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# HUMAN AGGRESSION IN EVOLUTIONARY PSYCHOLOGICAL PERSPECTIVE

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**ABSTRACT.** *This article proposes an evolutionary psychological account of human aggression. The psychological mechanisms underlying aggression are hypothesized to be context-sensitive solutions to particular adaptive problems of social living. Seven adaptive problems are proposed for which aggression might have evolved as a solution — co-opting the resources of others, defending against attack, inflicting costs on same-sex rivals, negotiating status and power hierarchies, deterring rivals from future aggression, deterring mates from sexual infidelity, and reducing resources expended on genetically unrelated children. We outline several of the contexts in which humans confront these adaptive problems and the evolutionary logic of why men are cross-culturally more violently aggressive than women in particular contexts. The article concludes with a limited review of the empirical evidence surrounding each of the seven hypothesized functions of aggression and discusses the status and limitations of the current evolutionary psychological account. © 1997 Elsevier Science Ltd*

ANCIENT HOMINID skeletal remains have been discovered that contain cranial and rib fractures that appear inexplicable except by the force of clubs and weapons that stab (Trinkaus & Zimmerman, 1982). Fragments from the weapons are occasionally found lodged in skeletal rib cages. As paleontological detective work has become increasingly sophisticated, evidence of violence among our ancestors has mush-

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roomed (Daly & Wilson, 1988). Humans apparently have a long evolutionary history of violence.

Contemporary psychological theories of aggression often invoke domain-general learning mechanisms in conjunction with explanations specifying the plagues of modern living — violence in movies and TV, teachings in Western society, the purchase by parents of toy weapons for their children (Berkowitz, 1993). By watching aggressive models on TV, for example, children are said to acquire aggressive dispositions through observational learning (Berkowitz, 1993; Eron, 1982; Huesmann & Eron, 1986; but see Huesmann & Eron, 1989, for recent work on the interactions among and between learning, cognitive scripts, and genetic predispositions).

Although these factors undoubtedly play a causal role in the ontogeny of aggression, they run aground as complete explanations when confronted with the historical and cross-cultural records. They have trouble explaining the paleontological data, which reveal a long history of human violence thousands of years before the inventions of guns or television, or even the rise of Western civilization. They have trouble explaining the prevalence of violence among traditional societies uninfluenced by Western civilization and entirely lacking exposure to television (e.g., Chagnon, 1983). Among the Yanomamo of Venezuela, for example, one in four adult males die at the hands of other humans, either from within their local tribe or as a result of wars with neighboring tribes (Chagnon, 1988). Although the Yanomamo may be unusually violent as a group, rates of homicide are commonly high among traditional societies, such as the Ache of Paraguay (Hill & Hurtado, 1996) and the Tiwi of northern Australia (Hart & Pilling, 1960).

A deeper set of explanatory principles is needed, one that does not rely primarily on modern phenomena such as violence on television, the mass media, Western society, toys, current crowding, or the alienation of modern living.

## THE DEMISE OF "INSTINCT THEORY"

Most social psychology textbooks contain chapters on aggression (e.g., Myers, 1995; Sabini, 1992). Among the explanations considered, one usually finds a section on the "instinct theory of aggression," usually attributed to Freud and the ethologist Konrad Lorenz, which is selected to represent a class of "biological explanations." According to these accounts, aggressive energy is said to be an instinctual drive that builds up until it explodes. It may be "released" by external stimuli, but its internal building quality guarantees that it will be "pushed out" one way or another.

This depiction of instinct theory is usually dismissed with dispatch. According to Myers (1995), for example, "the idea that aggression is an instinct collapsed as the list of supposed human instincts grew to include nearly every conceivable human behavior...what the social scientists had tried to do was to explain social behavior by *naming* it" (p. 438). The second argument for dismissal is that "instinct theory...fails to account for the variation in aggressiveness, from person to person and culture to culture" (Myers, 1995, p. 439). According to this argument, "biological" represents those things that are invariant, and so evidence of cultural or individual variability requires nonbiological explanations. Berkowitz (1993) provides a more detailed critique. He dismisses the instinct conception on the following grounds: (a) scientists have not discovered within the brain or body any reservoirs of aggressive energy; (b) research rarely reveals spontaneous aggression, but commonly finds that aggression is responsive to external stimuli; and (c) there are different types of aggression, not a

single form. Following these dismissals, textbook writers proceed to spend the bulk of the coverage on theories invoking environmental conditions, such as observational learning as a result of media exposure to violence.

Perhaps the dismissal was too hasty. During the domination of learning theory, which reigned over psychology for the bulk of this century, biological explanations were roundly derided. The dichotomies drawn between instincts and learning, biology and environment, or nature and nature, however, are inherently false (Tooby & Cosmides, 1992). These dichotomies obscure more than they reveal.

The fact that humans show such behavioral flexibility and context-sensitivity is enough to jettison notions of inflexible aggressive instincts invariably getting "pushed out" into behavior regardless of circumstances. But neither are humans passive receptacles for environmental forces, unformed lumps of clay until molded by reinforcement contingencies. A more complex model is needed.

## EVOLUTIONARY PSYCHOLOGY: AN INTERACTIONIST MODEL

Evolutionary psychology provides a more complex interactionist model for viewing the origins of aggression (see Huesmann & Eron, 1989, for a different interactionist model, focusing on the interplay of genetic dispositions, observational learning, and cognitive scripts). Evolutionary psychology starts with a set of premises about human behavior. First, according to evolutionary psychology, all human behavior is a product of mechanisms internal to the person, in conjunction with inputs that trigger the activation of those mechanisms. Even the simplest behaviors — such as the blink of an eye in response to a puff of air — require both a mechanism and an input. No mechanisms, no behavior; no input, no behavior. This is as true for aggression as it is for an eye blink.

Second, all psychological mechanisms, at some fundamental level of description, owe their existence to evolution by selection. Whatever mechanisms we humans have — whether they are just a few highly general learning mechanisms or a larger number of Lorenzian instincts, or different ones altogether — they originated through the process of evolution by natural or sexual selection. Selection is the only causal process powerful enough to produce complex organic mechanisms (Cosmides & Tooby, 1994; Daly & Wilson, 1983; Tooby & Cosmides, 1992). If another causal process exists, it has not been made known to the scientific community (Daly & Wilson, 1988).

If behavior requires the existence of mechanisms, and mechanisms owe their existence to evolution by selection, then evolution is relevant in every single instance of human behavior. This is a trivial truism, but the basic point is often obscured by false dichotomies that divide the conceptual world into "evolutionary" and "nonevolutionary" explanations, or any number of similarly false dichotomies. In this sense, all or most modern scientists are evolutionists.

When the rhetoric and false dichotomies are swept aside, the debate turns out to be about this: The nature of the mechanisms. The radical behaviorist B.F. Skinner was as much an evolutionist as Konrad Lorenz, but they differed in their views of the nature of the mechanisms designed by natural selection (Skinner, 1981). Skinner believed that evolution by selection had endowed organisms, including humans, with a small number of highly general learning mechanisms. Lorenz believed that evolution by selection had endowed humans with a larger number of mechanisms, including an aggression instinct. The issue in contention is the nature of the mechanisms, not whether they are or are not produced by evolutionary processes.

Modern evolutionary psychology conceives of mechanisms as information-processing devices with special properties. At the simplest level of description, an evolved psychological mechanism takes in specific forms of input, operates on that input with decision rules, and then produces an output. The input can stem from the external environment, outside the walls of the human skin, or from the internal environment from other mechanisms. The output can be physiological activity, input to other mechanisms, or manifest behavior (see Buss, 1995; Tooby & Cosmides, 1992, for more extended definitions and discussions).

From the vantage point of evolutionary psychology, mechanisms are fashioned by selection processes to *solve adaptive problems.* Evolution is not forward-looking and does not anticipate what is needed. Rather, variation provides the raw materials on which selection operates, and variants that solve adaptive problems better than other variants are ultimately tributary to fitness and are therefore preserved, replicated, and spread throughout the population over time. Fitness is defined in its modern form as "inclusive fitness" (Hamilton, 1964) and does not correspond to intuitive notions of well-being, personal happiness, or adjustment, nor to long-discarded notions of "the good of the species" (Cosmides & Tooby, 1994).

An evolutionary psychological perspective leads us to pose a cluster of related questions about aggression: (a) What specific adaptive problems might be solved by the use of aggression? (b) Have men and women over human evolutionary history confronted these problems equally or differently? (c) What are the "design features" of the psychological mechanisms involved in aggression, and can they be predicted and explained by particular hypotheses about the adaptive functions of aggression? (d) What contexts trigger aggression, and can they be predicted and explained by specific hypotheses about the adaptive functions of aggression? (e) Can individual and cultural variation in aggression be explained by variations in the degree to which individuals and groups confront the classes of adaptive problems to which aggression is a functional solution?

## ADAPTIVE PROBLEMS TO WHICH AGGRESSION MIGHT HAVE EVOLVED AS A SOLUTION

Evolutionary hypotheses do not enjoy a privileged status by virtue of being evolutionary. As implied in the above discussion, all psychological hypotheses are implicitly or explicitly evolutionary. An evolutionary psychological perspective does not yield a single invariant hypothesis about aggression or any other behavioral phenomenon. Thus, within evolutionary psychology, several hypotheses are sometimes proposed and put into scientific competition with each other. The empirical data, as with all scientific hypotheses, are then used to adjudicate. Below we detail several leading candidates for adaptive problems to which aggression might be an evolved solution.

### *Co-Opt the Resources of Others*

Humans, perhaps more than any other species, stockpile resources that historically have been valuable for survival and reproduction. These include fertile land and access to fresh water, food, tools, and weapons. There are many means for gaining access to the valuable resources held by others, such as engaging in social exchange, stealing, or trickery. Aggression is also a means to co-opting the resources of others.

Aggression to co-opt resources can occur at the individual or group level. At the individual level, one can use physical force to take resources from others. Modern-day

forms include bullies at school who take the lunch money, books, leather jackets, or designer sneakers from other children (Olweus, 1978). Childhood aggression is commonly about resources, such as toys and territory (Campbell, 1993). Adult forms include muggings and beatings as a means to forcibly extract money or other goods from others. The *threat* of aggression may be enough to secure resources from others, as when a child gives up his lunch money to prevent a beating or a small store owner gives mobsters money for "protection" to prevent his or her business from being ransacked.

People, particularly men, often form coalitions for the purposes of forcibly co-opting the resources of others. Among the Yanomamo, for example, male coalitions raid neighboring tribes and forcibly take food and reproductive-aged women (Chagnon, 1983). Throughout human recorded history, warfare has been used to co-opt the land possessed by others, and to the victors go the spoils. The acquisition of reproductively relevant resources through aggression could have selected for aggressive strategies when the benefits, on average, outweighed the costs in the currency of fitness.

### *Defend Against Attack*

The presence of aggressive conspecifics poses a serious adaptive problem to would-be victims — they stand to lose valuable resources that are co-opted by the aggressors. In addition, victims may suffer injury or death, impeding both survival and reproduction. Victims of aggression may also lose in the currency of status and reputation. The loss of face or honor entailed by being abused with impunity can lead to further abuse by others, who may select victims in part based on the ease with which they can be exploited or their unwillingness to retaliate.

Aggression, therefore, can be used to defend against attack. Aggression may be an effective solution to this adaptive problem by preventing one's resources from being forcibly taken. It can be used to cultivate a reputation that deters other would-be aggressors. And it can be used to prevent the loss of status and honor that would otherwise follow from being victimized with impunity.

### *Inflict Costs on Intrasexual Rivals*

A third adaptive problem is posed by same-sex rivals who are vying for access to the same resources. One such resource consists of access to valuable members of the other sex. The image of the beach bully kicking sand in the face of a weaker man and taking his woman is a stereotyped notion of intrasexual competition, but the underlying logic it conveys is powerful.

Aggression to inflict costs on rivals can range from verbal barbs to beatings to killings. Men and women both derogate their same-sex rivals, impugning their status and reputation to make them less desirable to members of the other sex (Buss & Dedden, 1990). At the other end of the spectrum, men sometimes kill their same-sex rivals in duels. Bar fights that start as trivial altercations sometimes escalate to the point of death (Daly & Wilson, 1988). And men sometimes kill other men discovered to have had sex with their wives or girlfriends (Daly & Wilson, 1988).

Since evolution operates according to *differences* in designs, a cost inflicted on a rival can translate into a benefit for the perpetrator. According to this hypothesis, a key function of verbal and physical aggression is to inflict costs on same-sex rivals.

### Negotiate Status and Power Hierarchies

A fourth evolutionary hypothesis is that aggression functions to increase one's status or power within existing social hierarchies. Among the Ache of Paraguay, for example, men engage in ritual club fights with other men. Men who have survived many club fights are admired and feared, and so attain status and power as a result of their successful aggression (Hill & Hurtado, 1996). In modern societies, we have ritualized aggression in the form of boxing matches, for example, where the victor experiences status elevation and the loser a status loss.

Men who expose themselves to danger in warfare to kill enemies are regarded as brave and courageous, and consequently experience an elevation in their status within the group (Chagnon, 1983; Hill & Hurtado, 1996). Within street gangs, men who display ferocity in their beatings of fellow or rival gang members experience status elevation (Campbell, 1993).

The hypothesis that aggression sometimes serves the adaptive function of status elevation does not imply that this strategy works in all groups. Aggression within many groups may result in a status decrement. A professor punching another professor at a faculty meeting, for example, would almost certainly experience a decline in status. The key to the status elevation hypothesis is to specify the social contexts in which aggression pays.

### Deter Rivals from Future Aggression

Cultivating a reputation as aggressive may function to deter aggression and other forms of cost-infliction from others. Most people would think twice about stealing from a Mafia hit man or tangling with Mike Tyson. Most people would hesitate to flirt with the girlfriend of a member of the Hell's Angels motorcycle gang. Aggression and the reputation for aggression thus can act as deterrents, helping to solve the adaptive problem of others attempting to co-opt one's resources.

### Deter Long-Term Mates from Sexual Infidelity

A sixth hypothesis is that aggression and the threat of aggression function to deter long-term mates from sexual infidelity. Much empirical evidence suggests that male sexual jealousy is the leading cause of spousal battering (Daly, Wilson, & Weghorst, 1982). Studies of shelters for battered women, for example, document that in the majority of cases, women cite extreme jealousy on the part of their husbands or boyfriends as the key cause (Dobash & Dobash, 1984). As repugnant as this may be, some men may beat their wives to deter them from consorting with other men.

### Reduce Resources Expended on Unrelated Children

When a new male lion displaces another male and takes over a female, he often commits infanticide. He kills the young sired by the usurped male and re-inseminates the female. This act of brutality may seem repugnant, but in evolutionary context it serves a specific function for the killer — it reduces the resources he and his new mate expend on offspring that are genetically unrelated to him. A similar adaptive logic may apply to aggression against stepchildren, including that which falls short of actual homicide. Since the presence of stepchildren threatens to absorb valuable resources that might otherwise get channeled to genetically related children, adult aggression

against stepchildren may have functioned historically to reduce the resources expended on unrelated children.

## THE MODULARITY AND CONTEXT-SPECIFICITY OF AGGRESSION

This account of seven key adaptive problems that might be solved by a strategy of aggression strongly suggests that aggression is not a unitary, monolithic, or context-blind strategy. Rather, it suggests that aggression is highly context-specific, triggered only in contexts in which the specific adaptive problems are confronted and the adaptive benefits are likely to be reaped.

Consider the use of spousal battering to solve the adaptive problem of a partner's potential infidelity. This adaptive problem is more likely to be confronted by men who are lower in relative mate value than their wives, for example, or who experience a decrement (e.g., loss of a job) in the resources that women value (Buss, 1994). Under these conditions, the probability that a woman might commit infidelity or defect from the relationship altogether is likely to be higher, and so the adaptive problem is confronted more severely. Men in these conditions are predicted to be more aggressive than men whose partners are less likely to commit infidelity or to defect from the relationship.

Adaptive benefits must also be evaluated within the context of costs. Aggression, by definition, inflicts costs on others, and those others cannot be expected to absorb the costs passively or with indifference: "Lethal retribution is an ancient and cross-culturally universal recourse for those subjected to abuse" (Daly & Wilson, 1988, p. 226). One of the most robust findings in aggression research is that aggression tends to cause retaliatory aggression (Berkowitz, 1993; A. Buss, 1961). This can sometimes cause escalating cycles of aggression and counter-aggression, as in the fabled family feud between the Hatfields and the McCoys (Waller, 1993).

One critical context for costs pertains to the reputational consequences of aggression. Cultures and subcultures differ tremendously in whether aggression enhances or depresses status. Among "cultures of honor," for example, failure to aggress when insulted can lead to status loss (Nisbett, 1993). A daughter who has brought shame upon the family name by engaging in premarital sex, for example, may be killed as an "honorable" solution to the problem of restoring the status of the family (Daly & Wilson, 1988).

Another dimension of cost pertains to the ability and willingness of the victim to retaliate. Among school children, bullies typically select victims or "whipping boys" who can not or will not retaliate (Olweus, 1978). Similarly, the husband of a woman with four strapping brothers and a powerful father living nearby will think twice before beating her for flirting with someone else. The presence of extended kin, therefore, is one context of cost that should moderate the manifestation of spousal violence. Recent empirical evidence supports this prediction. In a study of domestic violence in Madrid, Spain, it was found that women with higher densities of genetic kin both inside and outside Madrid experienced lower levels of domestic violence (Figueredo, 1995). A higher density of genetic kin within Madrid appears to have exerted a larger protective effect than kin outside Madrid, suggesting the importance of proximity.

In some contexts, aggressors will suffer reputational damage because of their aggression. In academic circles, for example, physical aggression is shunned and those

who engage in it can suffer ostracism. Among some street gangs, the failure to engage in aggression when provoked will result in irreparable loss of status (Campbell, 1993).

The key point is that an evolutionary psychological perspective predicts modularity and context-sensitivity, not the rigid invariant expression of aggression depicted in earlier instinct theories. Thus, findings of variability of aggression across contexts, cultures, and individuals in no way falsify particular evolutionary hypotheses. Indeed, that very context-sensitivity is a critical lever for testing evolutionary hypotheses.

Earlier researchers in this area concluded that variability simultaneously falsified "biological" theories and confirmed "learning" theories. Evolutionary psychology jettisons this false dichotomy by proposing a specific interactional model — aggression as evoked by particular adaptive problems confronted in particular cost-benefit contexts. In principle, the mechanisms producing aggression could remain dormant for the entire life of an individual, if the relevant contexts are not encountered. Aggression, on this account, is based on evolved psychological mechanisms, but is not rigid or invariant and does not get "pushed out" regardless of circumstances.

## WHY ARE MEN MORE VIOLENTLY AGGRESSIVE THAN WOMEN?

In a sample of homicides committed in Chicago from 1965 through 1980, 86% were committed by men (Daly & Wilson, 1988). Of these, 80% of the victims were also men. Although the exact percentages vary from culture to culture, cross-cultural homicide statistics reveal strikingly similar findings. In all cultures studied to date, men are overwhelmingly more often the killers and their victims are mostly other men. Any reasonably complete theory of aggression must provide an explanation for both facts — why men engage in violent forms of aggression so much more often than women and why other men compose the majority of their victims.

An evolutionary model of intrasexual competition provides the foundation for such an explanation. It starts with the theory of parental investment and sexual selection (Trivers, 1972). In species in which females invest more heavily in offspring than males, females become the valuable limiting resource on reproduction for males. Males become constrained in their reproduction not so much by their ability to survive, but by their ability to gain sexual access to the high-investing females.

The sex difference in minimum obligatory parental investment (e.g., mammalian females bear the burdens of internal fertilization, placentation, and gestation) means that males can sire more offspring than females. Stated differently, the ceiling on reproduction is much higher for males than for females. This difference leads to differences in the variances in reproduction between the sexes. The differences between the haves and have-nots, therefore, become greater for males than for females.

The greater the variance in reproduction, the more ferocious the competition within the sex that shows higher variance. In an extreme case, such as the elephant seals off the coast of northern California, 5% of the males sire 85% of all offspring produced in a given breeding season (Le Boeuf & Reiter, 1988). Species that show high variance in reproduction within one sex more than the other tend to be highly sexually dimorphic across a variety of physical characteristics. The more intense the effective polygyny, the more dimorphic the sexes are in size and form (Trivers, 1985). Elephant seals are highly sexually dimorphic for weight, for example, with males weighing four times what females weigh (Le Boeuf & Reiter, 1988). Chimpanzees are less sexually dimorphic for weight, with males roughly twice the weight of females.

Humans are mildly dimorphic for weight, with males roughly 12% heavier than females. Within primate species, the greater the effective polygyny, the more the sexual dimorphism, and the greater the reproductive variance between the sexes (Alexander, Hoodland, Howard, Noonan, & Sherman, 1979).

Effective polygyny means that some males gain more than their "fair share" of copulations, while other males are shut out entirely, banished from contributing to the ancestry of future generations. Such a system leads to more ferocious competition within the high-variance sex. In essence, polygyny selects for risky strategies, including those that lead to violent combat with rivals and those that lead to increased risk-taking to acquire the resources needed to attract members of the high-investing sex.

Violence can occur at the top as well as the bottom of the hierarchy. Given an equal sex ratio, for each man who monopolizes two women, another man is consigned to bachelorhood (Daly & Wilson, 1996). For those facing reproductive oblivion, a risky, aggressive strategy may represent a last resort. The homicide data reveal that men who are poor and unmarried are more likely to kill compared with their more affluent and married counterparts (Wilson & Daly, 1985).

As Daly and Wilson (1988) note, "sexual dimorphism and violent male–male competition are ancient and enduring elements of our human evolutionary history" (p. 143). Current levels of sexual dimorphism among humans are roughly the same as those of our ancestors living 50,000 years ago. Male–male combat among humans, as among other sexually dimorphic mammals, is a leading cause of injury and death among males.

Modern humans have inherited from their ancestors the psychological mechanisms that led to their success. This does not imply that men have a conscious or unconscious desire to increase their reproductive success. Nor does it imply that men have an "aggression instinct" in the sense of some pent-up energy that must be released. Rather, men have inherited from their successful ancestors psychological mechanisms sensitive to contexts in which aggression probabilistically leads to the successful solution of a particular adaptive problem.

This account provides a parsimonious explanation for both facts revealed in the cross-cultural homicide record. Males are more often the perpetrators of violence because they are the products of a long history of mild but sustained effective polygyny characterized by risky strategies of intrasexual competition for access to the high-investing sex. The fact that men die on average 7 years earlier than women is but one of the many markers of this aggressive intrasexual strategy.

Men are the victims of aggression far more than women because men are in competition primarily with other men. It is other men who form the primary sources of strategic interference, other men who impede their access to resources needed to attract women, and other men who try to block their access to women. To the victors go the spoils. The losers sustain injury and early death.

Women also engage in aggression, and their victims are also typically members of their own sex. In studies of verbal aggression through derogation of competitors, for example, women slander their rivals by impugning their physical appearance and hence reproductive value (Buss & Dedden, 1990; Campbell, 1993). The forms of aggression committed by women, however, are typically less florid, less violent, and hence less risky than those committed by men — facts accounted for by the theory of parental investment and sexual selection (see Campbell, 1995).

## MEN'S AGGRESSION AGAINST MEN

Homicide represents the most extreme form of aggression, and homicide statistics worldwide reveal that the majority of the killers are men. So are a majority of the victims. Several causal contexts surround male–male homicides.

First, the killers and victims often share similar characteristics, such as being unemployed and perhaps relatedly, being unmarried. In a study of Detroit homicides in 1982, for example, although only 11% of the adult men in Detroit were unemployed that year, 43% of the victims and 41% of the perpetrators were unemployed (Wilson & Daly, 1985). The same study revealed that 73% of the male perpetrators and 69% of the male victims were unmarried, as contrasted with only 43% of same-age men in the Detroit area. Thus, lacking resources and being unable to attract long-term mates appear to be social contexts linked with male–male homicides. This is especially true among young men, new and unestablished entrants into the competition for status and mating.

One of the key motives of male–male homicide appears to be the defense of status and honor in the local peer group. These are often classified as "trivial altercations" in the police records. A typical case is the bar-room verbal altercation that escalates out of control. The combatants, sometimes unable to back down and suffer humiliation in the eyes of their peers, break a bottle, pull a knife, or open fire with a gun. The seemingly trivial nature of the arguments sometimes puzzles police. A Dallas homicide detective noted: "Murders result from little ol' arguments over nothing at all. Tempers flare. A fight starts, and someone gets stabbed or shot. I've worked on cases where the principals had been arguing over a 10 cent record on a juke box, or over a one dollar gambling debt from a dice game" (Mulvihill, Tumin, & Curtis, 1969, p. 230).

Status, reputation, and honor are far from trivial, however. Since humans evolved in the context of small groups (e.g., Alexander, 1987; Tooby & DeVore, 1987), a loss of status could have been catastrophic in the currency of survival and reproduction. We carry with us ancient psychological mechanisms for aggression designed for a time and place long forgotten. These mechanisms operate in the modern context, triggered by cues to a loss of status. They may be maladaptive today, just as our taste for fat may be maladaptive in a modern environment characterized by fast food restaurants at every street corner. The mechanisms operate nonetheless, triggered by events that would have triggered them in our ancestral past.

Sexual jealousy appears to be another key context triggering same-sex aggression and homicide. It is predominantly men who do the killing and other men who are the victims. A summary of eight studies of same-sex killings involving "love triangles" documented that 92% were male–male homicides and only 8% were female–female homicides (Daly & Wilson, 1988, p. 185).

Rivalry and competition over women can trigger nonlethal aggression as well. In a study of mate guarding, for example, men more than women picked a fight with the rivals who showed interest in their mates and threatened to hit rivals who were making moves on their mates (Buss, 1988). Thus, male aggression against rivals is manifest in a very specific context — dealing with the adaptive problem of mate retention.

In a study of competitor derogation, men were far more likely than women to physically dominate or beat-up their rivals to render them less desirable to women (Buss & Dedden, 1990). Furthermore, committing such acts of aggression was judged by an independent panel to be more effective for men than for women in lowering the victim's desirability in the eyes of the other sex.

At the other end of the spectrum is warfare — coalitions of males aggressing against other coalitions of males. In the recorded history of humans, there is not a single instance of women forming a war party to raid a neighboring village. Tribal warfare, however, is common among male coalitions (e.g., Chagnon, 1983).

## WOMEN'S AGGRESSION AGAINST WOMEN

Women's physical same-sex aggression, compared with that of men, is less frequent, less violent, and less florid (Campbell, 1995). In a sample of 47 Detroit homicides in 1972 involving sexual jealousy, only 3 were committed by women against a same-sex rival (Daly & Wilson, 1988, p. 184). The low levels of risky physical aggression, however, do not translate into low levels of verbal aggression.

If aggression is defined as inflicting costs on someone else, women's aggression can be quite potent. In a study of derogation of competitors, women engaged in as much verbal aggression against their rivals as did men (Buss & Dedden, 1990). The content of the derogations, however was different. Women exceeded men in derogating their rivals on the basis of physical appearance and sexual promiscuity, for example. They were more likely than men to call their competitors fat and ugly, mention that the rival's thighs were heavy, make fun of the size and shape of their rival's body, and call them physically unattractive (Buss & Dedden, 1990). Women seem to be extraordinarily observant about the physical imperfections in other women's appearance, and take pains in the context of intrasexual competition to point them out publicly, thereby drawing attention to them and amplifying their importance in men's attentional field.

In the domain of sexual conduct, women were more likely than men to say that their rivals slept around a lot, had many past boyfriends, were sexually promiscuous, and would sleep with practically anyone (Buss & Dedden, 1990). Furthermore, this derogation tactic was context-dependent. When the man was seeking a short-term mate, derogating a competitor by implying promiscuity was not at all effective, presumably because men are relatively indifferent to this quality in a short-term mate, and might even value it since it signals an increased likelihood of intercourse (Schmitt & Buss, 1996). When the man is seeking a long-term mate, in contrast, derogating a rival on the promiscuity dimension was extremely effective, presumably because men seeking long-term mates place a premium on sexual fidelity (Buss & Schmitt, 1993).

In sum, women derogate other women as often as men derogate other men. This is not an aggressive instinct, nor does it get "pushed out" regardless of context. Rather, women seem to be aware of what men desire in both short-term and long-term mating contexts, and shift their derogation tactics accordingly.

## MEN'S AGGRESSION AGAINST WOMEN

Much of men's nonsexual violence against women is directed at spouses, mates, or girlfriends, and sexual jealousy appears to be the major cause. In one study of Baltimore spousal homicides, 25 out of the 36 were attributed to jealousy, and the wives were victims in 24 of these cases (Guttmacher, 1955). In a study of battered women at a refuge, two thirds reported that their husbands were extremely jealous (Gayford, 1975). In another study, 57 out of 60 battered women reported extreme jealousy and possessiveness on the part of their husbands (Hilberman & Munson, 1978). In yet another study, in the majority of 100 cases of spousal violence, the

husbands reported frustration over their inability to control their wives, with accusations of infidelity the most common complaint (Whitehurst, 1971).

Sexual jealousy is also a key context for spousal homicide, and apparently the most common cause (Daly & Wilson, 1988). Men kill their wives or girlfriends under one of two key conditions — the observation or suspicion of a sexual infidelity and when the woman is terminating the relationship. The first represents cuckoldry, which places a man at risk of investing his limited resources in an offspring to whom he is genetically unrelated. The second represents the loss of a reproductively valuable woman to a rival — also a direct loss in the currency of fitness. This adaptive logic, of course, is not present in men's minds. But men carry with them the psychological mechanisms that led to their ancestors' success, and one collection of such mechanisms fuels sexual jealousy and proprietariness over mates, both of which lead to aggression.

One characteristic of female victims stands out — their age. Young wives and girlfriends are more likely to be killed than older ones (Daly & Wilson, 1988). Since youth is a powerful cue to a woman's reproductive value, it follows that male sexual jealousy would be especially targeted toward young mates. It is also likely that younger women are more often the objects of desire by other men, and so male sexual jealousy might be triggered by the presence of rivals attempting to attract these women.

The key point is not that violence against women is produced by some sort of invariant instinct. Rather, its patterning — the contexts in which it emerges and the nature of the targets — is highly dependent upon the specific adaptive problem being faced.

## WOMEN'S AGGRESSION AGAINST MEN

It may be obvious that women rarely inflict violent aggression against men. In reports of spousal abuse, such as slapping, spitting, hitting, and calling nasty names, however, the percentages of men and women victims often are roughly the same (e.g., Buss, 1989; Dobash, Dobash, Wilson, & Daly, 1992).

Extreme aggression, such as spousal homicide, is less frequently perpetrated by women, but it does occur. And the contexts are almost always linked with one of two factors — when the woman is defending herself against a husband who is enraged over a real or suspected infidelity and after a prolonged history of physical abuse, where the woman sees no way out of the coercive grip of her husband (Daly & Wilson, 1988; Dobash et al., 1992). Male sexual jealousy, in short, appears to lie at the heart of women killing their spouses as well as the more common case of men killing their spouses.

## ADULT AGGRESSION AGAINST CHILDREN

Not all aggression involves adult victims. Children are victims as well, and these cases are shocking, in part because of the helplessness of the victims. Can evolutionary psychology shed any light on adult aggression against children?

Although the topic has just begun to be explored, one important causal context has been identified — stepparenting. Abuse from stepparents has been immortalized in children's stories, the most common being that of Cinderella, who was abused by her wicked stepmother.

The stepparental case represents an unusual window into conflicts of interest from an evolutionary perspective. From a stepparent's point of view, a stepchild represents a conflict of interest — a genetically unrelated child absorbing the time, energy, and resources of a mate. Even from the point of view of a natural parent married to someone other than the natural parent, the child represents a conflict of interest,

threatening to interfere with the marital relationship and possibly jeopardizing future reproduction (Daly & Wilson, 1985, 1988). None of this is consciously calculated, but rather is likely to operate through evolved psychological mechanisms.

The increased risk for child abuse in stepparental constellations is well documented. One study of preschool children found that those living with one natural parent and one stepparent were 40 times more likely to be physically abused than those living with two natural parents (Daly & Wilson, 1985). Obvious confounds and alternative explanations, such as low socioeconomic status and large family size, cannot account for this statistical association. The high risk to stepchildren is not limited to the United States, but has been documented across a variety of cultures (Daly & Wilson, 1996).

## CONCLUSIONS

From the perspective of evolutionary psychology, aggression is not a singular or unitary phenomenon. Rather, it represents a collection of strategies that are manifest under highly specific contextual conditions. The mechanisms underlying aggression have emerged, on this account, as solutions, albeit a repugnant ones, to a host of distinct adaptive problems, such as resource procurement, intrasexual competition, hierarchy negotiation, and mate retention.

From this perspective, variability in aggression — between the sexes, across individuals, over the lifespan, and across cultures — is predicted theoretically. This contrasts markedly from earlier instinct theories, in which aggression was presumed to be manifest invariantly, "pushed out" in all people one way or another. It also contrasts with domain-general learning accounts in that it suggests specific dedicated psychological mechanisms that have evolved over thousand of generations in response to particular social adaptive problems. Simultaneously, however, it illustrates the point that documented variability does not imply that biology is irrelevant. An evolutionary psychological perspective is truly interactionist — it specifies a set of causal conditions in which particular features of the perpetrator, victim, social context, and adaptive problem are likely to evoke aggression as a strategic solution.

An evolutionary psychological perspective on human aggression contains many limitations. This perspective currently cannot account, for example, for why three men confronted with a wife's infidelity will result in a beating in one case, a homicide in the second case, and getting drunk in the third case. It currently cannot account for why some cultures, such as the Yanomamo, seem to require male violence to attain a position of status, whereas in other cultures aggression leads to irreparable reputational damage. The current evolutionary psychological account of aggression is limited in these and many other respects.

Even at this preliminary stage of inquiry, however, an evolutionary psychological account of aggression provides a heuristic suggesting particular lines of investigation not examined by other approaches. It can account parsimoniously for a host of otherwise inexplicable findings, such as the universally greater prevalence of aggression by men against other men, the ubiquity of male sexual jealousy as a cause of spousal violence, and the identification of stepparenting as a causal context putting children at risk of aggression. As such, this account brings us one step closer to a complex interactionist theory of human aggression.

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