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Sex Differences in Same-Sex Aggression

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Definition

With few exceptions, males tend to exhibit higher levels of aggressive behaviors than females. This sex difference reflects differences in evolutionarily adaptive reproductive strategies based on mating versus parenting trade-offs, with males competing to maximize sexual access to females.

Introduction

Aggression and its intricacies are widely studied in the social sciences, and its potentially criminal nature propels it to the forefront of social policy development in modern society. Aggression is far from simplistic however, covering many different definitions, multiple subtypes, being criminal or noncriminal and is assessed by multiple measures. Indeed, Campbell (2005, p.68) goes as far as to say that aggression has historically been "taken to be innate and learned, universal and culturally prescribed, a pervasive trait and a contextualized response, functional and dysfunctional, behavioral and cognitive and a phenomenon not to be measured and modelled or experienced and described." Internationally and historically, academics across disciplines have explored aggression from many perspectives, covering almost every aspect from its etiology to classifications of subtypes. Within all of this, perhaps the one most consistent element of this complicated behavior is the manifestation of universally stable sex differences. It is to this central theme that this chapter will be dedicated.

Evolution and Aggression

Few disciplines parsimoniously detail all of the intricacies of this phenomena as well as the evolutionary sciences. Evolutionary psychology offers a theoretical framework from which testable hypotheses regarding a behavior can be generated. Thus, evolutionary psychology readily predicts sex differences across many domains of human behavior, aggression being one of them. It also provides a more parsimonious explanation as to the origins of the behavior than traditional social role-based theories. Note from the onset however that an evolutionarily driven theory does not imply determinism, and evolved, genetic mechanisms do not imply that certain cognitions or behaviors will be expressed. As shall be noted later, the environment plays a crucial role, providing important input to evolved mechanisms and consequently influencing their later output(s).

So why should sex differences in aggressive behavior be expected? Answering that requires an

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understanding of the purpose of aggression and the problem(s) that it emerged to solve. As our ancestors became the most dominant species on the planet and began to master many of the complexities of the earth's ecology, one of the most pressing threats to individual survival became each other. Conspecific competition became an issue that all men and women would have to cope with in order to maintain reproductive fitness. Competition is necessary to secure the resources required to survive. These resources can be material (food, shelter) but are not limited to this domain and include status and mate access. However, competition often entails the use of aggression and violence. It is an adaptive strategy that can be employed when necessary. Aggression can achieve many things: the acquisition of food, water, or territory, securing reproductive access to the opposite sex, defending against attackers, and eliminating threats to survival and reproduction. But this is not without limitations. Costs of aggression can be high, potentially catastrophic, including: the loss of resources, social ostracism, injury, or even death (eliminating the ability to reproduce permanently). Thus aggression is not necessarily the first response to a problem, and individuals carefully consider the costs and benefits of its use. While in some cases it may appear to be so, this decision-making process is not necessarily conscious, and our sophisticated evolved neural architecture can manage this without explicit, conscious processes.

As competition is a fundamental part of life, necessary for both males and females, it is helpful to understand where the sexes are in fact similar where aggression is concerned. There are strong correlations between male and female aggression (including violent and/or criminal – Campbell et al. 2001). Male and female aggression levels are moderated by many shared environmental factors including: impoverishment, sex ratios, and population densities, to name but a few of the most common factors. Many underlying psychological mechanisms associated with aggression (traits such as anger, hostility, self-esteem) do not demonstrate the sex differences many would expect where aggression is concerned. Moreover, increasing levels of provocation decrease the magnitude of the sex difference in aggression (Archer 2004). The conclusion is thus obvious: male and female aggression is inextricably linked. The question therefore becomes, why should levels of aggression differ between men and women?

The Evolution of Sex Differences

Before examining why men and women should differ in terms of aggression, one must understand the differences in selection pressures they each face. The prevailing view in the evolutionary sciences for the basis of sex differences (not just in aggression) is one of differences in fitness variances. Two principles within the evolutionary discipline form the core explanation of many sex differences (across all species): sexual selection (Archer 2009) and parental investment theory (Trivers 1972). It should be noted that these two theories predominantly detail the benefits of male aggression. The costs and benefits of female aggression will be explored in section "Explaining the Sex Difference: Male and Female Competition."

The sex that makes the larger investment (predominantly the female) acts as a limiting factor for the sex with the smaller investment (predominantly the male). Investment in this context means the allocation of bioenergetic resources critical for successful reproduction. Investment levels differ between males and females. For males, reproductive investment can potentially end at conception, meaning a strategy focused on accessing as many mates as possible can potentially grant greater fitness returns. For females, investment is protracted, entailing gestation, lactation, and resource acquisition to sustain any resulting offspring (potentially for many years post-pregnancy). While males can quickly reenter the mating arena and repeat this process with as many other females as they can access, females cannot usually do so for some time after birthing, creating a skewed operational sex ratio with an excess of reproductively active males.

Directing resources to parenting is generally more advantageous for females to ensure

reproductive fitness, despite the resource burden of reproduction reducing their overall reproductive rate. The sex with the lower rate of reproduction thus benefits more from parenting than mating. Male reproductive rates can be much higher given low obligatory costs that females must bear. Despite low reproductive rates, however, a female is rarely unable to mate, thus reducing their reproductive variance. Females (who bear the real costs of reproduction) aim to maximize their investments and usually seek high genetic quality or the offer of high levels of male offspring investment from potential partners. For males, there is no ceiling on reproductive rate. This, however, is contingent on males competing for sexual access to mates, either through female choice or aggressive intrasexual competition. As such, while females are nearly assured to have mating opportunities, the risk of reproductive oblivion for males is much higher. Consequently, reproductive variance is much higher for males than for females. According to Trivers (1972), "The sex whose typical parental investment is greater than that of the opposite sex will become a limiting resource for that sex. Individuals of the sex investing less will compete among themselves to breed with members of the sex investing more" (Trivers 1972, p.140).

Consequently, fitness variances between males and females shape sexual strategies. Males compete for females, and females strive to access high-quality males. Male competition in particular fostered sexual dimorphisms that enhanced their reproductive success. Indeed, it appears that across species (including our own), greater variability exists for sexually selected traits rather than nonsexually selected traits in males and females (Archer and Mehdikhani 2003). To take an example from the animal kingdom, the northern elephant seal's (*Mirounga angustirostris*) physical size is a sexually selected characteristic through which it establishes social dominance. Large males more ably monopolize access to females and defend against (or remove entirely) subordinate male rivals. Mate competition is intense, with over 75% of all seal pups being the resulting offspring of approximately 5% of adult males. Furthermore, merely 10% of males actually survive to reproduce at all. As if the competition was not enough for males, female elephant seals deliberately attempt to mate with the most socially dominant and "protest" against the advances of subordinate males. This further increases male-male conflict and allows females to effectively choose the best mates. Physical size in the elephant seal thus allows males to compete while simultaneously acting as a signal of quality to females, increasing the likelihood that the largest males reproduce and increase their overall fitness. Sexually dimorphic traits have evolved in hominid species also, such as facial hair, voice pitch, and physical size, and likely evolved as a result of inter- and intrasexual selection (Archer 2009). Furthermore, archaeological evidence suggests that aggression can increase male fitness benefits (Grauer and Stuart-Macadam 1998).

From the principles of sexual selection and parental investment theory, testable hypotheses regarding the expression of behaviors or traits can be generated. In the case of aggression, the following predictions can be made:

1. As reproductive variances are higher for males than for females, so to should variances in sexually selected behaviors such as aggression.
2. As males compete for female access, aggression should be more often invoked by males than females.
3. Ecological factors such as density, resource scarcity, and sex ratio should increase levels of aggression.
4. Aggression (and any subsequent sex differences) should be universal across all cultures and time periods.
5. Levels of aggression should increase through development, reach its zenith during the most reproductive phase of the lifespan, and decline with increasing age.
6. In our evolutionary past, males who use aggression successfully should achieve fitness gains.
7. The magnitude of the sex difference should increase as the behavior becomes increasingly violent and dangerous.

The discussion above has touched on data pertaining to hypotheses 1, 3, 4, and 6, and there is relative consensus that aggression is likely a sexually selected trait (Archer 2009). The remainder of the chapter is dedicated to detailing where human men and women differ in terms of aggressive behavior.

How Do the Sexes Differ in Terms of Aggression?

As the mating arena poses different challenges for men and women, it is reasonable to predict that they will express aggression differently. Research confirms this, with males being ubiquitously more aggressive. Gender differences appear in almost all forms of aggression, and this effect appears universally across age, time, culture, and geography. Numerous meta-analyses have confirmed these effects (e.g., Archer 2004). This provides further evidence to support hypotheses 2 and 4: that males should resort to aggression more than females and that this effect should be consistent across cultures. As noted earlier, aggression has multiple forms, subtypes, and categorizations, and it is impossible to cover all of them here. The most obvious place to start, however, is with an analysis of sex differences in direct aggression.

Sex Differences in Direct Aggression

Direct aggression represents the propensity to intentionally inflict either physical and/or psychological harm or injury or reputational damage upon another person and can be physical, verbal, violent, nonviolent, criminal, or noncriminal. In all cases, the target can identify the aggressor and is able to retaliate immediately. As such, direct aggression is a strategy of high risk, and the costs of such an action can be high. It is also the type of aggression in which the differences between men and women are most pronounced, supporting prediction 7 which suggests that the sex difference should increase in line with increasingly violent or dangerous aggressive behaviors.

Across almost all measures of direct aggression, men universally express higher levels of it (Archer 2004, 2009) and show greater variation within it (Archer and Mehdikhani 2003). While men and women are more likely to aggress against members of the same sex, men are most likely to be the victims of aggression, not just from other men but also from women (Archer 2004). Physically aggressive activity (such as hitting, kicking, etc.) show male-biased effect sizes between $d = 0.91$ and $d = 0.59$, with smaller effect sizes for nonphysical aggression such as abuse and threats, $d = 0.46$ and $d = 0.28$ (Archer 2004). Men are more likely to aggress toward known, rather than unknown, targets, but lowering aggression in line with greater levels of intimacy, while females report more aggression toward unknown than known targets. Females are more likely however to aggress toward an opposite sex intimate partner than males (to be discussed later).

Homicide is overwhelmingly male biased, with 97% of killings involving men and 99% of same sex homicides being male-male (Daly and Wilson 1988). The likelihood of hospitalization through violence induced harm is significantly higher for men than women (Shepherd 1990). Approximately three quarters of violent offences committed by women, however, are classed as simple assaults (Greenfeld and Snell 1999). Men are much more likely to carry and aggress with weapons (Archer 2004), while women fight mainly with their fists and/or feet (Ness 2004). Pathologies characterized by high levels of aggression, violence, and criminality tend to be heavily male biased (American Psychiatric Association 2000). Consistent with the theory of sexual selection and parental investment, introducing the motivation to mate appears to increase direct aggression in men but not women, with this increase directed predominantly at the most viable same-sex targets such as single, unmarried men (Ainsworth and Maner 2014). Sex differences appear very early in childhood, often observable from 12 months of age (Baillargeon et al. 2007), and while the actual magnitude of these differences remain relatively stable until the early teens, male aggression then begins to peak (Archer 2004). Throughout adulthood, this difference remains but declines in magnitude with age. These data provide support for prediction 5 with

aggression being at its highest levels during our core reproductive years.

Sex Differences in Indirect Aggression

Indirect aggression is conceptually ambiguous, often used synonymously with terms such as relational and social aggression. Here, indirect aggression is used to cover all of these subsets, following Archer and Coyne (2005) who claimed these terms are best integrated due to their conceptual overlap. Indirect aggression is more veiled than direct aggression and is used as an alternative way to harm the target, for instance, via manipulating other people to conceal one's own identity. It includes actions such as gossiping, rumor spreading, ostracism, and defamation and acts where the perpetrator often remains anonymous to victims. Indirect aggression is a low-cost attack on a target. It is also a type of aggression relatively unique to our own species, with analogous behavior in animals being almost nonexistent (Archer and Coyne 2005).

Meta-analytic studies to date suggest that in this domain, sex differences do not exist, with either trivial effect sizes in the female direction or parity between the sexes (see Archer 2004). However, variation between these studies is considerable (potentially due to measurement issues), and, while the precise nature of the sex difference within indirect aggression remains inconclusive, there are specific sex differences noteworthy of discussion. This provides us some support for prediction 7, as in the case of indirect aggression, sex differences are difficult to detect due to the inherently nonviolent nature of the behavior.

Research shows that girls preferentially used indirect aggression compared to boys (52% versus 20%, respectively, in 15-year-olds) when comparing engagement rates. Women also show stronger preferences for this strategy (even after controlling for perceptions of social norms and approval). Girls rate these forms of aggression as more harmful than boys (Coyne et al. 2006). In the media, indirect aggression is likely to be enacted by an attractive female aggressor, the characters often portrayed as justified for and rewarded by its use. Girls who exhibit higher levels of indirect aggression watch such programs more than less-aggressive peers, and viewing this form of aggression appears to increase its use by girls in real-world settings (Archer and Coyne 2005). Gossip patterns also vary between males and females. While both sexes attend more to same-sex gossip, this effect is stronger in women, who engage in more of it and also remember more details regarding other women who were subject to it, particularly if the victim is physically attractive. The use of exclusion tactics is more prevalent in girls than boys, appearing in some form from as young as age three and persisting into adolescence and adulthood (Benenson 2013). While aggregations on a meta-analytic level do not display consistent sex differences, particular subtypes, when examined individually, demonstrate differences favoring women.

Sex Differences in Other Aggression Related Areas

Unsurprisingly, there are sex differences in a number of psychological areas pertinent to aggression. Men and women mentally represent their beliefs about aggressive behavior differently. Beliefs and justifications, or social representations, separate into two distinct dimensions: instrumental (believing aggression is a means to an end) and expressive (believing aggression results from loss of control). Men are more likely to view aggression instrumentally while women are more expressive (Tapper and Boulton 2004). Differences in social representations of aggression emerge in childhood from an early age (Tapper and Boulton 2004). Instrumental beliefs tend to show a positive correlation with verbal and physical aggression. Expressive beliefs however show more inconsistent patterns of results with actual levels of aggression (Tapper and Boulton 2004). Representations also demonstrate relationships with forms of noninjurious outbursts of angry behavior.

Males and females also differ on unconscious levels when it comes to aggression. Noted earlier was the male propensity to aggress with weaponry (Archer 2004). Related to this, men are also more sensitive to the presence of weapons (Sulikowski and Burke 2014). From early childhood, men even report higher frequencies of aggression and

violence in dreams than women, and within dream manifestations of these aggressors are far more likely to be male (Schredl 2009). Finally men and women are more likely to form false memories regarding aggression in a way consistent with sex differences in actual aggression. Laney and Takarangi (2013) demonstrated using false feedback procedures that men were more likely to form false memories about causing a black eye while women were more likely to form false memories about spreading malicious gossip. These reflect the differences observed in direct and indirect aggression. While these more unconscious elements of aggression receive less empirical attention in the literature, it is the nonetheless interesting that they exist and that the evolved minds of men and women process information on the periphery of aggressive behavior differently, but not irreconcilably so from the actual expression of aggression itself.

Explaining the Sex Difference: Male and Female Competition

So why should men be so much more likely to attack, wound, and kill each other compared to women? Why should women prefer a more circuitous form of aggression? These two important questions require answering in order to truly understand why the sexes differ. Referring back to the earlier discussion on differences in reproductive variances, the answer becomes apparent. For men, the reproductive stakes are high and the drive to compete is more imperative. Men compete for mating opportunities with women, and aggression allows men to establish dominance hierarchies, suppress challengers, and remove threats to reproductive success. For men struggling to access mates, the impetus to aggress increases, as failure to mate means lineage extinction. Although potential costs are high, men will risk injury, and potentially death, in order to achieve fitness gains. As the alternative is to not reproduce, however, the potential reward of reproductive success becomes all the more salient. Combine this impetus with ecological disadvantages, such as an operational sex ratio with more men than women (making access harder), lack of status or resources to attract women (making them less desirable than the competition) or high concentrations of young men (who particularly lack the status and resources of older, more experienced conspecifics) and the overall likelihood of male-male competition increase further. Reproductively active men become more accepting of the risks involved in aggression, and this increases the frequency and magnitude of male aggression. This phenomena was termed by Wilson and Daly (1985) as the "young male syndrome." Note that this competition for female access is not necessarily conscious and indeed is not usually directly about aggressing over women. Men fight over status and their overall position in the dominance hierarchy. The hierarchy symbolizes their worth to women and thus their desirability as a mating prospect (recall the example of the elephant seal). Thus it is status that, in the environment of evolutionary adaptiveness, would have translated into reproductive success and it this that they are willing to use aggression to achieve and maintain.

Status acquisition in males begins early in development. Hierarchical structures appear in groups of boys as early as age six. The position a boy occupies is even predictive of their dominance 9 years later. Rough and tumble play is more important to and engaged in more by boys, allowing them to establish who is tougher. Boys more than girls are also better at identifying who among a group is the strongest (Archer 2009). This early development of competitive behavior suggests boys are effectively preparing themselves for status competitions that will emerge in young adulthood. While high-status men will not necessarily be more aggressive, the pursuit of status from those who seek it may necessitate aggressive strategies to retain it. Group living has fostered norms that punish aggression in most cases, and status can be awarded in a variety of other ways such as demonstrating wealth or excelling in competitive sports. However, men can use aggression in certain circumstances to gain status if they can maintain an image of strength and of credible threat to challengers. Men are particularly sensitive to attacks on status and position (Daly and Wilson 1988), and the

need to defend it results in violent escalations and retaliations to "save face." This is one reason why many male-male altercations begin with startlingly banal causes (jests, jostling, insults, etc.) and can ultimately lead to homicide. Despite the risks entailed in escalation, the potential loss of status is too great a cost, and aggression often ensues to prevent it.

Many authors (see Campbell 2013) note that this explanation of sex differences in aggression focuses almost exclusively on why men should aggress and not on why women should. According to Triver's principles, females aggress less simply because their likelihood of not reproducing is comparatively lower. But women are also locked in their own competitive struggles which may manifest in aggression, if not necessarily as often or as directly as men (Benenson 2013; Campbell 2013). It is important to explain when and why women will resort to physical force if necessary. As with men, status loss and the avoidance of victimization are prime motivations. Women who successfully fight can force other women to withdraw and establish a reputation to disincentivise challengers (Campbell 2013; Ness 2004). As with men, these reputations often require defending. Retaliation over insults, particularly those deriding either their sexual reputation or attractiveness, are also key determinants of aggressive escalation in women (Campbell 2013; Ness 2004). A second motivation in women stems from jealousy and the need to protect an existing relationship, or the status that such a relationship may bring (Campbell 2013; Ness 2004). These escalations likely increase in situations where there is variation in men's resources or a general paucity of males exists, making competition for well-resourced mates (even in the short term) worth fighting for. While these are pertinent explanations of why women physically aggress, they do not explain why women's aggression is lower in magnitude when compared to men. As noted earlier however, there are distinct sex differences in indirect aggression that clearly favor women, and in understanding these, an explanation as to why women are less likely to resort to physical aggression becomes clear.

The so-called young male syndrome claims that men take risks to achieve status that translates into fitness gains. But, women rarely fail to find a partner: their fitness is thus not at stake in the same way. However, the tactics employed by males affect females in other ways. Male investment in offspring is low as men often aim to invest more time in mating effort rather than parenting (Trivers 1972). Consequently, males do little to no child rearing, largely due to the fact that a male can never be 100% sure that an infant is his; cuckoldry is after all a potential risk. To reinforce this point, note that the loss of a father (and thus his provisioning power) has little impact on offspring fitness (Sear and Mace 2008). Thus, the survival of children depends almost exclusively on continued investment from mothers. Research shows that this is the case across human societies (Sear and Mace 2008). The optimal use of a women's resources is therefore to ensure continued investment in her children. If the mother was harmed in such a way that she could not adequately provision her family, her children's survival (her inclusive fitness) would be endangered. Were she to die, the consequences would have been likely fatal to the offspring, and lineage extinction would be increasing likely (Campbell 2013). Thus, women benefit from staying alive, because this, ultimately, will keep her children alive as well. Given the importance of survival of the mother to survival of the offspring, selection pressures should favor less costly means of competition in women.

Women however still need to compete (not just indirectly) despite potential costs. They still require resources to survive and provision. They still aim to access higher-quality males for reproductive purposes (and aim maintain access for as much investment as possible). Their propensity to aggress also increases as males aggress, driven by the same environmental factors that heighten competition and make survival harder. The necessity for women to use aggression does not disappear in the face of rising costs. Female aggression, however, still entails higher costs than the equivalent action in males, and this should translate into a less confrontational style of competition. If an opponent cannot retaliate, a woman may be able

to increase the survival odds in favor of her own progeny. Indirect aggression provides a means of achieving this end.

This explains why most indirect aggression (1) shows a female bias, (2) from females, is predominantly aimed at other females, (3) is used primarily during adolescence and young adulthood (the peak reproductive window for females and when competition for mates is most salient, Vaillancourt 2013), and (4) increases in females when mating motivation is experimentally primed. These elements of indirect aggression parallel the major trends demonstrated earlier in same-sex male direct aggression. There is therefore a growing consensus that indirect aggression is an intrasexual competition strategy among women (Benenson 2013; Campbell 2013).

From an early age, women, like men, form dominance hierarchies between themselves. Dominance hierarchies in females confer fitness benefits such as higher offspring survival rates (Campbell 2013). A woman's status can be based on a number of factors such as her mate value, her alliances with other females, and the status of her mate(s) and/or kin (Benenson 2013). Other women act as a barrier to achieving reproductive goals, and so female-female competition tends to be disguised, aims to punish other females who strive for similar goals, and potentially leads to the elimination of unrelated females via exclusion tactics (Benenson 2013). High-status women also have a competitive edge and can compete more overtly, either through their mate value or alliances, as the threat of retaliation from lower status targets is less likely (Benenson 2013). Women do not necessarily need to cause direct physical harm to other females in order to inhibit their reproductive success. Character defamation and rumor spreading, particularly regarding a woman's sexual reputation, are seen as successful aggressive tactics designed to reduce the status of females in the community, as female mate value is often contingent on sexual fidelity (Vaillancourt 2013). Similarly, attacking another woman's appearance can reduce the target's attractiveness as a mate to men and as an ally to other women. This explains why name calling (such as "slag" and "slut" or "ugly" and "fat") is perceived as more damaging to women and why this may result in escalation to physical retaliation (Campbell 2013; Ness 2004) as they are challenges to a woman's mate value. These escalations are still much lower in magnitude (and in their consequences) than typical male-male aggression as, in the vast majority of circumstances, fitness costs remain much higher than reproductive benefits. Avoiding direct conflict (and thus harm) for the sake of offspring survival is still a safer strategy for women (Campbell 2013).

Risk and Fear

Two key elements have been identified in this analysis of sex differences – the salience of risk in pursuit of reproductive reward to males and the avoidance of high costs in safeguarding reproductive fitness for females. Sexual selection theories focusing on male risk-taking as a driver of aggression (Wilson and Daly 1985) are complementary to theories regarding female avoidance of direct aggression (Campbell 2013). As the propensity of the sexes to accept risks differs, with women being more avoidant than men, risk-taking could be a proximal mechanism that mediates the sex difference in aggression.

It is thus not surprising that sex differences in risk-taking are evident and in directions that parallel sex differences in aggression. Men have significantly higher scores on measures of risk-taking and sensation seeking than women across almost all measurement types (Byrnes et al. 1999; Cross et al. 2011). The magnitude of this sex difference increases with the potential costs (Byrnes et al. 1999). In tasks involving rating situations on the level of risk entailed, women's estimates are significantly higher than men's (Eagly and Steffen 1986). Furthermore men and women classified as greater risk-takers and sensation seekers exhibit aggressive behaviors more frequently (Wilson and Scarpa 2010). Measures of risky impulsivity completely mediate the sex differences in physical and verbal aggression. The parallels between aggression and risk-taking are suggestive of a potential link.

If sensitivity to risk drives human aggression, what motivational factors, for women in particular, curtails this trait? Campbell (1999, 2013) suggested that the underlying driver of sex differences in risk and aggression can be reduced to an evolved sex difference in fear-based inhibition. Risk-taking (and synonymous measures such as sensations seeking) can broadly be classified as the reverse of fear. Strong emotional responses to fearful stimuli are likely to inhibit the urge to take risks. If this is so, sex differences should be evident in this domain, with women experiencing it more strongly than men. Campbell's review of the evidence suggests that this appears to be the case, with levels of fear being significantly higher for women being observed cross-culturally while reporting to experience it more intensely. Girls also express fear developmentally earlier than boys. Psychometric analyses of measures containing items with fear and anxiety connotations show gender differences in the female direction, while indices of sensation seeking lacking elements of danger show no sex differences. This fear-based mechanism may be specific to real physical danger, as there are few sex differences in measures that examine social fears only. Research also indicates that fear appears to more strongly suppress aggression in women than in men, while harm avoidance is a significant mediator in the relationship between gender and expressive representations of aggression. A wealth of neuropsychological evidence supports the proposition that differences in sensitivity to fear is perhaps the underlying mediator of gender differences in aggression. Neuroimaging studies show that subcortical structures such as the amygdala (located in the temporal lobe) and the orbitofrontal cortex may be pivotal in managing responses to fearful stimuli. Wider and longer activation patterns of the limbic system (which includes the amygdala) are evident in women who are presented with threatening stimuli. Similarly, sex differences are evident in response to angry, threatening faces. Orbitofrontal activation is also greater for women than for men in response to facial stimuli that express negative emotion. Similar relationships between the orbitofrontal cortex and the amygdala have been reported previously in aggressive individuals, which may suggest that women show higher levels of restraint and more effectively regulate negative emotions.

These sex differences in fear may explain one of the intricacies of aggressive behavior, the somewhat unexpected sex differences found in intimate partner violence or IPV (Cross and Campbell 2011). While most homicides resulting from IPV are committed by males (Daly and Wilson 1988), this is largely a function of the fact that men are much stronger and kill more generally. Jealousy accounts for a much larger proportion of female-perpetrated homicides than male-perpetrated homicides, suggesting that, as males are physically larger and stronger, the higher number of male perpetrated partner deaths may just be a factor of their greater physical ability to kill rather than jealously led motivation. Thirty-five percent of IPV-related injuries are sustained by men, while a meta-analysis of IPV measures (based upon different acts) found a small but significant effect in the female direction, suggesting that females are more likely to aggress toward partners than vice versa. Female aggression toward partners is also not only limited to minor acts. Cross-culturally, even allowing for national levels of female empowerment, men are more likely to be victims of IPV (Archer 2006). However, women do not just aggress toward men generally, it appears only disinhibited toward men they are intimate with. This suggests that there is something specific to intimate partner dyads that may invoke a muted fear response.

So why are women more likely to attack intimate partners than other men (or women) generally? Campbell (2010) suggests this could be due to fear reduction in women who are emotionally invested in their partners. In this model, the nonapeptide hormone oxytocin (which is secreted during and has a functional role in several bonding, nurturing, and sexual behaviors) serves to reduce the level of fear and stress in females. Forming a sexual relationship requires a female to decrease inhibitions. As selection pressures on female mate choice make choosing the wrong partner a costly business, it is advantageous for females to be more generally inhibited sexually to

allow time to choose appropriate partners carefully and to reduce the risk of injury from sexually aggressive partners. The release of oxytocin thus serves as an anxiolytic to the fear that normally inhibits sexual behavior and allows copulation to occur. The effect of oxytocin is likely to be one of general disinhibition to facilitate mating but potentially disinhibiting aggression as a by-product. Campbell cites evidence suggesting that oxytocin release increases during interactions with a partner simply increase the odds that a female may be more likely to aggress toward them as opposed to strangers and explains this reversal of the sex difference in IPV. This functional account of oxytocin moderated changes to fear-based inhibition allows us to reconcile why women may be more aggressive than men in intimate situations in a way that is still entirely consistent with complementary evolutionary explanations. It should be noted, however, that recent work challenges this hypothesis in finding that the administration of oxytocin can cause fear reductions in men and the opposite effect in women. Further work is required to comprehensively understand the wider implications of oxytocin as well as how it may act differently within the male and female brain (Campbell 2013).

Conclusion

Understanding aggression as an adaptive response provides a functional purpose for both the behavior and the gender differences within it. Contrary to popular belief, aggression is not a pathology and is a strategy that all are capable of under specific conditions to facilitate survival. It is essential that we understand how the sexes differ if we are to have a full understanding of this broad phenomenon, and this review represents only a small fraction of the research conducted in the field to date. While the underlying psychology of the sex differences in aggression is not wholly clear, the recent advances in theory regarding fear-based inhibition (Campbell 2010, 2013) go a long way in reconciling why men and women appear more or less aggressive across different situations. Although these theoretical developments contingent on models of oxytocin and evidence from small scale neuropsychological studies are in their relative infancy, research stimulated by these newer ideas and continued advances in neuroscience will no doubt enhance our understanding of the neuromechanisms responsible for the universal behavioral differences observed between men and women.

Gender is equally pivotal for the purposes of policy and intervention in aggression, violence, and crime. We must understand how and why men and women act and react differently if any degree of success is to be expected from strategies society implements to reduce these potentially dangerous characteristics. Much of this work also needs to focus on what we know to be the shared antecedents of aggression, namely, environmental factors that increase the likelihood of competition: poverty, lack of educational opportunities, population densities, and social and gender inequalities. This is by no means a small task, but greater work is required to examine how these various factors impact strategies that include aggression (Copping and Campbell 2015). Finally, it is worth reiterating that much of the historic literature has focused on predominantly male aggression. While this has been vital to our understanding of behavior, it is encouraging to note that there is an increase in work focusing on female aggression (Benenson 2013; Campbell 1999, 2013; Cross and Campbell 2011). As noted earlier, women are not passive compared to men in their use of aggression and have their own reproductive agenda to which aggression can be used to pursue. Future work should continue to integrate accounts of male and female aggression into their theoretical underpinnings in order to help advance the field constructively.

Cross-References

- Ability and Willingness of Victim to Retaliate
- Aggression
- Aggression for Sexual Access
- Aggression Solves Adaptive Problems
- Aggression to Avoid Total Reproductive Failure

- Aggression to Secure Additional Partners
- Aggression to Thwart Intrasexual Rival
- Aggressive Defense Against Attack
- Anne Campbell
- Antisocial
- Antisocial Behavior
- Anxiety
- Anxiety (Randy Nesse)
- Assault and Murder
- Benefits of Aggression
- Charles Darwin: Theory of Sexual Selection
- Competition Between Groups
- Competition for Females
- Competition for Parental Investment
- Competition for Resources
- Competition for Resources Desired By Females
- Competition for Sexual Access
- Contexts for Men's Aggression Against Men
- Contexts for Men's Aggression Against Women
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AU5

- ▶ Vocal Indicators of Dominance
- ▶ Weaponry

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