The overall conclusion is that aggression can be costly but it also can be beneficial to individual fitness (Fry, Schober, & Björkqvist, 2010).

Natural selection can be seen as shaping the aggressive behavior of a species over many generations to maximize benefits and minimize costs to fitness. Natural selection has performed these cost-benefit analyses and restraint seems to be the standard outcome. Out of 1,314 agonistic interactions between pairs of male caribou (*Rangifer tarandus*), 1,308 were ritualized sparring matches between animals who followed the rules compared to a mere six bouts of escalated fighting (Alcock, 2005). This is a ratio of one escalated fight to every 218 restrained ritualized contests. As other illustrations, Enquist and Leimar (1990) note that of 107 observed fights among red deer stags (*Cervus elaphus*) only two resulted in injury, and of 305 fights in antelopes called white-eared kobs (*Kobus kob leucotis*), only four resulted in serious injuries as the opponent's horns penetrated an opponent flanks or abdomen. The risks of injury in intraspecific aggression vary depending on the mammalian

species in question, but serious injuries are the exceptions, not the rule, in conspecific physical fighting. And of course not every injury results in death.

Aside from injury risk, energy expenditure, and other costs, engaging in severe aggression also holds the potential for damaging valuable relationships. Some species of nonhuman primates value long-term relationships; having partners can help an individual to attain needed resources or deal with social situations (Preuschoft, Wang, Aureli, & de Waal, 2002; Silk, Alberts, & Altmann, 2009; Sussman, chapter 6). The valuable relationship hypothesis holds that taking care of others occurs if the relationship is beneficial (Arnold & Aureli, 2007; van Schaik & Aureli, 2000; Watts, 2006). Chimpanzees from Gombe National Park in Tanzania, for instance, form groups that hunt red colobus monkeys (*Colobus badius tephrosceles*), a valuable source of nutrition (Stanford, Jallis, Matama, & Goodall, 1994). Being in good relations also helps in forming alliances against rivals that could not be defeated or scared away on one's own; female chimpanzees from Budongo Forest form coalitions with one another if there is need for retaliating against male aggression (Newton-Fisher, 2006), and coalitions of female bonobos (*Pan paniscus*) keep the males in check (White, Waller, & Boose, chapter 19; see Figure 23.2).

A valuable relationship is worth caring for, not only in terms of restoring a damaged bond, but also for maintaining an existing one. Japanese macaques (*Macaca fuscata yakui*) groom mostly with their friends, so we may conclude that maintaining these relationships is useful (Majolo & Koyama, 2006). Relatedly, in order to restore a strained relationship, individuals sometimes reconcile. Reconciliation reduces the cost of aggression by repairing a strained relationship (Fraser, Stahl, & Aureli, 2010), and occurs more often when a



FIGURE 23.2 An example of social grooming in bonobos. Physical closeness, relaxed poses, and facial expressions indicate the lack of tension. (D. P. Fry photo collection).

relationship is valuable (Brosnan, chapter 20; Preuschoft, Wang, Aureli, & de Waal, 2002; Verbeek, chapter 4).

## Evolutionary Mechanisms of Restraint

Certain mechanisms have evolved to promote the least costly yet effective forms of agonism in mammals and more generally in vertebrates. These mechanisms include (1) territorialism, (2) assessment prior to physical contact, (3) dominance relations, and (4) behavioral proclivities to “follow the rules” of restraint (such as not attempting to bite or gouge vulnerable parts of an opponent’s body or ceasing an attack once an opponent signals submission or attempts to flee). These evolved mechanisms of restrained competition prevent individuals from expending unnecessary energy, taking foolhardy risks, or damaging valuable relationships when interacting agonistically with their peers.

In territorial species, once boundaries have been established, threats and fights markedly decrease among neighbors (Bernstein, 2007; Kokko, chapter 3, 2008). Additionally, in lieu of actually fighting, territories can be marked and defended via safe and efficient methods such as calls, songs, barks, scents, movements, and gestures. Some but not all nonhuman primate species are territorial (Fashing, 2007; Jolly, 1985). Humans living in nomadic foraging bands typically have home ranges rather than defended territorial boundaries, and social mechanisms exist that grant permission for resource use to neighbors, which suggests that territorial defense per se is not species-typical (Birdsell, 1971; Cashdan, 1983; Holmberg, 1969; Kelly, 1995; Marlowe, 2005, 2010, p. 267; Tonkinson, 2004; Wolf, 2001). For example, Siriono bands interact peacefully and do not claim exclusive territories. If hunters see signs that a different band is camped in the area, they abstain from hunting, thus respecting the rights of the first band to the game in the vicinity (Holmberg, 1969). Obviously, humans *can* be territorial, as reflected since the advent of the agricultural revolution in a plethora of historical examples, including the current-day partitioning of the globe into nation-states (an example of an unnatural environment very different from the EEA).

A second way of avoiding unnecessary fighting is by assessing one’s own size, strength, health, age, weapon quality, number of allies, and any other relevant features relative to those of an opponent (Bernstein, 2007; Wilson, chapter 18). If pertinent, the outcome of past fights or dominance rank within an existing hierarchy also can be taken into consideration before engaging in combat (Kitchen, Cheney, & Seyfarth, 2005). The ability to accurately predict probable defeat or victory would seem to be favored by natural selection (Symons, 1978); Kokko (chapter 3) notes that animals tend to avoid a fight “when the likely outcome is clear from the start.” Humans certainly have the same ability to predict an outcome and generally avoid taking on a notably larger or stronger opponent. Of the nomadic foraging Yahgan of Tierra del Fuego, Gusinde (1937, p. 887) describes: “A person will literally foam with rage. . . . Nevertheless, he can muster astonishing self-control when he realizes that he is too weak to stand against his opponent.” However, nomadic

band ethnographies suggest that supporters, the element of surprise, and weapons (such as poison-tipped arrows) can sometimes neutralize size and strength differences, so assessment of opponents within the natural environment of the EEA undoubtedly would have involved variables beyond simply size and strength comparisons (e.g., Balicki, 1970; Lee, 1979).

A third mechanism for reducing the costs of physical altercations is dominance. Dominance hierarchies within social groups greatly reduce fighting on a daily basis, as each individual knows its place relative to the other group members (Bernstein, 2007; Kokko, 2008; Preuschoft & van Schaik, 2000). Boehm (1999) proposes that nomadic foragers developed a reverse dominance hierarchy wherein the group as a whole banded together to control any rising bully (see also Narvaez, chapter 17).

Fourth, with rare exceptions, mammals tend to follow the rules of restraint rather than escalating to more risky types of fighting. Maynard Smith and Price (1973, p.15) describe how mule deer (*Odocoileus hemionus*) “fight furiously but harmlessly by crashing or pushing antlers against antlers, while they refrain from attacking when an opponent turns away, exposing the unprotected side of its body.” Generally speaking, once an opponent submits or tries to flee, prolonging a struggle serves no useful purpose to the victor; to the contrary, failing to respect a loser’s submission signals may lead to escalation, a greater chance of injury, and wasted time and energy for both contestants (Bernstein, 2007; Bernstein & Gordon, 1974; Popp & DeVore, 1979; Roscoe, 2007).

In social species, there are sets of rules prohibiting certain kinds of behavior and promoting other kinds, and this fosters social coexistence. Violating rules can lead to punishments, paybacks, or ostracism. Punishment helps in maintaining dominance relationships and ensures that an individual will be less likely to violate the rules in the future (Bekoff & Pierce, 2009). Bekoff (2011, p. 115) illustrates the importance of following the rules within the context of play, which would similarly apply to respecting the rituals of ritualized aggression: “When animals play, they are constantly working to understand and follow the rules and to communicate their intentions to play fairly. . . . Coyotes [*Canis latrans*] who do not play fair often leave their pack because they do not form strong social bonds. Such loners suffer higher mortality than those who remain with others.” Shortly, we will consider some examples of human rule-following when discussing ritualized aggression.

## The Triumph of Restraint in Nonhuman and Human Primates

### The Overall Pattern

Sussman and Garber (2007) scoured primate field studies on nearly 60 different species in order to gain an idea of how prevalent agonistic behaviors actually are. They included as agonism “mild spats, displacements, threats, stares, and fighting”—hence noncontact as well as contact behavior (Sussman & Garber, 2007, p. 640). For four subgroups—diurnal

prosimians, New World monkeys, Old World monkeys, and Apes—the vast majority of all social interactions were affiliative and cooperative (e.g., food sharing, huddling together, and grooming), whereas agonism accounted for *less than one percent of all interactions*. When they calculated average rates of agonism per adult, the Old World monkeys averaged less than one act of agonism per day, New World monkeys averaged about half that amount, and apes (and prosimians) *less than one agonistic act per month*. The highest rate of agonism was attained by male yellow baboons (*Papio cynocephalus*), being about 11 times per week per individual. It would appear that the chest-beating, building-smashing, airplane-swatting, blonde-kidnapping King Kong (*Gorilla* spp.) provides about as accurate a picture of primate nature as Batman portrays bats, Mr. Ed speaks for horses, or Brian from *Family Guy* reflects actual canines. Nearly everyone has seen the nature documentaries or book passages and magazine articles about “warring” chimpanzees that have been observed in commando raids, attacking a lone individual from a neighboring group (Sussman, chapter 6; Verbeek, chapter 4; Wilson, chapter 18). But as Jane Goodall points out, “It is easy to get the impression that chimpanzees are more aggressive than they really are. In actuality, peaceful interactions are far more frequent than aggressive ones; mild threatening gestures are more common than vigorous ones; threats *per se* occur much more often than fights; and serious wounding fights are very rare compared to brief, relatively mild ones” (Goodall, 1986 quoted in Bekoff & Pierce, 2009, p. 4).

If we pause to consider how the human primate fits into this cross-species comparison of our taxonomic order, obviously there are individual and cultural differences across human societies, but, such variation aside, as among other primate species the vast majority of human social interactions are positive, not agonistic, and *years* can pass for many persons without them receiving or delivering a single act of physical aggression. Consider that the most serious form of intragroup agonism, homicide, is routinely counted in numbers of annual killings, not per 100, not per 1,000, not even per 10,000, but per 100,000 persons in a population. For Batek foragers, Semai horticulturalists, the Japanese, and the Danes, the homicide rate is likely less than 1 or 2 killing per 100,000, and it is for the nomadic Hadza foragers 6.6, for Poles around 3.5, for Finns about 5.0, for El Salvadorans or Guatemalans about 50, and as an extreme comparison, for Europe during World War II an estimated rate for all types of violent deaths is between 455 and 600 per 100,000 per year (Butovskaya, chapter 14; Endicott, chapter 12; Fry, 2006; Knauff, 2011; Malby, 2010; see also Kelly, chapter 9). Currently, an overall worldwide homicide rate for *Homo sapiens*, averaged across countries, is estimated at 7.6 per annum (Malby, 2010). The upshot is that homicide in *Homo sapiens* hardly could be considered a typical behavior, let alone a frequent one. Even during the World War II high for Europe that included all war-related killings along with domestic homicides, the annual rate was only about one-half of 1 percent of the population (Knauff, 2011; Sussman, chapter 6).

Looking across the Order Primates from baboons to gorillas or from lemurs to humans, rates of agonism are dwarfed by rates of affiliative, prosocial types of social interaction. Furthermore, agonism is not always physical. The key point is that across the primate

species—human and nonhuman—agonism reflects self-restraint as a central principle; agonism is limited in a number of ways as furry and not-so-furry members of our Order demonstrate in daily life that “discretion *is* the better part of valor,” that it *is* best to “live and let live,” “let bygones be bygones,” and if fighting to “play by the rules.”

There are many methods for reducing the possibility of having a dangerous encounter with a member of the same species. We will now consider how the types of restraint depicted in the first three categories of Figure 23.1 are reflected in nonhuman and human primates. Then we will consider how the fourth category, escalated aggression, is the rare exception.

### Avoidance

The first effective and commonly used strategy by primates is simply to avoid contact with others. Especially in situations where the fitness risks of social interaction are likely to be greater than gains, then avoidance is a viable course of action (Enquist & Leimar, 1983; Kitchen et al., 2005). Gorillas (*Gorilla gorilla gorilla*), to avoid meeting their fellows, may move out of the path taken by other gorillas (Cordoni & Palagi, 2007). Some species also use territorialism, which helps to prevent possibly harmful encounters. One way to communicate a territorial boundary is through scent marking, as used for example by white sifakas (*Propithecus verreauxi*), ring-tailed lemurs (*Lemur catta*), or capuchin monkeys (*Cebus capucinus*) (Jolly, 1985; Palagi & Dapporto, 2007). Alternatively, some species use spacing calls to achieve the same effect. The song of the Indri (*Indri indri*) is energy-efficient and allows them exclusive foraging use of nearly all their territory: “they merely sit and sing, and hardly ever have to do anything else” (Jolly, 1985, p. 143). Wilson (chapter 18) explains how the majority of intergroup interactions among chimpanzees consists of acoustic contacts only. When groups of black howler monkeys (*Alouatta caraya*) meet on the edges of their ranges, fighting occurs only 3 percent of the time and, more typically, encounters merely involve keeping an eye on the competition (56 percent) or engaging in howling contests (41 percent) (Garber & Kowalewski, 2011). Scent marking and vocalizations facilitate avoidance and hence any risk of physical aggression by sending a clear message to “Keep Out!”

Avoidance reflects restraint (Fry, 2006). To begin with nomadic band societies, foragers are famous for “voting with their feet” in response to conflict (e.g., Balikci, 1970, on the Netsilik; Endicott, chapter 12, on the Batek; Gardner, chapter 15, on South Indian foragers; Marlowe, 2010, on the Hadza and generally). For a sample of 21 nomadic forager societies in the Standard Cross-Cultural Sample (SCCS), Fry (2011) notes ethnographic evidence for intragroup *or* intergroup avoidance in 16 (76 percent) of the societies, and Boehm (chapter 16), who does not tally within group avoidance, reports 35 percent intergroup avoidance for his sample of 49 nomadic forager societies.

More generally, Fry (2006, pp. 23–26) points out that interpersonal avoidance and intergroup avoidance are widespread cross-culturally and probably occur in all societies, can be short-term or long-term, and in some societies involve a specific cultural term or

concept. Some interesting cases of avoidance by enemy troops are noted by Hughbank and Grossman (chapter 25), wherein both sides showed restraint by ignoring each other's presence rather than engaging in a firefight: "small groups of American and German soldiers knowingly passed within a few feet of each other, yet never fired their weapons." During the Vietnam War, a small group of American Green Berets, alerted to the presence of enemy soldiers, jumped into the foliage along the side of a trail. As the Viet Cong soldiers passed by, one stopped to urinate and found himself eye-to-eye with a hiding American soldier. He gestured in fear so as to convey "let's pretend this didn't happen," and then quietly went on this way without a shot being fired by either side (James Welch, personal communication, March 17, 2012).

### Noncontact Displays

Displays, a second type of agonism, reduce the risk of injury to nil because they involve no physical contact between adversaries. As a general rule, across species, noncontact threats and other noncontact displays (e.g., barking, howling, jumping wildly, chasing) vastly outnumber actual contact events (e.g., Nagel & Kummer, 1974; Poirier, 1974). Figure 23.3 shows a back-and-forth chase-retreat episode between Barbary macaques (*Macaca sylvanus*)

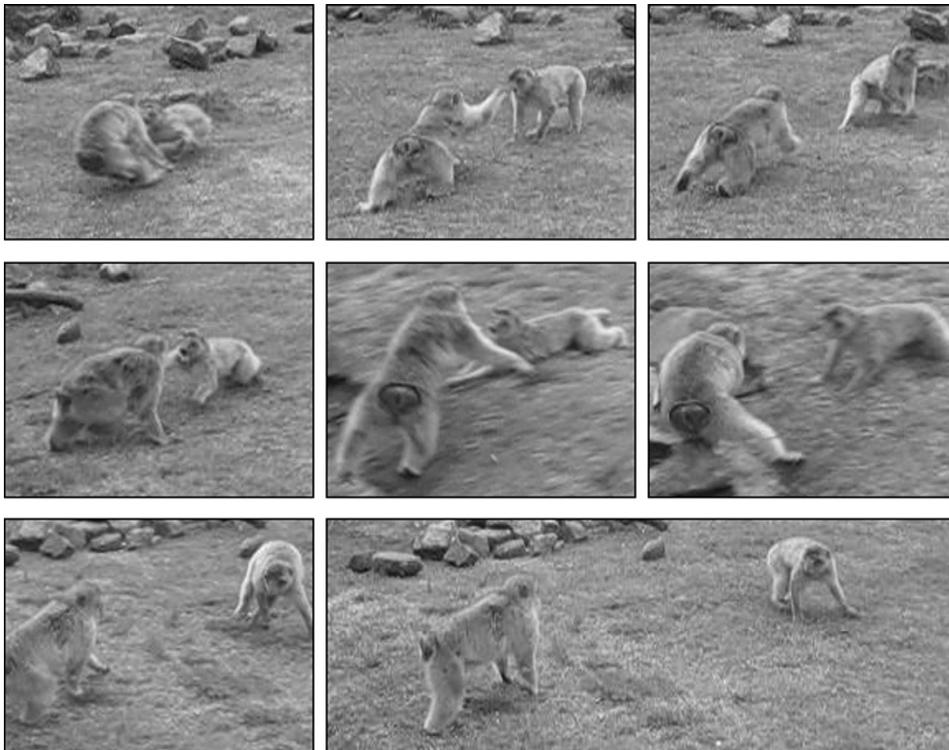


FIGURE 23.3 An example of noncontact agonism in Barbary macaques. Still photos extracted from this filmed episode of noncontact agonism between two captive-living Barbary macaques illustrate noncontact agonism. Back-and-forth, the two monkeys take turns advancing and retreating, often quite rapidly, without ever making physical contact. (D. P. Fry photo collection)

in which physical contact is never actually made. Furthermore, not all contact episodes involve actual fighting.

Out of more than 15,000 agonistic events (noncontact threats and chases plus unidirectional attacks and bidirectional fights) recorded for rhesus monkeys (*Macaca mulatta*), a trifling four-tenths of one percent consisted of mutual fighting (Symons, 1978, p. 166 reporting data collected by Southwick). For a variety of Old World monkey species, Nagel and Kummer (1974) summarize reported findings on noncontact versus contact agonism. The ratios of noncontact-to-contact agonism paint a fairly consistent picture: Noncontact agonism prevails and actual wounding is very rare. Here are four more examples (Nagel & Kummer, 1974: Table 23.1).

Rhesus monkeys: between-group episode ratio, 26 noncontact : 0 contact (zero wounds).

Chacma baboons (*Papio ursinus*): between-group episode ratio, 4 noncontact : 0 contact (zero wounds) and within-group episode ratio, 114 noncontact : 53 contact (including 20 biting; zero wounds).

Patas monkey (*Erythrocebus patas*): between-group episode ratio, 2 noncontact : 0 contact (zero wounds) and within-group episode ratio, 39 noncontact : 10 contact (including 2 biting; zero wounds).

Silver leaf-monkey (*Presbytis cristatus*): between-group episode ratio, 90 noncontact : 27 noncontact *or* contact (i.e., “chasing *or* fighting,” including zero biting; zero wounds) and within-group episode ratio, 83 noncontact : 93 contact (including 2 biting; zero wounds).

Nonhuman primates show impressive variation in noncontact display behavior. Among hanuman langurs (*Semnopithecus entellus*, formally *Presbytis entellus*) intertroop aggression is usually based on facial threats, staring, and ground slapping (Hrdy, 1977). Orangutans (*Pongo pygmaeus*) engage in many different types of displays: lip-smacking, grunting, belching, tree-shaking, branch-breaking, vine-rattling, and howling (Rodman, 1979), and gorillas display with fixated stares, through postures and locomotion such as a rigid quadrupedal stance or walk, gestures such as chest beating, a tight-lipped facial expression, and vocalizations such as grunts, roars, and screams (Cordoni & Palagi, 2007; Palagi, Chiarugi, & Cordoni, 2008; Pitcairn, 1974).

Displays of dominance or submission—reflecting an individual’s place on a social ladder—are another important device of peacekeeping and managing conflict (Thierry, 2000). Dominance can be displayed through an erect, stiff-legged posture, piloerection, staring at a subordinate, or charging at an opponent (Bernstein, 2007; Rodman, 1979; Jolly, 1985). Just as such nonviolent displays point out which individual is dominant, there also are special displays of submission. In the case of rhesus macaques and Japanese macaques (*Macaca fuscata*), subordinates retract their lips and expose their teeth in deference to individuals of high rank (Thierry, 2000). Facial expression, body posture, vocalization, physical withdrawal, and other indicators depending on species are used to communicate submission (Bernstein, 2007). Observations show that individuals with similar rank in

a dominance hierarchy are more likely to display toward or fight with each other (Kitchen et al., 2005), whereas larger rank differentials usually result in submission or flight by the subordinate (Stevens & de Vries, 2007). Thus agonism tends to be minimal between individuals of markedly different ranks.

Clearly, developmental experience is crucial for learning how to get along in a hierarchical society, for as Bernstein (2008, p. 60; see also Kempes, Sterck, & Orobio de Castro, chapter 22) notes, monkeys that have been experimentally deprived of opportunities to interact with other members of their species, rather than exhibiting the typical restraint of monkeys reared under normal social conditions, “launch suicidal attacks against opponents who are clearly physically superior to them or, alternatively, may mount murderous attacks on opponents who are signaling submission and attempting to withdraw from the site of a contest.” Verbeek (chapter 4) calls such uncommon agonistic behavior *species-atypical*. This severely aggressive, species-atypical behavior stems from these monkeys having been raised in a very unnatural environment—one without other monkeys!

Tonkinson (chapter 13) points out how much agonism among the nomadic foraging Mardu involved noncontact displays rather than actual acts of aggression. Ideally, disputes should be vented verbally as “protagonists broadcast their grievances and accusations publically, at high volume and with maximum menace, and satisfaction is gained from the drama of the confrontation.” Fry (2006) observes that the human capacity for speech allows such verbal threat displays such as those described for the Mardu. Rivals among nomadic Yahgan foragers sometimes engage in “talk contests” as each attempts to outdo the other in a verbal repartee (Gusinde, 1937). The Netsilik and other Inuit groups of the Central Canadian Arctic are renowned for song contests as an alternative to fighting (e.g., Balikci, 1970).

Displays are not just for nomadic foragers. Noncontact agonistic display mechanisms are often used in other human societies. As illustrated by Evans Pim (chapter 26), song duels, for instance, are a widely employed yet much neglected restraint mechanism against physical fighting. And Roscoe (chapter 24) examines how social signals among the Yangoru Boiken of Papua New Guinea are analogous to threat displays and ritualized contests that are widespread among mammals. Roscoe (chapter 24) concludes that Yangoru Boiken “are able to evaluate who would win a fight to the death in the event of conflict without any individual or community having to incur the costs of an actual fight to the death.” Hence displays allow disputants to achieve their ends, such as resource defense, without the risks inherent in physical confrontations.

### Restrained Physical Aggression

Reflecting the broader mammalian pattern, restrained aggression among primates is the norm and reduces chances of injury or death, damage to valuable relationships, wasted time and energy, and other costs compared to unrestrained aggression (Bernstein, 2007; Poirier, 1974). Restrained aggression may occur after an assessment period (Bernstein,

2007). Gorillas engage in ritualized chasing and fleeing as one animal pursues a rapidly withdrawing peer (Cordoni & Palagi, 2007). Olive baboons (*Papio anubis*) generally adhere to “rules” about which parts of the body should and should not be bitten. They direct bites at areas covered by fur, which are locations less likely to be seriously harmed, compared to the abdomen or genitalia (Owens, 1975).

As among nonhuman primates, restrained human aggression can allow for the establishment of dominance or for access to resources with substantially less risk than through escalated fighting (Fry, 2005, 2006; Fry et al., 2010). Many but not all nomadic band societies have contests or duels wherein certain rules of restraint apply. For example, among the Netsilik Inuit, two competitors take turns hitting each other on the forehead or shoulders until one man gives up—and in this way the dispute is put to rest. The Waramanga of Australia have a fire ritual for settling disputes between two men; accompanied by several supporters, the opponents rush at each other with flaming torches, trying simultaneously to strike their adversaries and to ward off blows (Berndt, 1965). After a fire ritual, the dispute is considered resolved. Grievances between Siriono men of South America are often settled through wrestling matches (Holmberg, 1969). Rules do not allow punching or hitting, and opponents typically adhere to the rules. Homicide is almost unknown among the Siriono, suggesting that aggression rarely escalates beyond the restrained pattern of the wrestling matches (Holmberg, 1969). If a married Ingalik woman ran away with another man, her lover and her husband might wrestle for possession of the woman (Osgood, 1958). As reflected in the foregoing examples and other cases listed in Table 23.1, duels and contests can be viewed as conflict resolution mechanisms that reduce the chance of serious injuries (Hoebel, 1967, p. 92).

Before considering a couple of examples of restraint in evolutionary unnatural environments, it would be useful to highlight what nomadic forager analogy suggests about salient features of agonism within the natural environment of the EEA. First, most disputes are handled in nonviolent ways, for example, by simply separating, through verbal

TABLE 23.1 Examples of Restrained Physical Fighting Events (e.g., Duels, Wrestling Contests, Ritualized Spear-Throwing/Dodging) Within Nomadic Forager Societies

| Society & Continent                   | Restrained Event                               | References                |
|---------------------------------------|--|---------------------------|
| Netsilik Inuit, North American Arctic | Reciprocal blow-striking to head and shoulders | Balicki, 1970             |
| Slavey, North America                 | Wrestling                                      | Helm, 1956                |
| Dogrib, North America                 | Wrestling                                      | Helm, 1956                |
| Ingalik, North America                | Wrestling                                      | Osgood, 1958, p. 204      |
| Siriono, South America                | Wrestling                                      | Holmberg, 1969            |
| Ona, South America                    | Wrestling                                      | Gusinde, 1931             |
| Yahgan, South America                 | Wrestling and mock group fighting              | Gusinde, 1937             |
| Ache, South America                   | Club fighting                                  | Hill & Hurtado, 1996      |
| Tiwi, Australia                       | Spear throwing and dodging                     | Goodale, 1971             |
| Murngin, Australia                    | <i>Makarata</i> peacemaking duel               | Warner, 1969              |
| Waramanga, Australia                  | Fire Ritual: Fighting with firebrands          | Berndt, 1965, pp. 181–182 |

harangues or song/talk contests, through discussion, or through group mediation, as in the Mardu's Big Meeting (Boehm, chapter 16; Fry, 2006, 2011; Gardner, chapter 15; Tonkinson, chapter 13). As we have just seen, some nomadic forager societies have ritualized contests or duels that may involve physical aggression but whose aim is to reduce the chance of serious injury or homicide. Second, most disputes originate between two individuals, not between groups, and most typically involve sexuality in some form or the seeking of revenge for a misdeed (Butovskaya, chapter 14; Fry, chapter 1; Fry, 2011; Hill, Hurtado, & Walker, 2007; Tonkinson, chapter 13).

Third, nomadic forager society is typically unwarlike (Fry, chapter 1, 2006; 2011). And in those cases where war is reported to take place, the nomadic forager involvement tends not to reflect conditions in the EEA but often involves pastoralists, farmers, ranchers, colonial powers, and so forth either directly or through the disruptive effects brought about by such populations, such as encroachment upon nomadic forager lands (see Birdsell, 1971; Hill et al., 2007; Haas & Piscitelli, chapter 10). Despite often repeated claims to the contrary (e.g., Bowles & Gintis, 2011; Ember, 1978; Pinker, 2011; Potts & Hayden, 2008; Wrangham & Peterson, 1996), numerous factors in nomadic band society actually dictate *against* the practice of war: Individuals have close relatives and friends in neighboring bands (whose membership changes from month-to-month through ongoing fission-and-fusion dynamics); residence is ambilocal or multilocal, meaning that male relatives will be spread across different groups rather than being concentrated in a single patrilineal group; lethal disputes, as mentioned, generally have very personal causes (e.g., sexual jealousies), not political ones, so, consequently, it is difficult to get others involved in dangerous situations over matters that do not involve them; there are no caches of stored food or other goods to plunder; no one possesses the authority to command other band members to fight; and population densities tend to be very low with adequate resources spread over wide areas (Fry 2006, 2011; Meggitt, 1965; Marlowe, 2005, 2010; Service, 1966). Given all these variables, it should not be surprising that the majority of nomadic forager societies in the SCCS (62 percent) lack warfare (Fry, 2006, chapter 1; see also Kelly, chapter 9). Marlowe (2010, p. 264) also concludes for a large sample of foragers that warfare was not very prevalent. Unfortunately for the current purpose, Boehm (chapter 16) combines homicide, feud, raid, and war under the combined category Intergroup Conflict, so we must await future analyses of his data to learn for his sample the relative proportions of these subtypes of lethal aggression (see Fry, chapter 1, for a discussion of the term "raid"). The overall conclusion, however, is clear: nomadic foragers as a whole are not very warlike and this suggests that warfare was rare in the EEA. This ethnographically derived reconstruction of a mostly warless EEA is backed up by archaeology that shows warfare to have originated repeatedly in different world regions *within the last 10,000 years*, that is, after the beginning of the agricultural revolution (Dye, chapter 8; Ferguson, chapters 7 & 11; Haas, 1996; Haas & Piscitelli, chapter 10; Keeley, 1996; Kelly, 2000). In sum, a consideration of extant nomadic forager

societies corresponds with the worldwide archaeological evidence in suggesting a paucity of warring in the ancestral past older than 10,000 years ago.

Compared to the natural environment where warfare was an anomaly, if it occurred at all, nation states with their professional militaries, from the evolutionary point of view, constitute unnatural environments. The purpose of modern warfare is to kill the enemy. Obviously, humans as members of a flexible species are able to engage in military campaigns, fight battles, and slaughter their opponents in vast numbers. But is this actually species-atypical behavior manifested in unnatural environments that are extremely different from the conditions of the EEA? There is a difference between a behavioral capacity (for instance, doing a handstand) and an adaptation (walking bipedally). Assuming that war is an adaptation may be analogous in error to assuming that doing a handstand is a behavioral adaptation.

Interestingly, there is considerable evidence that the typical soldier must overcome a resistance to killing. We suggest that this restraint against killing other human beings is the result of strong selection pressures since it clearly manifests itself even under environmental conditions designed to encourage, promote, and reward killing during times of war. Hughbank and Grossman (chapter 25) consider this topic, so here we will only mention a couple of examples briefly.

One of the most intriguing bodies of evidence that even soldiers on the battlefield show restraint against killing other human beings despite their training and pressure to do so comes from an analysis of 27,574 Civil War muskets recovered from the battlefield at Gettysburg, Pennsylvania. Nearly 90 percent of the muskets were loaded. Additionally, about 12,000 (44 percent) of the weapons were loaded more than once with some 6,000 having between three-to-ten rounds packed into the unfired musket. Grossman (1995) observes that if soldiers were firing their weapons as soon as they had loaded them, only some 5 percent of the guns, not nearly 90 percent, would have been loaded, and certainly not loaded multiple times. Clearly, a huge number of soldiers were spending their time on the battlefield loading and reloading their guns rather than firing at enemy soldiers.

Research into weapon-firing rates was conducted during World War II by US Army historian Brigadier General S. L. A. Marshall. On the basis of extensive postcombat interviews with soldiers, Marshall concluded that only 15 to 25 percent of the men in battle fired their weapons at enemy soldiers (Marshall, 2000). The restraint phenomenon also is reflected in “dog fights” of World War II: less than 1 percent of US fighter pilots accounted for 30 to 40 percent of the enemy aircraft shot down, whereas the majority of combat pilots did not shoot down a single enemy plane (Grossman, 1995). General Marshall wrote that “the average and healthy individual . . . has such an inner and usually unrealized resistance towards killing a fellow man that he will not of his own volition take a life if it is possible to turn away from that responsibility” (Marshall, 2000, p. 79). As noted by de Waal in the Foreword to this volume, the resistance toward killing also is reflected in significant rates of PTSD and also depression, suicide, domestic violence, and

other problems faced by war veterans, which suggests that participating in killing can be psychologically very costly and traumatic.

### Unrestrained Physical Aggression

Only rarely does nonhuman primate agonism result in death. For example, Nagel and Kummer (1974) conclude, “Inflicting damage (wounds) or even killing is so rare in Old World monkeys under natural conditions that it may be regarded as an accident.” During fighting, the most vulnerable parts of the body are injured less frequently, again suggesting the overall pattern of restrained aggression (Bernstein, 2007). And across species of primates, restrained aggression outnumbers unrestrained aggression many times over.

Excluding for the moment primate infanticide, only humans and chimpanzees appear to premeditatedly kill conspecifics. In neither species is lethal aggression frequent, nor does unrestrained aggression predominate, but periodic lethal aggression does occur. Fry et al. (2010) have argued that in the EEA of humans, lethal aggression would have been selected against for three reasons. Besides the overall principle (with overwhelming evidence to support it) that natural selection favors restrained intraspecific aggression in mammalian species, a second selection pressure that has suppressed unrestrained aggression may be that humans in nomadic forager societies interact a great deal with relatives, and killing a relative is not generally fitness enhancing (Hamilton, 1964). Finally, Fry et al. (2010) hypothesize that a third selection pressure against unrestrained aggression may be uniquely human (see Fuentes, chapter 5). In many nomadic forager societies, there exists a tendency for a close family member of a homicide victim to avenge the death of their relative by disposing of the killer:

We find no such cases of revenge homicide among other animals. This means that killers in nomadic forager society often sign their own death warrant by committing a homicide, and given that the nomadic band social organization is the social type under which humans evolved, the fitness ramifications favoring nonkilling may be significant. In other words, the tendency for family members to avenge killings may constitute a powerful supplementary evolutionary selective force against intraspecific killing in humans in addition to the two previously discussed factors. (Fry et al., 2010, p. 119)

As a Ju/'hoansi forager pointed out, “hunting men is what gets you killed” (Lee, 1979, p. 391). The execution of killers and especially recidivist killers is widely reported in the ethnographic literature on nomadic foragers (Boehm, 1999; Fry, 2006; 2011; Fry et al., 2010; Hoebel, 1967). Turning to chimpanzees as another exception to the principle of restraint against lethal aggression, chimps have been observed to kill in captivity and in the wild (Verbeek, chapter 4; White et al., chapter 19; Wilson, chapter 18; Wrangham & Peterson, 1996). The jury is still out as to whether intergroup killings in

the wild represent species-typical or species-atypical aggression. Some researchers such as Wilson (chapter 18) propose that intergroup patrols, raids, and killings represent adaptations for gaining access to more territory and reproductive females. By contrast, Ferguson (2011) and Sussman (chapter 6) argue that killing in chimpanzees can be traced to human influences broadly conceived to include not only food provisioning by researchers, which is known to increase aggression, but also the effects of habitat loss, tourism, poaching, epidemics, and so on.

Infanticide occurs in some mammalian species including primates, and as an exception to the restraint principle deserves comment (Angst & Thommen, 1977; Fry, 1980; Huntingford & Turner, 1987; Hrdy, 1977). Conditions under which infanticide in primates has been practiced include when a new male takes over a harem of females or when a new male becomes dominant in a multi-male group. In an evolutionary cost/benefit analysis, infants can be killed by a male with relatively low risk of injury but with high fitness dividends because females return to estrus and can bear the killer's offspring sooner than had they continued to nurse infants fathered by a previous male. Hence, infanticide by males in some species can be seen as a special case where restraint against killing conspecifics has been countermanded by a different type of selection pressure (Fry, 1980; Hrdy, 1977).

Finally, in contrast to mammals, some arthropod females mate only once or just a few times in a lifetime. Two males may fight to the bitter end for this all-or-nothing opportunity to pass along their genes to the next generation (Enquist & Leimar, 1990; Kokko, chapter 3). But such all-or-nothing or "desperado" strategies are rare among mammals. With their longer reproductive life spans that present multiple opportunities for mating and reproduction, mammals generally adopt a restrained "live to fight another day" approach to competition, as we have discussed. These aforementioned cases are exceptions to the predominate pattern of restraint (Barash, chapter 2; Kokko, chapter 3).

## Conclusion

In summary, research shows that when it comes down to contact agonism between conspecifics, *restrained, non-lethal* aggression, in contrast to more risky escalated combat, has evolved as the predominant pattern in mammals and many other species (Alcock, 2005; Archer & Huntingford, 1994; Bernstein, 2007; Bernstein & Gordon, 1974; Fry et al., 2010; Hinde, 1974, p. 269; Kokko, 2008, p. 49; Riechert, 1998, p. 65). Natural selection favors non-lethality among conspecifics. "If aggression is elicited, then it must be limited, controlled, and regulated in such a way that it terminates with minimal risk of injuries," explains Bernstein (2008, p. 59). The prevalence across mammalian species of displays instead of contact aggression and ritualized tournaments instead of "total war" suggest that restraint is a more successful evolutionary strategy than engaging in unbridled aggression.

Our approach in this chapter has been both *evolutionary*, as we considered fitness costs and benefits, and *novel*, as we argued that restraint is a guiding principle in humans. The usual focus when considering humans has been on how killing and warring have presumably evolved as adaptations (Konner, 2006; McDonald et al., 2012; Pinker, 1997; Wilson, chapter 18). We propose instead that conspecific killing in humans is species-atypical behavior, the exception not the rule, and that neither an evolutionary cost/benefit analysis nor an examination of the data support the assertion that intergroup killing, per se, is an adaptation (Fry, chapter 1, 2006; Fry et al., 2010).

We have contextualized human agonism in four ways: (1) within the broader mammalian realm, (2) within the Order Primates, within *Homo sapiens* (3) with data on nomadic forager societies (and a few other cultural contexts as well), and (4) with reference to the worldwide archaeological record. The first two contexts clearly show that lethal fighting constitutes an exception to the normal expression of agonism, suggesting that natural selection, as an overarching pattern, tends *not* to favor lethal aggression between conspecifics. The key human nature question is: To what extent does *Homo sapiens* also reflect this widespread principle of restraint? The picture that emerges from a careful consideration of extant nomadic forager data (see also Fry, chapter 1) is that contrary to widespread presumptions, there are numerous recurring features of nomadic forager society that (1) correspond with the principle of restraint, and (2) are not conducive to warfare in this natural or near-natural environment. Correspondingly, there is a paucity of archaeological evidence for warfare in the Pleistocene, and there are a number of well-documented sequences that show the beginning of warfare from previous warless conditions, within the time frame of the last 10,000 years (see Part II). The fact that warfare occurs periodically in very recent millennia and today—that is, in unnatural evolutionary environments—is not evidence in and of itself for an adaptation; the behavior in question must also have been present in the EEA to be considered for adaptation status (for further discussion see Fry, chapter 1; Fry, 2006, pp. 217–241).

As in other species, most agonism in humans occurs without any physical contact. With language available, a plethora of possibilities has been devised to deal with conflicts and competition that minimize risks to life and limb. For example, humans regularly just walk away or bite their tongues, verbally reprimand, insult, threaten or argue, negotiate, mediate, arbitrate or go to court, punch, wrestle, or duel, and only very occasionally kill. In other words, the percentage of grievances, disputes, and rivalries that actually end with one or more corpses is miniscule. Restraint generally prevails. In humans, the fact that even the highest recorded homicide rates are still some fraction of one percent of the population shows that killing in humans is the rare exception, not the rule.

Restrained physical aggression in humans, as among mammals in general, results in less risk to the rivals than all-out fighting. Thus restrained aggression in humans is less risky for the participants than unbridled aggression with its many costs including energy expenditure, potential damage to valuable relationships, chance of injury, expulsion from the social group, susceptibility to predation, distraction from mating or securing food,

and so forth, activities which may include, ultimately, a lowering of fitness (Fry 2006). Fry et al. (2010) go one step further to propose the operation in the EEA of an additional uniquely human selection pressure against lethal aggression: The tendency in the natural environment of the nomadic forager band is for the family members of a homicide victim to seek lethal retribution against the killer of their loved one. “Hunting men is what gets you killed” (Lee, 1979, p. 391). An evolutionary model that gives restraint a central place accords better with observed facts and evidence than does a model that presumes a priori that killing and warfare are adaptations.

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