Chapter 11
Violence and Aggression in Women

Catharine P. Cross and Anne C. Campbell

That women, as a sex, are less aggressive than men is relatively uncontroversial. Until evolutionary theory was incorporated into psychologists' thinking, the widely accepted reason for this was evident and wrong: While we reward little boys for conforming to male adult stereotypes incorporating aggression, agency, and dominance, we reward little girls for conforming to female adult stereotypes of care, empathy, and compromise. This answer, however, simply pushes the explanatory problem back one step to asking why such stereotypes exist. Sex differences in aggression cross cultural boundaries and transcend historical periods. Moreover, as evolutionary biologists have noted, they are not confined to humans.

This led evolutionary psychologists to argue that the correlation between gender stereotypes and gendered behaviour results from a causal connection precisely opposite to that proposed by the Standard Social Science Model: Stereotypes reflect our accurate appraisal of behavioural sex differences that we see around us. Evolutionary psychologists argue that these are a consequence of our mammalian heritage, characterised by asymmetry in parental investment.

In the first part of this chapter, we will examine this evolutionary argument and suggest that female competition has been underestimated and under-theorised. In the second section, we will explore some of the proximate psychological mechanisms that might underlie sex differences in aggression. In the third section, we will introduce the "special case" of intimate partner aggression and argue that cultural effects might shape sex differences in aggression to a greater extent than previously acknowledged by evolutionary psychology.

C. P. Cross (✉)
School of Psychology & Neuroscience, University of St Andrews, KY16 9JP, St Andrews, UK
e-mail: cpc2@st-andrews.ac.uk

A. C. Campbell
Department of Psychology, Durham University Science Site, DH1 3LE, Durham, UK
e-mail: a.c.campbell@durham.ac.uk

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From Investment Asymmetry to Sex Differences in Aggression

In about 90 % of mammals, males limit their reproductive input to the supply of easily replaceable sperm and make no contribution to the care of infants (Clutton-Brock 1991). Eggs are costly, carrying the necessary nutrients to sustain a zygote (should one be formed) until it can sequester resources through the placenta directly from the mother's bloodstream. The majority of parental investment, beginning with anisogamy and continuing through gestation, lactation, and infant care, was firmly imposed on females in most mammalian species. This simple fact is argued to have had immense ramifications for the evolutionary bifurcation of male and female behaviour (Trivers 1972).

This is because the strategies for maximising reproductive success differ between the sexes depending on who invests more. For males, inseminating multiple females became the holy grail of reproductive success. The more females a male could inseminate, the more offspring he could leave behind (Bateman 1948, but see Brown et al. 2009; Gowaty et al. 2012). Of course, this was also the optimal strategy for his similarly parentally unencumbered rivals, raising the levels of intra-male competition. Male reproductive winners won big: In our own species, Moulay Ismail the Bloodthirsty (1672–1727) of Morocco is alleged to have fathered 888 children. Losers left no descendants and it is this fact which is most critical to evolutionary accounts of sex differences in aggression. The greater male variance in human reproductive success continues today even under ostensible monogamy (Jokela et al. 2010). This disparity between reproductive winners and losers made the stakes high and consequently increased male willingness to take risks for mating success (Wang 2002).

Females were freed from the need to compete with one another for male insemination. This was the upside to their heavy burden of parental investment: Males were only too happy to monopolise female investment at the cost of a modest sperm deposit. Females, it was argued, did not benefit from "superfluous" copulations. Once inseminated, why would a female risk the chance of disease, predation, physical injury, and possible coercive aggression from males that are associated with further copulations (Arnqvist and Rowe 2005)?

The simplicity of this argument has recently been questioned in relation to human behaviour. Although reproductive variance is higher in men, the sex difference is more marked in polygynous and serially monogamous societies than under strict monogamy (Brown et al. 2009). Mathematical models suggest that traditional sex roles (the extent to which females prioritise parenting and males prioritise mating) can vary as a function of numerous factors such as operational and adult sex ratio, mortality rates, variance in mate quality, and population density (Kokko and Jennions 2008). Finally, benefits to females of mating with multiple males have been documented in humans (Mesoudi and Laland 2007) and other species (Jennions and Petrie 2000).

These three points all demonstrate the need for recent work in evolutionary biology to be integrated into the work of evolutionary psychologists (see also Laland and Brown 2011). Our focus, however, is on rectifying what we see as an androcentric bias in previous evolutionary thinking on aggression. For many theorists, it was assumed that because females did not fight for copulations there was nothing of consequence for them to fight about. High levels of male aggression were treated as the focus of interest and low levels of women's aggression were dismissed as a default option—only the former was thought to warrant explanation. However, there is more to life than copulation—mating is only one component of reproductive success.

Although at an individual level the most successful male will always out-reproduce the most successful female, every offspring has one father and one mother, so ultimately the two sexes are equal in their output (the "Fisher condition"; see Kokko and Jennions 2008, for a consideration of how this affects models of sex role evolution). Although women are more tightly bunched together in terms of offspring *number*, differences in offspring *quality* have the potential to produce large variance in numbers of grandchildren which are not captured by most existing empirical studies of reproductive success. We have already seen that males in poor condition might well fail to produce any offspring; similarly producing poor-quality children carries a very real cost in terms of potential grandchildren. As Sarah Hrdy put it: "behind every wildly reproductively successful male there must also be, one generation back, a mother" (Hrdy 1987: 109). There should, therefore, be strong selection for any factor that bestows even a small advantage in bearing, raising, and protecting offspring who themselves are reproductively successful.

Mothers need food resources to raise their offspring. Pregnancy raises a women's metabolic rate by 15–26 % (Butte et al. 2004). Lactating mothers need approximately 670 extra calories and 20 g of additional protein per day (Dewey 1997). Like most primates, humans are a group-living species, which means that food can be a contested resource and females must compete to feed themselves and their offspring. At the same time, they must supervise and protect their offspring from ecological dangers, potentially infanticidal males, and harassment by other females. These tasks can be achieved more easily by a dominant female because her status elicits deference and compliance from lower-ranking females. Dominant female primates typically have higher infant survival rates and more rapid production of offspring (Pusey et al. 1997), which is, at least in part, a function of better access to food resources (Stockley and Bro-Jørgenson 2011).

This suggests that dominance should be worth fighting for among females as well as males. Yet female dominance hierarchies are primarily restricted to female-bonded species in which females are philopatric, remaining in their natal group while males disperse (Sterck et al. 1997). In these species, dominance hierarchies are organised around matrilines. Dominance follows three clear rules. First, females inherit their mother's rank relative to other members of the group. Second, mothers dominate daughters for life: Daughters can rise to their mother's position in the matriline only upon her death. Third, as adults, younger sisters dominate older sisters which removes incentives for younger daughters to form alliances with their older sisters. The point is that females, unlike males, rarely risk their lives to achieve dominance. They simply accept it when lineage and fate confer it on them.

A female's reluctance to engage in direct attack is particularly puzzling because a successful challenge would not only immediately increase her food intake, freedom from harassment, and reproductive success, but all of these advantages would be passed down to her daughters as well. Matrilines remain remarkably stable over time. Walters (1980)found that a juvenile female's rank at the time of her birth correctly predicted her adult rank in 97% of cases. In a 400-day study of yellow baboons, Hausfater (1975)did not find a single instance of an agonistically induced change of status among females. In non-female-bonded species, in which female group members emigrate from their natal group, dominance hierarchies are "weak or undiscernible, unstable, and non-linear" (Isbell and Young 2002, p. 188; Van Hoof and van Schaik 1992)and agonistic interactions are rare. Dominance behaviour is "uncommon and is never observed among some dyads" (Pusey et al. 1997). So, while dominance offers manifest rewards, fighting for dominance has not been strongly selected for in females. This suggests that it was offset by higher costs (see also Sharp and Clutton-Brock 2011).

We outline here two ways in which competition carries higher costs for females than for males. First, success in aggressive competition appears to be a double-edged sword for female primates: Dominant females are better nourished and reproduce faster, but they also have a higher risk of miscarriage. Some of the most successful female competitors show suppressed fertility and have few, or no, successful pregnancies (Packer et al. 1995). This suggests that dominance competition is a risky 'hit and miss' strategy for females as it is for males, with some individuals winning big rewards and some suffering reproductive death. This suppression of fertility represents a direct trade-off between parenting and competition which constrains competition to a greater degree in females than in males (Stockley and Bro-Jørgenson 2011).

Second, we turn to the most obvious cost of aggression—the possibility of injury or death. At an experiential level, this is doubtless welcomed no more by males than by females. However, recall that costs are calculated in terms of the number of surviving descendants who themselves go on to reproduce. Here the costs differ by sex. Even scholars exploring the idea of humans as "cooperative breeders"—with children benefiting from the help of kin—acknowledge that "the consequences of losing a mother very early in life are catastrophic" (Sear and Mace 2008, p. 5). If she dies while her offspring are young, they will likely die too. In the end, a woman's massive investment in her offspring will shorten her life (Penn and Smith 2007) but, until that day comes, the critical dependence of the young on her for their survival means she must stay away from danger and the possibility of injury or death. For a male, death removes the possibility of future matings but is less likely to compromise the reproductive success he has achieved to date because he can rely on the mother to ensure the survival of his offspring.

Sear and Mace (2008) examined the impact of parental survival on offspring survival in populations ranging from eighteenth-century China to twentieth-century Nepal; from Burkina Faso to New York State. In every case, a mother's survival reduced the likelihood of her children dying. The percentage of children surviving a mother's death ranged from 2 to 50%. The beneficial effects are stronger before children are weaned: In rural Gambia, a mother's death multiplies the odds of her child's death by 6.2 in infancy, 5.2 in toddlerhood, and 1.4 in childhood (Sear et al. 2002). Pavard et al. (2005) examined data from seventeenth-century Quebec, controlling for a range of variables including the possibility of transmitted infection and shared genetic vulnerability. If a mother died while her infant was still a neonate, the odds of the child dying in the neonatal period were multiplied by 5.52, dropping to 1.27 when the child was aged 5–15 years.

But what about fathers? In 68% of cases, across 22 populations, the death of a father had no effect on the survival of his children (Sear and Mace 2008). Because there is always variation within populations, this finding suggests that some fathers have a positive effect on infant survival, while some are *detrimental* to a child's chances of living to adulthood. This stands in stark contrast to the consistent and marked effect of mothers on child survival: Mothers, all things considered, are more important to their offspring, and there is therefore an increased selection pressure on females to safeguard their own lives to raise their offspring (Campbell 1999). Sex differences in aggression could be thought of not just as the result of selection pressures on males to compete for dominance, but pressures selecting for the avoidance of dangerous competition in women.

To summarise this section: Our understanding of sex differences in aggression can never be complete if we only ask the question: "Why are males so aggressive?" For a complete picture of sex differences in aggression we must also ask, "Why do females refrain from aggression?" As we shall see later, however, we also need to consider circumstances in which the sex difference in aggression diminishes or reverses.

The Proximal Mechanisms of Sex Differences in Aggression

We have seen that the fitness rewards and costs of aggression differ for males and females. Evolutionary psychologists are interested in the evolved psychological processes that calibrate them and thus mediate the sex difference in behavioural response to these long-haul sexual selection pressures. It is important to emphasise that when we speak of rewards and costs, in relation to the use of aggression, we do not mean to imply that individuals consciously calculate the pros, cons, and respective probabilities of different courses of action, choosing the one with the highest positive net value. Instead, our actions are guided by the "whisperings within" of emotion (Barash 1981) and unbidden impulses (Berkowitz 2008). We do not dismiss conscious decision-making and higher cortical processes as unimportant, and we acknowledge that explicit cost–benefit perceptions do correlate with aggressive behaviour (Archer and Southall 2009). However, the role of emotion in general decision-making has been increasingly recognised in recent years (Loewenstein et al. 2001) and this is likely to be particularly true of aggression, which is often an unpremeditated and reactive behaviour. In this section, we briefly review research on sex differences in emotion (fear and anger) and personality traits (impulsivity and sensation seeking) with a view to identifying the psychological infrastructure that supports sex differences in aggressive behaviour.

Aggressive behaviour can be thought of as a trade-off between prospective rewards (which motivate approach and attack) and potential costs (which motivate avoidance and withdrawal). The basic emotions of anger and fear align neatly with *approach* and *avoidance* motivation, respectively. Angry people make optimistic estimates of risk and favour risk-seeking choices, while fearful people make pessimistic risk estimates and risk-averse choices (Lerner and Keltner 2000; 2001). A sex difference in the threshold for experiencing one or both of these emotions might underlie the sex difference in aggression. Fear and anger are differentially associated with aggressive responses to provocation in the context of hypothetical aggressive conflicts, suggesting that “anger functions as aggression facilitator whereas fear functions as aggression inhibitor” (Winstok 2007, p. 131).

In situations of threat, anger and fear can and do co-occur. In some situations, the scales are tipped strongly in favour of anger so that fear barely registers as an emotion. In others, despite our fury, fear overpowers us and we retreat. While men and women experience both emotions, we argue that the relative balance between them is tipped more strongly in favour of overt aggression in men. But is this because men experience greater anger or lower fear?

Anger

It used to be thought that positive emotions were associated with approach motivation and negative emotions with avoidance motivation (Davidson 2000; Lang et al. 1992; Watson et al. 1999). By this logic, anger should be associated with avoidance, but this is not the case (Carver and Harmon-Jones 2009). In common with other emotions associated with approach motivation, anger activates left frontal brain activity more strongly than right hemisphere activity (Murphy et al. 2003). Anger correlates positively with psychometric scales measuring approach motivation and negatively with avoidance motivation scales (Harmon-Jones 2003; Smits and Kuppens 2005). In typically developing children, infant approach tendencies predict increased anger at later ages (Rothbart et al. 2000) and toddlers with externalising problems, including aggression, show high levels of behavioural approach in laboratory tasks (Putnam and Stifter 2005). Anger increases muscle tension, heart rate, blood pressure, muscular blood flow, and body temperature; these are the hallmarks of the sympathetic nervous system activity preparing us for exertion and combat.

Therefore, anger represents the accelerator pedal for aggressive behaviour. Is the more frequent and severe aggression of males a result of their propensity to experience greater anger? It seems not. A narrative review by Kring (2000) concluded there was a marked absence of sex differences in anger and this was confirmed by Archer (2004), who reported an effect size of $d=-0.004$ in his meta-analysis of data from 46 samples. In a poll of over 2000 Americans, women reported more episodes of anger during the last 7 days than men, even after controlling for sex differences in emotional expressiveness (Mirowsky and Ross 1995). Simon and Nath's (2004) analysis of data from the US General Social Survey found no difference in the frequency of anger, but women exceeded men in the intensity and duration of the emotion, controlling for sociodemographic factors. The evidence suggests, therefore, that men do not experience greater anger than women.

Fear

Unlike anger, there is much evidence that the sexes differ in the frequency and intensity of fear (Else-Quest et al. 2006). Developmentally, girls express fear earlier than boys (Gartstein and Rothbart 2003) and, in a large longitudinal study of personality development, more girls than boys were on a high fearfulness trajectory (Cote et al 2002). In adulthood, women experience fear more intensely (Brody and Hall 1993; Fischer 1993; Fischer and Manstead 2000; Gullone 2000) and more frequently (Brebner 2003) than men. Women also show more intense verbal and non-verbal expression of fear than men (Madden et al. 2000). Behaviourally, women show greater increases in skin conductance and a more marked startle reflex to physically threatening scenes (McManis et al. 2001). Women who receive a single dose of testosterone show a reduced potentiated startle response to anticipated electric shock (Hermans et al. 2006), implicating testosterone as a mediator of this sex difference.

Women make more risk-averse decisions than men do, especially when the risks are physical or life-threatening and when actual risky behaviour (rather than hypothetical choice) is examined (Hersch 1997). The sex difference in fear "may explain gender differences in risk taking more adequately than the cognitive processes involved in the reflective evaluation of options" (Byrnes et al. 1999, p. 378). Loewenstein et al. (2001)also identified women's higher level of fear as particularly relevant to sex differences in risk taking.

Neuropsychological research supports women's greater sensitivity to fear. Although both sexes recruit frontal, limbic, and neural structures when processing emotion, women show stronger activation in these areas when processing fear (Williams et al. 2005). Furthermore, men show more effective automatic modulation of negative emotion, with stronger parieto-temporal activation and weaker activation of limbic and subcortical areas (Whittle et al. 2011). In response to negative stimuli, women report greater negative emotion and show stronger activation in a number of areas, including anterior cingulate cortex and insula (Hofer et al. 2007). These two areas are jointly activated by fear-inducing stimuli and have been implicated in the experience of emotion. The anterior cingulate mediates consciousness of affective state and the insula is associated with interoception (Craig 2009). Stronger activity in these regions may explain why women experience fear more intensely (Ordaz and Luna 2012).

Consistent sex differences in fear, but not anger, strongly suggest that women's desistance from aggression, which becomes more marked as the degree of danger increases, results from their stronger fear responses. We now turn to sex differences in the personality traits of impulsivity and sensation seeking, which are evaluated here as complementary, rather than competing, explanations for sex differences in aggression.

Impulsivity and Sensation Seeking

Impulsivity has been proposed as a mediator of sex differences in aggression: Perhaps women are simply more successful than men in controlling their behavioural impulses, including aggression (Campbell 2006; Strüber et al. 2008). Given developmental evidence that fear underlies the acquisition of self-control and behavioural inhibition (Rothbart and Bates 2006), women might be expected to show lower impulsivity. Consensus on the definition of impulsivity has proved elusive in psychology, though most academics broadly agree that it refers to a "tendency to act spontaneously and without deliberation" (Carver 2005, p. 313). Sensation seeking has also been proposed as another relevant personality factor, measuring as it does the "taste for risk" that Wilson & Daly (1985) argued underlies male participation in aggressive competition. We conducted a meta-analysis of sex differences from 277 studies of impulsivity and sensation seeking (Cross et al. 2011). In summarising our results here, we note important distinctions between higher- and lower-order theories of impulsivity, and between impulsivity and sensation seeking.

Impulsivity Lower-order theories of impulsivity view impulsive actions not as the result of a cognitive deficit but as manifestations of basic affective and temperamental reactions (e.g., Fowles 1988; Gray and McNaughton 2000). According to this view, impulsivity can arise either from over-attraction to reward ("I want it so much I can't tolerate a delay") or from under-sensitivity to punishment ("There may be a price to be paid for this decision but I don't care about it"). In our analysis, women and men did not differ consistently in their sensitivity to reward ($d = -0.02$, with effect sizes strongly modulated by how sensitivity was measured), but women were consistently more sensitive than men were to punishment ($d = -0.33$). This dovetails with our argument that women have evolved greater sensitivity to negative outcomes than men, manifested in their lower threshold for fear (Campbell 1999; 2006).

Higher-order theories of impulsivity see it as a failure of the cognitive control over behaviour that is typically acquired with age (e.g., Rothbart and Bates 2006). Researches who conceptualise impulsivity in this way often measure it as the inability to withhold a prepotent response or to plan for the future. Here, there are very few differences between men and women ($d = 0.08$). This finding provides further evidence that cognitive processes, while important in developing a complete understanding of aggression, are not a likely candidate for mediating the sex difference.

Sensation seeking In our review of the literature on impulsivity and sensation seeking, we found that one is frequently measured as a proxy for the other. We strongly caution against this. Empirically, the two constructs consistently appear as orthogonal factors in factor analytic studies (Depue and Collins 1999). Sensation seeking is defined as "the seeking of varied, novel, complex, and intense sensations and experiences and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman 1994, p. 27). The central defining feature of impulsivity—namely, acting without deliberation—is absent from the definition of sensation seeking. Questionnaires that measure sensation seeking typically ask about the respondent's preference for risky but exciting activities—such as parachute jumping—over safe but tedious ones. However, the items make no reference to the failure of deliberation which is the hallmark of impulsive action. Parachute jumpers do not jump from planes on impulse; they plan carefully, checking their equipment, drop site, parachute, and timings. When we analysed sensation seeking and risk taking separately from impulsivity, we found a marked sex difference in the male direction ($d=0.41$). This was in stark contrast to the weak, inconsistent differences in measures of impulsivity. Men seek risk to a much greater extent than women, but are not more impulsive in general.

In summary, women are not consistently less impulsive than men, but they are more punishment-sensitive and more risk-averse. While impulsivity and sensation seeking are distinct personality traits, the overlap between them is an area in need of further research (Campbell and Muncer 2009). Actions such as running across a road to beat the traffic, having sex with a stranger, or accepting an offer of drink or drugs can be considered both risky and impulsive. The tendency to engage in these actions—risky impulsivity—is likely to be of most relevance to understanding sex differences in aggressive behaviour.

When, Why, and How do Women Use Aggression?

Although women engage in physical confrontations less frequently and less seriously than men, fights between women do occur. In a victimisation survey of 1,455 British respondents, 7% of women reported an actual assault by another woman and a further 4% reported a threat of assault during the preceding 5 years (George 1999). Approximately three-quarters of adolescent girls' attacks are on other girls (Bureau of Justice Statistics 1999; Campbell 1986). In the USA and Britain, the perpetrators and victims of female assault are usually 15–24 years old and known to one another. The most common forms of attack are pushing, shoving, grabbing, tripping, slapping, kicking, and punching (Campbell 1986; Ness 2004).

Women's aggression is sensitive to the same environmental and social factors as men's. Girls, like boys, show a marked age–violence relationship, rising in the early teenage years and falling in the mid-20s. The age–violence relationship is very similar in both sexes, although male violence is more prevalent than female violence and peaks slightly later, corresponding to girls' 2-year-earlier attainment of sexual maturity. For both sexes, the post-pubertal years are a time of high stakes: Entry into the arena of mating brings with it increased competition. The reasons for the evolution of monogamy in our species are still debated (Henrich and Richardson 2012), but that monogamy brought with it a two-way sexual selection is not disputed (see, e.g., Kokko and Johnstone 2002). When a man commits himself to a single woman, he becomes considerably more selective in his choice of mate. Under monogamy, women gain male support that can ease the burden of childcare, but the price is greater competition between women for access to the best male partners.

The reasons for fighting between females are often connected directly or indirectly to young men (Burbank 1987; Campbell 1995; Ness 2004; Schuster 1985). As with male aggression, ecological and demographic factors concentrate female aggression among the young in the poorest communities (Campbell 1999). For example, women are most likely to find a partner in the immediate neighbourhood and, to the extent that the local male–female ratio drops below unity (as a function, for example, of early male mortality or more frequent incarceration), competition between women increases. High variation in men's resources also intensifies female competition. Among middle-class young women, the risk of direct aggressive competition is rarely worth it: The difference between marrying this doctor or that accountant is not sufficiently great. However, in deprived areas, the difference between the desperate poverty of "dope fiends" and the conspicuous consumption of "high rollers" is extreme (Campbell 2011). Men who can be a source of support, rather than a drain on resources, are worth fighting for.

A common cause of female fights is defending a sexual reputation. Gossip about a girl's promiscuity, while an indirect form of attack (see later), can act as a trigger for direct physical attack when a victim attempts to reclaim her threatened reputation. Cues to potential infidelity can be used by men as a means of ruling out potential long-term partners (Buss and Schmitt 1993), so women can gain an advantage by undermining their rivals' sexual reputation while defending their own. That is why terms such as "slag," "tart," or "whore" are powerful sources of reputation challenge among women (Campbell 1982, 1995; Marsh and Patton 1986). Because it is not possible to publicly prove that such an accusation is false, women might seek to deter rivals from making such accusations with a credible threat of violence.

Despite these episodes of outright aggression, female aggression is still less frequent and less likely to be lethal than that of males. Weapons are rarely used, with fights confined overwhelmingly to fists and feet (Ness 2004). The majority of women's violent offences are simple rather than aggravated assaults (Greenfeld and Snell 1999). Even when women do use physical aggression, they are less accepting of risk to their lives than men.

The sex difference in aggression has been the focus of hundreds of studies using a range of techniques including laboratory experiments, observation, personality assessment, and self- and peer-reported behaviour. The results fit a clear pattern: The less risky the form of aggression measured, the smaller the sex difference (see Archer 2009, and Campbell 2006, for cross-cultural reviews). For physical acts such as hitting, punching, and kicking, the effect size lies between $d=0.59$ and $d=0.91$, while for verbal acts such as abuse and threats, the effect size is between $d=0.28$

and $d=0.46$ (Knight et al. 1996; Knight et al. 2002). The sex difference in indirect aggression is negligible, $d=-0.02$ (Archer 2004) and it is this form of aggression to which we now turn.

Indirect or relational aggression (see Archer and Coyne 2005, for a discussion of terminology) is a means by which women can compete without risking their safety. Acts that stigmatise, ostracise, and otherwise exclude others from social interaction can be used without direct physical confrontation. Such acts do not eliminate or physically injure the target, but they do inflict stress and diminish the opponents' reputation and social support. The target is attacked circuitously—the aggressor can often remain unidentified and safe from retaliation, at least in the short term. Targets that discover the identity of an indirect aggressor might, however, reply with direct aggression, for example in the case of derogation of sexual reputation (see above).

A key component of indirect aggression is the use of gossip to undermine an opponent's reputation and decrease their social capital. Physical attractiveness is another topic of gossip used to derogate competitors (Hall 2002). Of the 28 tactics that participants reported using to make same-sex rivals undesirable to the opposite sex, Buss and Dedden (1990)found that "derogate competitor's appearance" was used more often by women than men. Naturalistic studies concur that pejorative comments about other girls' appearance rank high in girls' topics of gossip (Duncan 1999; Simmons 2002).

We have seen the potential prizes that can incite female competition. We have also seen how, relative to men, women's aggressive competition is suppressed by pressures acting on women to safeguard their bodily integrity to support offspring. We move now into an area in which—in Western samples—aggression shows no sex difference: Intimate partner aggression. We note how this form of aggression is a particularly potent demonstration of the interactions between evolved psychology and culture.

Intimate Partner Aggression

Intimate partner aggression is one of the most emotive topics in the social sciences and empirical demonstrations of gender symmetry in rates of partner-directed aggressive acts have been the subject of controversy and resistance (see, e.g., Archer 2000, 2006; Johnson 2011; Straus and Ramirez 2007). We note here that gender symmetry is found only in Western samples (Archer 2006) and is confined to acts rather than outcomes (Archer 2000). In this brief overview, we first highlight the distinction between *situational* couple aggression and *intimate terrorism*. Intimate terrorism (hereafter IT) is a form of unilateral intimate violence, coupled with controlling behaviour (see Graham-Kevan and Archer 2003; Johnson 2011). Scholars are currently divided on whether intimate terrorism is gender-symmetric or perpetrated predominantly by men (see Johnson 2011, and Straus 2011, for opposing views). However, it is clear that the majority of people who are injured (Archer 2000) or killed (Coleman et al. 2007) by intimate partners are female. The most severe consequences of intimate aggression therefore affect women more frequently.

Our empirical work (Cross and Campbell 2012; Cross et al. 2011)focuses on what is known as "situational" (Johnson 2006), "ordinary" (Straus 2011), or "common" (Milardo 1998) couple violence. We will adapt Johnson's terminology and call it situational couple aggression (SCA). This is the—usually bilateral—result of an escalation of conflict rather than part of a systematic pattern of unilateral control (Johnson 2006). Importantly, most of what is detected in self-report studies is SCA, rather than IT (Johnson 2011). We highlight the distinction between SCA and IT because while the former shows strong evidence of being gender-symmetric (Archer 2000, 2009; Cross and Campbell 2012; Robertson and Murachver 2007; Straus 2011; Straus and Ramirez 2007), the latter does not. Perhaps more importantly, SCA and IT likely require different psychological explanations.

Evolutionary Approaches to Intimate Aggression

Early evolutionary approaches to intimate aggression focused almost exclusively on male violence towards female partners, and male jealousy was the main explanatory factor (see Dobash et al. 1992; Kaighobadi et al. 2009). The argument is as follows: Because fertilization takes place inside the female body, men can be deceived into investing in children who were sired by other males—at the expense of their own fitness. Males can reduce their risk of being cuckolded by "mate guarding"—controlling their partners' behaviour and restricting their movement so that they cannot consort with other males. Men's partner aggression, therefore, is a tactic for ensuring paternity (Wilson and Daly 1996). According to this argument, patriarchal societies perpetuate this evolved pattern, upholding the belief that men have the right to control their partners, which leads to police and judicial reluctance to intervene in "domestic" disputes and allows male abuse of partners to go unchecked. In short, patriarchal societies positively foster a culture of "wife-beating"—unilateral violence suffered by women at the hands of men. Proponents of this view argue that women's aggression towards male partners is rare and, in cases where it does occur, is "almost always… in response to cues of imminent assault" (Dobash et al. 1992, p. 80).

We welcome this acknowledgement that culture and evolutionary factors can interact, a perspective that has been missing from some evolutionary accounts of human behaviour but that is now gaining prominence (Bolhuis et al. 2011). However, we also suggest that this argument has only limited applicability to SCA because it focuses entirely on male perpetration. Hence, it cannot account for the gender-symmetric rates of SCA found in most Western self-report studies. While we touch on the issue of specific male adaptations for jealousy elsewhere (Campbell and Cross 2012), here we focus on the role of societal norms in accounting for the gender-symmetric pattern of SCA.

Women in UK samples raise their aggression in the context of an intimate relationship, relative to friends of either the same or the opposite sex. This is true in self-report studies of actual aggressive acts (Cross and Campbell 2012) and in a study in which participants were asked about their likely aggression in response to the same hypothetical provocations by partners and others (Cross et al. 2011). It is also very different from men's responses in such studies, which suggest that men would engage in less aggression towards female than male targets and that partners are no exception.

This pattern of results appears paradoxical in light of our explanation of women's lower aggression as resulting from their lower threshold for experiencing fear. If women have evolved to place a premium on their own safety, why take the risk of attacking a man, given the male advantage in size and strength? And why does this effect appear to be restricted to Western samples? Here, we consider cultural variation in whether women's fear of men is likely to be modulated in line with social norms of male behaviour. As we have noted, parity between the sexes in intimate aggression appears to be unique to "WEIRD" societies (i.e., Western, Educated, Industrialised, Rich, and Democratic; Henrich et al. 2010). Cross-cultural findings are hard to compare directly, so what we present here is intended to illustrate the scope of the problem rather than to provide comprehensive answers.

Western Culture and Women's Intimate Aggression

Do Western social norms, as some have argued, encourage or tolerate male aggression towards partners? At present, the answer appears to be no. A man's aggression towards a female partner is deemed more serious and more deserving of police intervention than a woman's aggression towards a male partner (Felson and Feld 2009; Sorenson and Taylor 2005). Men who assault their partners are more likely to be convicted (Felson 2008) or incarcerated (Smith and Farole 2009) than their female counterparts. A review published in the early 1990s (Dobash et al. 1992) reported that male violence towards female partners is unlikely to be punished by police. However, both sexes are less likely to be convicted for assaulting a known person than a stranger, regardless of whether they are a partner, a friend, or a family member (Felson and Pare 2007). Furthermore, penalties for partner assault have been more stringently applied for assailants of both sexes in recent years. While those who assault partners are less likely to be convicted than those who assault strangers, this effect is diminishing over time, is not confined to partners, and is not confined to male assailants. A snapshot of the social norms of modern wealthy industrialised societies, therefore, suggests that men who assault their female partners are "breakers, not bearers, of society's norms" (Felson 2002: 70).

We argue that the prevailing cultural framework radically alters the costs–benefit analysis of aggression—including women's aggression towards intimate partners. The reduced likelihood of male aggression means that women's appraisals of fear are also reduced, weakening their inhibition of aggressive impulses. For example, Fiebert and Gonzalez (1997)reported that women who strike their partners believe that they are not in danger of being struck in retaliation, and social norms in the USA proscribe male aggression towards women even in response to an attack (Feld and Felson 2008). Cultural context alters the likely consequences and the cognitive appraisal of costs and benefits which, in turn, influence levels of aggression.

Cultural Variation in Intimate Aggression

A large-scale review by Archer (2006)found an impressive correlation of $r = -0.79$ between the United Nations' Gender Empowerment Measure (GEM) and the magnitude of sex differences in intimate aggression in community samples. Countries with lower GEM showed a male-biased perpetration and countries with higher GEM showed a more gender-symmetric pattern. In high GEM societies, this appears to be a function both of men hitting female partners less frequently and of women hitting male partners more frequently. Women's victimisation, in particular, is inversely correlated with gender equality and positively correlated with sexist attitudes (Archer 2006). This, in turn, alters the risk of retaliation in response to female aggression towards male partners.

WEIRD societies with high GEM tend also to be more individualist than collectivist, and the construal of women as individuals rather than as parts of a family unit might be an important factor in predicting rates of partner aggression. For example, in cultures in which there is a strong societal emphasis on "honour," women are expected not to report intimate partner aggression to the authorities (Clark et al. 2010). Haj-Yahia (2011) describes how the functioning of the family unit is considered more important than the well-being of individual members in some collectivist societies: Women are defined primarily as members of their family unit rather than as autonomous individuals. When intimate aggression occurs, it is not generally considered to be a criminal problem—indeed, the prevention of partner aggression is seen as the responsibility of the wife (Clark et al. 2010; Haj-Yahia 2000). Where men's use of physical aggression towards partners is condoned, women's aggression is likely to be constrained—to a greater extent than in WEIRD societies—by a realistic fear of retaliation.

The cultural dynamics of a particular society, therefore, can have strong effects on the levels of male- and female-perpetrated intimate aggression[1], and are strong predictors of the sex differences therein. We must appreciate that, while sex-specific selection pressures appear to have influenced male and female minds differently, culture is also important. Our suggestion is that the sexes differ relatively consistently in their sensitivity to the costs and benefits of aggression, but that these costs and benefits vary considerably cross-culturally. But how and why do these cultural effects come about?

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[1] Note also that the proportions of reported intimate aggression that reflect SCA as opposed to IT might also be expected to vary cross-culturally.

Gene–Culture Co-Evolution

Researchers working in the area of gene–culture co-evolution explicitly address the interactions between culturally transmitted behaviour and humans' evolved psychological characteristics, treating both of these as essential to any complete explanatory account (see, e.g., Henrich et al. 2012; Laland and Brown 2011). Gene–culture co-evolution research has already developed useful models of the cultural evolution and proliferation of beliefs relating to reproduction. For example, evolutionary accounts of intimate partner aggression often treat male-perpetrated jealousy-induced aggression as a consequence of paternity uncertainty stemming from internal fertilisation in humans. Yet evidence that this behaviour is not a human universal comes from "partible paternity" societies. In such societies, men are believed to be a father (either "primary" or "secondary") to any child whose mother he had sex with in the year before the child was born. Children with both a primary and a secondary father have increased survivorship to age 10, compared to children with only one father. This is contrary to what would be expected if males who were uncertain of sole paternity routinely attacked or deserted their wives or offspring (Beckerman and Valentine 2002).

Mesoudi & Laland (2007) used a gene–culture co-evolution approach to model the origin and proliferation of partible paternity beliefs. Different configurations of sex ratio and control over mate choice were modelled. The critical scenarios were those in which the sex ratio was strongly female-biased (highly plausible in small populations, especially where many males die in intergroup aggression, for example). In these cases, beliefs and mating strategies diverged into one of two stable states according to which sex had more control over mating: Where females (i.e., the majority sex) controlled mating, partible paternity beliefs and polygynandrous mating became fixed. Where males (i.e., the minority sex) controlled mating, singular paternity beliefs and monogamous mating became fixed (Mesoudi and Laland 2007). Phylogenetic analysis of populations in lowland South America also supports Hrdy's (2000) argument that polyandry is more likely when women have more societal power and kin support (Walker et al. 2010). Internal fertilisation and uncertainty of paternity are human universals, but adaptive responses to them vary depending on cultural constraints.

Gene–culture co-evolution can also be applied to cultural variation in beliefs about the status of women (e.g., Smuts 1995). For example, Henrich et al. (2012) argue that the socially imposed monogamy prevalent in many societies is the result of cultural group selection: It benefits the groups in which it is held by reducing the numbers of unattached adult males, thereby reducing male–male aggression and age discrepancies between husbands and wives. In turn, it increases gender equality in a society (Henrich et al. 2012). Cultural changes such as this could in turn affect sex differences in intimate partner aggression: For example, large discrepancies in partner ages are positively correlated with intimate homicide by both sexes (Daly and Wilson 1988). Because baseline rates of perpetration are male biased, reducing age discrepancies could affect the rates of partner homicide committed by men more than it affects partner homicide committed by women. More generally, we have already noted that gender empowerment is strongly correlated with sex symmetry in intimate aggression (Archer 2006). This illustrates how cultural beliefs prevalent in a society, which can evolve in complex reciprocal interaction with our evolved psychology, can affect patterns of sex differences observed in intimate aggression.

Conclusion

In closing, we hope that researchers in the near future will examine more closely the interactions between evolved mechanisms and cultural factors in producing sex differences in aggression. Calls for an integrated approach which grants agency to both evolved psychology and cultural processes are not new (see, e.g., Boyd and Richerson 1985; Feldman and Cavalli-Sforza 1979; Lumsden and Wilson 1981; Tooby and Cosmides 1992), although the importance of the roles of biological and cultural evolution remains contentious. We close by highlighting three lines of questioning that could be particularly fruitful.

First, the nature of hypothesised species-typical evolved mechanisms needs to be elucidated further. Low-level affective mechanisms such as fear and punishment sensitivity have utility in explaining sex differences in behaviour. Researchers in a number of psychological disciplines are recognising the need for dual process theories which emphasise the interaction between the evolutionarily ancient limbic structures which humans share with other species and our higher-level reasoning capabilities (Bolhuis et al. 2011; Evans 2008). Neuroimaging studies are especially useful in identifying connectivity (which sometimes shows sex differences) between these neural structures (Li et al. 2012; Whittle et al. 2011).

Second, the extent to which evolved sex differences might interact with contextual factors is empirically tractable: Vignette studies have already proved useful in examining the effects of context on sex differences in aggression (e.g., Richardson and Green 2006, Cross et al. 2011) and could be used to examine contextual factors relating to societal norms that influence the perceived risks associated with aggression and the extent to which impelling and inhibitory forces are felt. Finally, it would be informative to model the conditions under which specific beliefs relating to the status of women and the (un)acceptability of controlling them could evolve, comparing these results with patterns in cross-cultural observations. Integrating different levels of explanation with an evolutionary perspective is the best way to gain a fuller understanding of women's aggression.

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