BEHAVIORAL AND BRAIN SCIENCES (1999) **22,** 203–252
Printed in the United States of America

Staying alive: Evolution, culture, and women's intrasexual aggression

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Abstract: Females' tendency to place a high value on protecting their own lives enhanced their reproductive success in the environment of evolutionary adaptation because infant survival depended more upon maternal than on paternal care and defence. The evolved mechanism by which the costs of aggression (and other forms of risk taking) are weighted more heavily for females may be a lower threshold for fear in situations which pose a direct threat of bodily injury. Females' concern with personal survival also has implications for sex differences in dominance hierarchies because the risks associated with hierarchy formation in nonbonded exogamous females are not offset by increased reproductive success. Hence among females, disputes do not carry implications for status with them as they do among males, but are chiefly connected with the acquisition and defence of scarce resources. Consequently, female competition is more likely to take the form of indirect aggression or low-level direct combat than among males. Under patriarchy, men have held the power to propagate images and attributions which are favourable to the continuance of their control. Women's aggression has been viewed as a gender-incongruent aberration or dismissed as evidence of irrationality. These cultural interpretations have "enhanced" evolutionarily based sex differences by a process of imposition which stigmatises the expression of aggression by females and causes women to offer exculpatory (rather than justificatory) accounts of their own aggression.

Keywords: aggression; competition; evolutionary psychology; female; sex differences; sociobiology; violence

Introduction

Analyses of male and female patterns of involvement in aggression suggest four important facts that any adequate theory must explain.

1. *Human males engage in aggression more frequently than females from about the age of two onward.* Childhood sex differences in aggression are universal (Rohner 1976; Whiting & Edwards 1973). Adult differences measured by anthropological report (Brown 1991; Ember 1981) and by criminal statistics likewise appear to be universal. Simon and Baxter (1989) obtained homicide data from 31 countries for three time periods spanning 1962 to 1980. They calculated the percentage of female arrests and found no time or country in which female rates exceeded that of males. The mean percentage of female arrests was 10.56% (s.d. = 5.55).

2. *The sex differential increases with increasing seriousness of the measure of aggression.* Men in the United States commit 85.53% of simple assaults, 87.31% of aggravated assaults, and 88.5% of murders (Kruttschnitt 1994). Women's proportionate involvement in violent crime has remained stable over the last 30 years (Kruttschnitt 1993). At subcriminal levels, recent meta-analyses have indicated that the sex difference is greater for physical aggression than for verbal or psychological aggression (Bettencourt & Miller 1996; Eagly & Steffen 1986; Hyde 1986; Knight et al. 1996) and this is in agreement with prior narrative reviews of the literature (Frodi et al. 1977). The magnitude of these sex differences in psychological research has remained stable from the mid-1960s (Knight et al. 1996). The only form of aggression in which girls and women exceed boys and men is on measures of indirect aggression (gossiping and ostracising) – I will return to this fact below.

3. *There is a high correlation between rates of male and female aggression across geographical areas.* Rohner (1976) reported a correlation between male and female rates of aggression of $r = .88$ for both children and adults across a world sample of 101 societies. The correlation over 66 nations reporting criminal assault data to Interpol is .99. In England and Wales, rates of male and female violent crime correlate $r = .98$ over 43 police jurisdictions. In a study of 34 police reporting districts in Massachusetts, the correlation over region for male and female aggravated and simple assault was .90 (Campbell et al., submitted).

4. *There is a high correlation between rates of male and female aggression over age.* In both sexes criminal violence



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https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

is most likely between the ages of 14 and 24 (Campbell 1995a) with the female peak occurring approximately two years earlier than that of males, in line with females' earlier attainment of puberty. The correlation between the sexes over age is .89 for assault, and .99 for aggravated assault based on U.S. data and .98 for U.K. crime statistics. Studies of aggression in children have also noted the remarkable similarity of the age curves (Bjorkqvist et al. 1992; Eron et al. 1983).

Men's violence has already received considerable scrutiny by evolutionary psychologists (Daly & Wilson 1988a). In species where one sex makes a higher parental investment than the other, the high investing sex is a resource for which the opposite sex competes. In humans as in many other species, females make a higher parental investment than do males. The reproductive strategies of women compared to men can be seen as reflecting concern with "quality versus quantity." Females' reproductive success is constrained by the long period of gestation and lactation (and resources necessary to sustain these) required for each offspring, while males' success is constrained by the number of partners they can inseminate. In line with this, evidence suggests that humans have a prehistory of mild polygyny (i.e., men tended to seek mating opportunities with multiple females). This is apparent in our universal sexual dimorphism, earlier male senescence and death, earlier female sexual maturity, longer male reproductive career, relatively large male sexual organs, and a higher preferred rate of copulation by men (Daly & Wilson 1988a; Mitani et al. 1996; Oliver & Hyde 1993; Symons 1979). The fact that some dominant males will monopolise more than their fair share of females means that other males will face "reproductive death." Thus competition among males is high because the associated payoffs in terms of reproductive success are high also. Dominance and resource holding are linked among males. Both are part of the same evolved system used by males to attract females. As Wilson and Daly (1985, p. 60) note, "males are in competition for those resources, including feeding territories, nest sites and more intangible 'resources' like political influence and social status that can be converted into reproductive opportunity, whether because they are directly attractive to females or because they help quell rival males." Daly and Wilson (1994) in a series of studies have argued that the higher rate of aggression in men is indicative of the crucial importance of status competition to male reproductive success. Males engage in dangerous confrontations and other forms of risky behaviour where the reward is an elevation in status in the local community – the "young male syndrome" (Wilson & Daly 1985). Using homicide as their assay of aggression, they have attended particularly to apparently "trivial" altercations resulting in death among men and concluded that these incidents are principally about maintaining "face" when challenged by another male.

Wilson and Daly (1985, p. 88) note that "women compete, too, and may even kill one another in the process but their lesser fitness variance means that they have little to gain, and at least something to lose by dangerous tactics." The following argument pursues this observation in more detail. While male aggression has been described as a "higher stakes, higher risk" enterprise (Daly & Wilson 1983, p. 92), I wish to emphasise that lower rates of aggression by women reflect not just the absence of masculine risk taking but are part of a positive female adaptation driven by the critical importance of the mother's survival for her own reproductive success. In addition, using a co-evolutionary perspective, I will consider how patriarchal culture has distorted our understanding of women's aggression.

I will begin by describing the greater importance of personal survival for female inclusive fitness, which renders the costs of direct aggression greater for females than for males. I will argue that these differential cost-benefit outcomes were and are mediated by differences in fear of physical harm in men and women. The greater need for women to avoid serious physical injury has implications for the formation of dominance hierarchies. Though achievement of high rank may confer advantages in terms of resource access, the establishment of hierarchies and the pursuit of dominance within them is more costly for females than for males. Primate and human research bearing on sex differences in dominance hierarchies and status seeking will be reviewed. Although females show less concern with status than do males, they must be concerned with securing resources. Such disputes, however, are likely to be low risk or indirect in form. Psychological and criminological studies pertinent to this argument will be reviewed. I will then consider how patriarchy awarded men the power to create and disseminate cultural images which enhanced the male monopoly on aggression by characterising female aggression as either an abnormal attempt to mimic male aggression or as evidence of psychopathology.

1. Evolutionary factors affecting form of female aggression

1.1. Maternal investment and the need for personal survival

In this section I will argue that the mother's presence is more critical to her offspring's survival and hence to her reproductive success than is the father's. This point is important because it forms the basis for the argument that females should be more concerned with staying alive than are men and this in turn accounts for their low-risk and indirect strategies of dispute resolution.

Lower fitness variance among females means that more females than males can expect to produce at least one child in their lifetimes. Though a successful male can always outreproduce a successful female, the principal difference between the sexes is the relative *certainty* of at least minimal lifetime reproduction. Furthermore, a female can be sure that her child will carry, on average, half her genes. In humans (and in many birds and some monkeys) concealed ovulation means that a male can never be certain of his paternity. Contemporary data suggest that between 7 and 14% of infants are not fathered by the mother's partner and a woman is also more likely to conceive during an extramarital affair than with her husband (Bellis & Baker 1990). A mother, unlike a father, can be certain that any sacrifices she makes to ensure her offspring's survival are not in vain from the point of view of genetic replication.

This is fortunate because women make a substantially greater contribution to parental investment than do males. At a purely biological level, male ejaculate is produced cheaply, quickly, and constantly. Women however require 28 days to move through a single reproductive cycle and, if conception takes place, contribute nine months to gestation. In hunter-gatherer societies (analogous to the circum-

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stances in which 99% of human history took place), lactation continued for up to four years. During this time, the mother probably carried the infant with her on gathering expeditions at a substantial cost in calories to her but with the benefits of continuous nutrition for the infant and contraceptive amenorrhea for the mother (Lee 1979). Hence the relative time costs to males and females respectively are measured in hours versus years and the metabolic costs are equally disparate.

Her motivation to ensure her child's survival is matched by the greater dependency of the infant on the mother rather than the father. The large endocranial size of our species together with a narrowing of the birth canal caused by bipedalism meant that infants had to be born relatively immature with a correspondingly longer period of dependency (Foley 1996; Lancaster & Lancaster 1983; Peccei 1995). In all societies, women take primary responsibility for infant care (Ember 1981) and though this is doubtless a product of lactation, it extends beyond weaning and continues with solid food provision by the mother (Lancaster & Lancaster 1983). Infants' primary attachment is to the mother rather than the father (Kotelchuck 1976) and infants show greater fear of strange males than of strange females (Greenberg et al. 1977). There are no known cultures where mothers voluntarily abandon their children at the rate at which fathers do (Browne 1995) and mothers experience greater grief than fathers at the loss of a child (Zeanah 1989). The mother is the principal carer and protector of the infant.

A substantial threat to their infants' lives comes not only from predators and natural hazards but from immigrant males entering the group and from male "raiding" parties from neighbouring communities (Hrdy 1979; Wrangham & Peterson 1996). In many species of primate, males use infanticide as a means of bringing the mother back into oestrous, fathering their own offspring, and dispatching those of rival males (Hausfater & Hrdy 1984). Females are highly sensitised to this threat and females' typical low-level aggression alters dramatically when a mother is faced with a strange and possibly infanticidal male. Smuts (1987, p. 407) has noted "this extreme female vigilance may explain why males often avoid infants and why they sometimes exhibit fearful responses when an infant approaches." The risk to infants from unrelated adult males has also been noted in humans. Stepchildren are 65 times more likely to be murdered than are children living with their two natural parents (Daly & Wilson 1988a). In Britain 52% of babies killed in the home were murdered by a stepfather (Watson 1995). The mother plays a primary role in protecting the infant from such attacks.

The greater importance of the mother to the child's survival may also explain the phenomenon of menopause which is unique to humans. Let us suppose that in the environment of evolutionary adaptation, women gave birth to their fifth and last child at age 35. Women who died immediately thereafter reduced the last child's probability of survival relative to women who lived on for another five years (Peccei 1995). This would result in a small but consistent advantage to women who bore the genes for nonreproductive life after the birth of their last child, and to the extent that this longer life had a genetic basis, they would pass it to their female children. The fact that men do not experience reproductive menopause and can continue to father children into old age suggests that their continued survival was less critical to their infants' survival.

Male reproductive strategy also has direct implications for maternal care of infants. Polygyny is associated with earlier death among males. In part, this results from the dangers of male – male competition and from the generalised risky behaviour of young men. In England and Wales, the male-to-female ratio for deaths from external causes is at its most extreme at ages 15 to 24 years (3.93:1) compared to a more modest ratio of 1.72:1 for the childhood period of 5 to 14 years (Office of Population Censuses and Surveys 1995). However males who survive past their peak reproductive years still die earlier than do females. Earlier male death is thought to result from the trade-off between survival and reproductive success in males. Testosterone, which energises male competitive behaviour, is associated with lower disease immunity and with higher rates of degenerative diseases (Folstad & Karter 1992). High rates of sexual activity in youth have been selected for despite the loss of longevity, again supporting the lesser importance of the father to infant survival. When males die, it is the female who must shoulder the full burden of infant care.

Polygyny affects not only a male's likelihood of death but the likelihood of his desertion. In monogamous societies, men seek more premarital and extramarital affairs than do women (Daly & Wilson 1988a; Fisher 1993). Men's preference for youth and physical beauty in sexual partners means that as their wives age, younger women are increasingly sought out. After divorce, men are more likely to remarry younger partners and to produce further children in their second marriages. Male desertion adds to the parental investment taken on by the female. Women are far more likely than men to seek and gain custody of children in a divorce and state benefits for single parents are overwhelmingly paid to women.

Data from studies of survivorship among orphans support the thesis that maternal survival is more important than paternal survival. Among the forest-dwelling Ache of Paraguay (Hill & Hurtado 1996), maternal death increases age-specific child mortality rate by a factor of five compared to a threefold increase when the father dies. (Paternal death and parental divorce are about equally hazardous to infants.) Where the mother died in the first year of the infant's life, the mortality rate was 100%. In a study of seventeenth to nineteenth century Ostfriesland in Germany, Voland (1988) reports that maternal death increased the risk of dying before the fifteenth birthday by a factor of 1.4 compared to a paternal death. Again, the discrepancy in survivorship is most marked in the first year of life where maternal death doubles the risk of infant mortality relative to paternal death.

In summary, women have long faced the same evolutionary problem with regard to inclusive fitness. Biological factors, infant dependence, and male reproductive strategies mean that the mother is more critical to the offspring's survival than is the father. If a mother wants her children to survive, then she must be equally concerned with her own survival. Because of this, we should expect that women would have evolved a psychology in which the costs of physical danger would have been weighted higher than that of a male.

1.2. Psychological mediation of personal survival

If survival is more critical to reproductive success in females than in males, we should expect to see a lower involvement

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

in forms of aggression that pose a risk to their bodily integrity. This can be conceptualised as assigning a higher weighting to the costs of any given agonistic encounter. For the psychologist, a key question is: By what mechanism do humans "weight" costs in an encounter? I suggest that the relevant mechanism is fear and that, given an equal degree of objective risk of harm, females will experience greater fear than will males. Fear has been invoked by others as an explanation of sex differences. Gray (1987) argues that differences in fearfulness among primates are a result of male dominance over females, thus ignoring the issue of sex differences in intrasexual aggression. MacDonald (1995) has argued that while behavioural avoidance is generally higher in females, there may be important differences in the types of stimuli that elicit fear in the two sexes. The current argument pursues this by suggesting that females should be more fearful than males, particularly when they perceive threat to their bodily integrity.

With regard to objects that do *not* pose a direct risk of injury, we would expect to see little evidence of sex differences. If women were more afraid of people in general, we would expect to see a greater prevalence of avoidant personality disorder in women but there are no reported sex differences in this diagnostic category (American Psychiatric Association 1994). At a nonclinical level we would expect to see sex differences in extroversion, which we do not (Costa & McCrae 1992). However, when extroversion is decomposed into its contributory facets, women score higher on warmth, gregariousness, activity, and positive emotions, and men score higher on assertiveness and excitement seeking (Corbitt & Widiger 1995). Females are no more prone to generalised anxiety disorder (American Psychiatric Association 1994), social phobia or school phobia than are men (Marks 1987). Nor are females more likely to fear intellectual or sensory novelty. The Openness to Experience factor of the "Big Five" (which measures curiosity, imagination, and creativity) shows no sex differences (Costa & McCrae 1992). The Experience Seeking (ES) subscale of the Sensation Seeking Scale measures desire for unusual experiences that do not contain a component of physical risk (e.g., through music, art, travel, and unconventional people). Zuckerman (1994) reports that in 15 out of 17 cross-cultural studies no sex differences on experience seeking were found and concludes "the lack of difference on ES suggests that while men are high on the more active forms of sensation seeking, women are just as open to novel experiences through the senses and lifestyle as men" (Zuckerman 1994, p. 101).

Phobic reactions are of particular interest because their foci are thought to correspond to specific dangers faced by humans during their evolution. Marks and Nesse (1997, p. 64) argue that such "evolved defenses often seem overresponsive . . . because repeated false alarms may cost less than a single failure to respond when danger is present." We should expect that such hypervigilance would be higher in females than males if the present argument is correct. Females are indeed more prone than males to panic disorder with agoraphobia (American Psychiatric Association 1994), and to phobias about animals (including dogs, snakes, insects, and mice), blood, and injury, and medical or dental procedures (Marks 1987). In short, women have a greater likelihood of overreaction to open spaces (where predation was more likely), closed spaces (with the danger of being trapped), potential predators and parasite carriers, and the sight of blood or tissue injury signalling possible death. Anxiety sensitivity describes fear of the harmful consequences of anxiety-related sensations. Females are more fearful than males only of the physical (i.e., health) consequences of anxiety. Males showed the greatest fear on items that measure the psychological and social facets of fear (Stewart et al. 1997) as might be predicted from men's particular sensitivity to autonomy and status (see sect. 1.4).

Sensation seeking is an inverse measure of fear. Males exceed females on physically risky forms of sensation seeking (Zuckerman 1994) and these in turn correlate significantly with a variety of physically dangerous activities such as involvement in crime, dangerous sports, injury proneness, and volunteering for drug experiments and hazardous army combat (Zuckerman 1994). There are very significant sex differences in mortality from traffic accidents (after controlling for miles driven) which seem to be attributable to men's more frequent speeding, tailgating, and running red lights (Wilson & Daly 1985). Rates of accidental injury on the street and in the home are higher among boys than among girls even after controlling for exposure times (Christopherson 1989). Such accidents are likely the result of the greater willingness by boys to take risks involving potential physical injury (Ginsburg & Miller 1982). Serious drug use is more common among males than females with sex ratios of between 3 and 4 to 1 for amphetamine, opioid, hallucinogen, inhalant, and phenocyclidine abuse (American Psychiatric Association 1994). Girls perceive the health risk posed by drugs to be more serious than do boys (Turtle et al. 1997). Despite the fact that men are more likely to be the victims of violent crime than are women (Bureau of Justice Statistics 1997), women report higher levels of fear of crime (LaGrange & Ferrero 1989).

Women also exhibit greater concern with their health than do men. The strongest predictor of preventive health care is gender (Harris & Guten 1979). Women rate the importance of health higher than men, know more about health issues, and are more likely to track the status of their health (Umberson 1992; Waldron 1988). Women visit the doctor more often than do men (after controlling for gynaecological and obstetric visits) and more often go for preventive care. Umberson (1992), investigating why the health benefits of marriage are greater for men than for women, found that women are significantly more likely to control the health-related behaviour of their spouse than are men. The prevailing sociological interpretation – that such female solicitousness derives from "gender role socialisation" (Umberson 1992, p. 908) or "cultural influences" (Waldron 1988, p. 204) – is not, of course, incompatible with the present view that such roles themselves derive from evolutionary pressures.

In focusing upon higher levels of female fear in response to prospective aggression, we are in a better position to account for results from human experimental work. Eagly and Steffen (1986) and Bettencourt and Miller (1996) in meta-analyses of 127 laboratory studies found that women estimated the danger of the same aggressive encounter to be higher than did males and that sex differences in aggression were greater to the extent that the actor would be in greater danger from aggressing.

In summary, I have argued that females show higher levels of concern with survival than do males and that fear is a plausible proximal mechanism for this sex difference. Sex differences in fear appear in childhood and fear is trait-like

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

in its stability over time (Gullone & King 1997). This suggests that women's higher level of fear does not depend upon the experience of parturition, as we would expect if it is an evolved adaptation resulting from the fact that young ancestral females who engaged in high-risk aggression were less likely to survive and hence to achieve any degree of reproductive success. With regard to aggression, I emphasise that this is not an argument for greater female vulnerability – in a same-sex encounter, females have no greater objective chance of injury or death than do males because both combatants are equally strong. Nor is it an argument for female nonaggression – the willingness of an animal (male or female) to engage in or to escalate an agonistic encounter is a function of anticipated rewards and costs. For a female the cost is usually higher than for a male so that only a very high payoff (such as the successful defence of her offspring's life, see sect. 1.1) would make lethal combat a successful strategy. The rewards for a male are usually higher than for a female because of the resource-status link. Success in one sphere carries implications for the other and both have implications for reproductive success (Smuts 1987).

1.3. Primates: Males, females, and dominance hierarchies

Males compete with one another for dominance and its associated resources because these enhance reproductive success. Females compete with one another for resources which can be converted to offspring and so enhance their reproductive success. (As we shall see later, one such resource may be males when females rely upon them for subsistence.) The fact that women in evolutionary terms had less to gain from achieving status has implications for the extent and form of their intrasexual aggression. In this section, I will consider evidence from primates concerning female dominance hierarchies.

Symons (1979) argued that because of polygyny, there was no reason for females to form dominance hierarchies because they conferred no advantage in terms of number or quality of copulatory partners. Primate studies have generally concurred that males do not show a strong or systematic preference for high ranking females (Loy 1971; Packer 1979; Small & Smith 1985). However, female reproductive success is linked to successful competition for nutrition, spacing, and safety, which might be enhanced for a female high in a dominance hierarchy. Many commentators note that the relationship between dominance and reproductive success is weaker and less consistent for females than for males (de Waal 1982; Silk 1987; Wrangham 1980). A recent review by Ellis (1995) of 700 studies of this relationship in a variety of species concludes that "establishing and maintaining dominance relationships is less consequential for females than for males. Presumably natural selection has favored the use of dominance as a vehicle for enhancing RS (reproductive success) for males more than for females" (Ellis 1995, p. 290). The advantage of a dominance hierarchy is that, once formed, there is a reduction in the frequency of conflict within the group (de Waal 1982; Ellis 1995). However, for females the costs that must be incurred in the formation of an achieved dominance hierarchy are rarely outweighed by the payoffs. The price of injury to the female and to her current and yet-to-be-conceived children is high (Smuts 1987) relative to the modest advantages in terms of reproductive success.

How then can we explain the existence of female dominance hierarchies in a number of cercopithecines (see Ellis 1995) – chiefly macaques, savannah and gelada baboons, and vervets? In these female-bonded species, where feeding patches are monopolisable and females remain in their natal group (Mitchell et al. 1991), dominance does not depend upon risky combat but is *inherited* from the mother (van Hoof & van Schaik 1992; Wrangham 1980). In matrilineal hierarchies "dominance status is transmitted across generations from a mother to her daughters, with the result that female kin rank adjacently in the dominance hierarchy rather than distributing themselves according to individual attributes such as their age and size" (Chapais 1992, p. 29). Any attempt to challenge the hierarchy is risky and only rarely are subordinate females willing to take the risk of an outright attack on a high-ranking female. This hierarchical inertia is all the more remarkable because the payoffs are exceptionally large – once a rank reversal occurs it can be maintained not only for the lifetime of the female and her kin but for several generations. Despite the high payoff for success, females are generally conservative, as I would predict, given their lower fitness variance and high degree of parental investment. Matrilines are extremely stable and highly resistant to change (Hrdy 1981). Walters (1980) found that a female's rank at the time of her birth correctly predicted her adult rank in 97% of cases, and in a 400-day study of yellow baboons, Hausfater (1975) found not a single instance of an agonistically induced change of status among females. When rank reversals do occur, they are often the result of maternal death (rather than attack frequency), which has a direct effect on the daughter's rank and an indirect effect via reduction in the daughter's kin alliance size (Mori et al. 1989). Chapais' experimental examinations of female rank relations indicated that only in situations where the possibility of injury was extremely low was a challenge made – a finding he refers to as a "minimal risk strategy" (Chapais 1992, p. 44).

Apart from rare attempts at revolutionary takeover, the vast majority of female–female aggression is "low key and chronic" (Smuts 1987, p. 402) and involves "mild bickering" (Walters & Seyfarth 1987, p. 308). Hrdy (1981, p. 106) notes that "females rarely inflict serious damage on one another in their quarrels." Seyfarth (1976) reported that among baboons the ratio of approach–retreat interactions to bouts of overt aggression was 20:1 for females and 1.7:1 for males. Thus, even in species which have a female dominance hierarchy, intrafemale aggression tends to be "low risk" because dominance is inherited not achieved, takeovers are rarely attempted, and most mundane resource disputes involve threat and withdrawal rather than injury.

In other species of primates, matrilineal dominance hierarchies are not found because females leave their natal group. Among these nonbonded females, there is little evidence of agonistically achieved linear hierarchies. One such species is the chimpanzee, our closest phylogenetic relative. Like humans, female chimps make a huge maternal investment – gestation is eight months and lactation lasts five years. Offspring whose mothers die before they are about eight years of age often die, even though older siblings may attempt to care for them. The mother–child dyad is the primary social unit and adult females spend approximately 60% of their time foraging alone with their infant (Pusey et al. 1997). In wild populations, adult females do not form strong bonds and rarely support one another.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

They rarely rest in close proximity or engage in mutual grooming. Though females can be assigned to high, medium, and low status by aggregating data on submissive vocalisation over several years (Pusey et al. 1997), dominance relations are "weakly-developed (egalitarian) and unstable" (van Hooff & van Schaik 1992, p. 362) and "dominance behaviour . . . is uncommon and is never observed between some dyads" (Pusey et al. 1997, p. 829). Direct agonistic conflicts are rare. Studies of captive chimpanzees likewise conclude that there is little evidence of linear hierarchy. De Waal (1989, p. 53) describes female relationships thus: "By contrast, the female hierarchy is rather vague. Since status communication is rare among females, it is difficult and almost useless to assign them positions on a vertical scale. The same is true of feral chimpanzee females." He notes that he witnessed not a single instance of female status ritual over a six-year period. However, unlike feral chimps, these females form close affiliative bonds, based on personal preferences and shared history, which are extremely stable. Bonobo females also form close bonds with very low rates of female–female aggression. Of 259 aggressive episodes witnessed by Kano (1992), only 3.5% occurred between females.

Male chimpanzees remain in their natal groups and are male bonded. Because they are genetically related we might expect to see, as we do in female-bonded species, strong kin alliance formation. Male chimps do show patterns of meat sharing, association, and grooming that suggest a less competitive relationship with other males. However, as van Hooff and van Schaik (1992, p. 367) conclude, "sacrificing a fertilisation has far more serious consequences than sacrificing a morsel of food." Males – even when related – continue to strive for dominance in the group and hence for individual reproductive success. They are willing to incur high risks in their competition for dominance, unlike the "minimal risk" strategy of female bonded species.

I suggest that it is the absence of a relationship between dominance and resources among females which best accounts for the pattern of female aggression in non-female-bonded species such as chimps and humans (see Mitchell et al. 1991). When food resources are in high demand (because of their scarcity or spacing), females may be forced to compete. But that competition is likely to be low key or indirect to the extent that the costs of injury are great and the reward for success limited. I turn now to a consideration of the human literature on sex differences in hierarchical organisation and status-seeking.

1.4. Humans: Men, women, and status

Anthropological surveys of traditional human societies indicate that, like apes, we have generally favoured patrilocal residence which entails female transfer and loss of female kin bonding (Ember 1978; Foley 1987; Leakey & Lewin 1979; Murdock 1967; Rodseth et al. 1991). Van Hooff and van Schaik (1992, p. 363) conclude that "we consider the low rates of aggression and agonistic support and the weakly expressed dominance hierarchy as diagnostic of non-FB (female bonded) groups." Taken together, these facts suggest that women should be expected to show less evidence of dominance hierarchies than do men.

Studies of children's social organisation suggests that dominance is more central to boys than to girls (Archer 1992; Browne 1995; Geary 1996; Maccoby 1990; Maccoby & Jacklin 1987; Maltz & Borker 1982; Savin-Williams, 1980; Thorne 1994). Boys tend to play in larger groups involving rough-and-tumble play and zero-sum games (Lever 1978a). When given a choice, boys choose to compete rather than cooperate while girls show the opposite pattern (Ahlgren 1983; Boehnke et al. 1989; Moely et al. 1979). When girls compete too vigorously against their peers, they are likely to be rejected by them (Hughes 1988). Conflict exchanges among boys are means of displaying verbal skills and maintaining status hierarchies (Goodwin 1982; Kochman 1983; Labov 1972; Maltz & Borker 1982). Influence attempts by boys involve giving direct commands, while girls are more likely to use polite suggestion. The challenging and competitive style of boys is manifest in the dominance hierarchies which they form (Maccoby 1988; Omark & Edelman 1975; Savin-Williams 1977). Girls are more concerned with developing shared norms and cohesion within the group (Eder & Sandford 1988) and more frequently resolve conflict through discussion than do boys (Eder 1990; Maltz & Borker 1982). Collaborative interchanges are more common in girls' groups while domineering exchanges are more common in boys' groups (Leaper 1991). With regard to status, Goodwin (1990) found that girls criticised and rejected other girls whose behaviour suggested that they felt themselves superior to other group members. Savin-Williams (1980) concluded that "in comparison to their male counterparts, female adolescents are considerably less likely to form stable and consistent groups. Groups that do form are likely to be cliquish (exclusive, intimate, intense) and small (usually pairs or threesomes). If a group's structure can be ascertained, then it is likely to be less structured than male adolescent groupings" (Savin-Williams 1980, p. 361).

Among adults, men score higher on traits associated with competition for status. Many studies (see Hoyenga & Hoyenga 1993) using the Bem Sex Role Inventory (Bem 1974) and the Personal Attributes Questionnaire (Spence et al. 1974) confirm that men score higher on the masculinity/agency scale which includes competitiveness, autonomy, and dominance and lower on femininity/communion which is composed of adjectives such as warm, sympathetic, and compassionate. Wiggins, using the related scales of dominance and nurturance, corroborates these sex differences (Wiggins & Holzmuller 1978; 1981). Williams and Best (1990) in a cross-national study of 14 countries found that men were rated higher on adjectives such as ambitious, dominant, and hostile. Feingold (1994) used national norms from standard personality inventories and found that men were significantly higher than women on assertiveness and lower on trust, tender-mindedness, and gregariousness. This effect was invariant over age, educational level, and nationality.

Male interest in rank is also apparent in the experimental literature on leadership. Men emerge as leaders more often than women where the focus is task leadership (problem solving) assessed by amount of task contribution and by acknowledgement of leadership by participants and observers (Eagly & Karau 1991). Men more often use an autocratic leadership style (i.e., discouragement of subordinates from participation in decision making) than do women (Eagly & Johnson 1990) and this is especially true where subordinates are male. When the style of leadership is autocratic, men receive more favourable ratings than do

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

women in terms of the group's satisfaction with the leader and the leader's competence (Eagly et al. 1992). Devaluation of female leaders is most likely to occur where subordinates are other women or where their sex is not specified. As Eagly and Karau (1991) note, these findings accord well with everyday stereotypes about gender. Men's leadership style focuses upon solving an immediate problem with much less concern for the social harmony of the group. Indeed, men's willingness to behave autocratically may be taken as a measure of their desire for dominance at the expense of social bonding. (This is not to deny that men forge alliances with one another but these tactical instances of mutual cooperation are ultimately aimed at achieving dominance over others. Men more than women endorse political stances likely to accentuate rather than equalise differences between individuals and groups; see Pratto et al. 1997.) Women's contribution to the group is more likely to be social–emotional, for example, showing solidarity and expressing agreement (Eagly & Karau 1991), and when they assume leadership roles they are more likely to employ a democratic style which downplays their personal status. Sociolinguists using naturalistic observation in the workplace have also found that women dislike female leaders who employ an authoritarian leadership style and that the most successful women managers are those who report that they avoid behaving like authority figures (Aries 1976; Statham 1987; Tannen 1996). In line with this, women are better at encoding happiness while men are better encoders of anger (Coates & Feldman 1996).

In summary, evidence from both children and adults suggests that females are less competitive than males, show less evidence of hierarchical organisation, are less interested in achieving leadership within the group, and are more concerned with maintaining relationships of mutuality and reciprocity. Although females are relatively indifferent to status, they are willing to compete directly and indirectly for resources as we shall see in the next sections.

1.5. Gender and aggression: Direct and indirect

In this section I will consider psychological studies of the development of sex differences with special attention to the social meaning and form of aggression. Boys' aggression becomes increasingly motivated by issues of social status and self-esteem while girls' aggression, being principally concerned with resource acquisition but not status, is more likely to take less physically dangerous and more covert forms.

At preschool ages, the majority of disputes are about resources – access to or guarding of a toy or territory (Hartup 1974; Hay & Ross 1982). Reduction of the amount of available play equipment increases aggression, as does the addition of one or two new and desirable toys (Smith 1974a; 1974b). Two-year-old children show no sex differences in this form of resource oriented aggression (Coie & Dodge 1998; Cummings et al. 1986). Hartup (1974) examined four- to seven-year-old children, focusing upon the distinction between instrumental and hostile aggression. Instrumental aggression (attempts to "retrieve an object, territory or privilege," p. 338) corresponds to what I call *resource disputes.* Hostile aggression (responses to "frustrations which involve ego threats or threats to one's self esteem," p. 338) corresponds to what I call *status-oriented aggression.* Boys were significantly higher than girls on hostile but not on instrumental aggression. Boys express this status-oriented aggression almost exclusively to other boys and boys are significantly more likely to retaliate against such an attack (Barrett 1979; Parke & Slaby 1983). Physical prowess seems to be an important component of standing in boys' dominance hierarchy at younger ages (Geary 1996; Parke & Slaby 1983). Teacher-rated aggression of third- and fourth-grade boys, but not girls, shows a significantly positive relationship with self-concept (Feshbach & Feshbach 1986). Among boys but not girls, both aggression and altruism are positively correlated with positive affect and emotional expressiveness with peers (Cummings et al. 1986). Rough-and-tumble play among popular children is positively associated with interpersonal problem-solving ability and shows a negative relationship with teacher-rated antisocial behaviour (Pellegrini 1988). In summary, among boys moderate degrees of aggressive reactivity to personal challenge seem to be associated with social standing and self-esteem.

It is important to emphasise that there is no expectation that girls will not struggle for resources. Charlesworth (1996) employed a paradigm where four children had to cooperate in order to watch a movie on a small screen. One child could watch provided that two other children agreed to operate the controls. This relegated the fourth child to a bystander position. In cross-sex groups, boys dominated girls. But in same-sex groups, boys and girls did not differ in the total amount of viewing time. However boys used significantly more physical behaviour and girls used significantly more verbal behaviour. Charlesworth concludes that the data confirm his prediction that "sex would not affect the ability to compete for resources." Though girls can and do compete when necessary, girls prefer cooperation (while boys prefer competition), and among adults, men value competition more than women (see Hoyenga & Hoyenga 1993). To the extent that girls require resources they will struggle for them. But to the extent that girls demonstrate an evolved predisposition to attend to their own survival, they will choose low-risk means of doing so.

"Low-risk" may refer to variations in the severity of the attack and I have already noted that sex differences are greater for physical than for verbal aggression among both adults and children (Eagly & Steffen 1986; Hyde 1986). "Low-risk" may also refer to a preference for indirect rather than direct means of contest. Indirect aggression is likely to be of especial relevance to sex differences because, if boys are concerned with aggression as a means of achieving status (as well as securing resources), then status must be publicly demonstrated or, at the very least, must be publicly attributable to them. Indirect aggression by its nature seeks to conceal the identity of the attacker and should therefore be less appealing to boys. Indirect aggression refers to a form of social manipulation where the target is attacked circuitously and the aggressor can therefore remain unidentified. It involves acts such as shunning, stigmatising, and gossiping. Girls are more likely to exclude newcomers than are boys (Feshbach 1969), to destroy their adversary's property or tell tales on them (Brodzinsky et al. 1979), and to use tactics of ostracising and manipulating public opinion (Cairns et al. 1989). Girls are significantly higher than boys on becoming friendly with someone else as revenge, gossiping, and suggesting shunning of another (Bjorkqvist et al. 1992; Crick & Grotpeter 1995). Studies of school bullying also report that girls preferentially employ indirect strategies (Ahmad & Smith 1994). Female use of indirect ag-

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

gression continues into adulthood. Bjorkqvist et al. (1994), investigating victimisation in the workplace, found that women more than men used indirect forms such as spreading false rumours and not speaking. The tendency for girls and women to employ indirect means is not associated with greater condemnation of the use of direct physical and verbal aggression by females (Osterman et al. 1994).

It is worth highlighting the analogy between humans and nonhuman primates with respect to indirect aggression. A number of primatologists have observed that among cercopithecines, higher status females engage in mundane harassment of lower status females which can cause suppression of oestrus and abortion (Chapais 1992; Hrdy 1981; Smuts 1987). Such tactics diminish the reproductive success of the victim and elevate the material resources available to the victor and her offspring. They do this indirectly in the sense that such tactics involve no direct combat between the adult females and thus competitive success in this modality does not carry with it the dangers of possible death which would offset any gains achieved.

1.6. Gender and crime: Severity and form

I have argued that women should compete for scarce resources while showing less concern with status than do men and that their resource disputes should reflect low-risk strategies. This leads to a consideration of the criminological literature and to three predictions of sex similarity and difference.

1. We should expect women to show similar response to acute resource shortage as do men despite the fact that the absolute level of their involvement in crime will be lower. As I have noted, correlations between men and women for violent crime over geographical regions are typically in excess of .80. Similarly high correlations are also found for total crime indices ranging between .84 (Steffensmeier 1980) and .90 (Simon & Baxter 1989). Despite men's higher absolute rate of crime, crime by men and women seems to be broadly responsive to the same ecological conditions (Campbell et al., submitted). These conditions are socioeconomic indicators of relative resource shortage (Cohen & Machalek 1988). Although victimless crimes may be more evenly spread through the class structure when only serious victimful crime is considered, studies concur that it is significantly and negatively correlated with social class (Elliott & Huizinga 1983; Ellis 1988). The relationship between crime and income/class does not appear to be linear but rather crime is concentrated among that sector of society where resource shortage is acute, as evidenced by high rates of unemployment and welfare dependency (Brownfield 1986; Farnworth et al. 1994).

2. Sex differences should be smaller for larceny/theft than for robbery since the former reflects a low-risk strategy of resource appropriation and the latter a high risk strategy. Larceny/theft is indeed the crime in which women's involvement comes closest to that of men. It includes appropriation of others' resources without direct physical confrontation and subsumes credit-card and welfare fraud, shoplifting, writing bad cheques, nonpayment of bills, and surreptitious taking of others' property. From the viewpoint of the present analysis, this crime is an index of pure resource competition without any element of physical violence. Unlike violent crimes where the proportion of female involvement remained remarkably constant between 1934 and 1979, petty property crime increased dramatically from 7.1% of all arrests in the United States in 1934 to 31.6% in 1979 – a period during which the proportion of single women in poverty grew. By 1990, the female share of arrests for minor property crime was 43% (Steffensmeier & Allan 1996). Steffensmeier and Cobb (1981) have linked the increase in female larceny to women's increasing reliance on welfare. Theft by women is usually tied to economic need and occurs as part of their domestic responsibilities for providing for their children (Carlen 1988; Gilfus 1992). It is a low-risk resource-expropriative enterprise in which there is no hostile confrontation with the "victim."

This stands in marked contrast to the crime of robbery where women's involvement has remained remarkably low – they constitute about 7% of offenders (United States Department of Justice 1989). Robbery is the quintessential male crime, in which violence is used both to extract resources and to gain status (see Campbell 1993). Though women need resources as much, if not more, than men, they do not seek the additional payoffs of dominance over a better-resourced individual or a reputation in the community as a "hardman" (Katz 1988; Lejeune 1977). The thrill associated with the moment of confrontation is an important attraction of robbery. Robbery is about exploitation and humiliation and robbers are acutely sensitive to this aspect of the crime (Allen 1978). The financial motive that spurs men to robbery is not borne out of desperation – only 18% of robbers say that they need the money for themselves or their families (Walsh 1986). Seventy-nine percent of robbers spend the proceeds on drugs, alcohol, clothes, cars, and vacations. A core concern for robbers is the lavish and conspicuous disbursement of money which impresses and indebts others (Katz 1988). Women aggress and they steal but they rarely do both at the same time because the equation of resources and status reflects a particularly masculine logic.

3. Women's age-assault relationship should be similar to that of men where males constitute a resource and where well-resourced males are in short supply. Despite their lower rate of absolute involvement, female assault – like male assault – peaks in the years between ages 15 and 24. In a social species, other people may themselves constitute a resource. This is particularly true in the case of female mate choice – a desirable male brings with him resources necessary to the successful care of children. Women prefer males who have plentiful resources and who are willing to share them (Buss & Schmitt 1993). This preference is likely to be of particular importance when there is substantial variation among available males in resources, for example, in areas where a high proportion of males are unemployed, drug addicted, or destined to spend time in prison, while others (often involved in the illegal economy) have surplus income which is advertised in flashy clothes and fast cars (see Campbell 1995a). "Losers" are more than merely neutral with regard to resources – they constitute a potential liability for a woman in that their presence will reduce available welfare benefits while their lifestyle means that income destined for her or her children is likely to be spent on drugs or drink (Miller 1986; Taylor 1993). Under such circumstances, there may be competition for the best-resourced men. Campbell et al. (1998) found that 73% of

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assaults by women aged less than 24 years were against other women and that assault was positively correlated with rates of female unemployment and welfare dependency. Schuster (1983; 1985) using data from China and Zambia found that female aggression is principally driven by competition over scarce resources and often these resources are male partners. The intensity with which women are prepared to fight to secure high-status males is related to the degree of female economic and social dependence on men. Cross-cultural studies indicate that female–female aggression most often occurs between co-wives or between a woman and her husband's lover who are in competition for male resources (Burbank 1987; 1994; Lamphere 1974; Levinson 1989). Campbell (1995a) found that female adolescent disputes often centre upon three issues relating to successful mate choice: management of sexual reputation, competition over access to desirable males, and protecting established relationships from takeover by rival females. Interestingly, the peak age for female assault occurs at ages 15–19 compared to the male peak at 20–24, reflecting girls' earlier sexual maturity. The above account suggests that the rise in female aggression during adolescence, like that of males, is associated with mate selection. It is important to note that women's willingness to engage in direct competition for male resources is largely limited to simple assault. Female–female homicide is vanishingly rare (Daly & Wilson 1988a) and women are far less likely to use weapons than are men (Burbank 1987). This is in line with the current proposal that even when resource shortage drives women to direct competition for mates, the level of aggression is substantially lower than that of men.

For males, status (and toughness where this quality is a determinant of status) is a route to desired resources, including females. Males seek public recognition of their status and Wilson and Daly (1985) have described how apparently trivial altercations can result in homicide when an opponent's acts are interpreted as a public challenge to a man's honour and when to back down is to accept that dishonour. This interpretation harmonises with criminological and ethnographic accounts of male violence (Felson 1978; Horowitz 1983; Katz 1988). For females, public recognition of toughness or status is not important because high-status, dominant, or aggressive females are not especially preferred as mates. In resorting to intrasexual aggression, women's aim is to secure a valuable male rather than to achieve status within her own sex.

2. Cultural factors affecting male and female representations of aggression

2.1. Female aggression and patriarchal culture

So far, my argument has been concerned with the application of evolutionary theory to behavioural sex differences in aggression. I turn now to a consideration of the way in which culture has interpreted these differences, specifically how patriarchal institutions may have stigmatised women's aggression and have led women to offer exculpatory accounts of their aggression. Culture is not considered here as an independent but complementary force "socialising" the frequency of aggressive behaviour in each sex (although such an analysis has been offered by others, see Low 1989). Rather, I examine culture as ascribing different meaning and value to the same behaviour when it is performed by men and women. Failure to recognise the role of meaning in human behaviour was a much criticised aspect of sociobiology and the term "evolutionary psychology" carries with it an obligation to address not only behaviour but aggregate cultural processes which give meaning to it. It is unlikely that the historically variable content of explanations of complex social action are hardwired (Sperber 1994). It is more probable that they are acquired from the community and this accounts for their tendency to alter over time, for example, possession by evil spirits is not generally offered as an explanation of aggression in contemporary western culture.

Coevolutionary theorists have argued that culture is a second stream of transmission where the units of selection are memes rather than genes. Although some have held that genetic and cultural transmission are parallel and independent forces, others have argued for their interaction. Lumsden and Wilson (1981) and Durham (1991a) have suggested that one common form of interaction may be "enhancement," whereby the impact of socially transmitted memes is to exaggerate evolutionarily adaptive traits. In terms of sex differences, a cultural enhancement bias would tend to exaggerate the difference between men and women. In addition, Durham uses the term "imposition" to describe how those in power may enforce upon the less powerful a meme favourable to the continuation of that power. In this section I will argue that patriarchal culture has imposed a meme which exaggerates sex differences by equating female aggression with social or individual pathology.

Culture refers to socially transmitted information which may be technological (methods of termite fishing by chimpanzees, use of a personal computer by schoolchildren), social (gossip, rumour, and symbolic linguistic grooming), or semiotic (the semantic interpretation and value that should be accorded to an event). It is this latter component that is of principal relevance to the present argument. Patriarchy defined as "a system of organisation in which the overwhelming number of upper positions in hierarchies are occupied by males" (Goldberg 1993, p. 14) is universal (Goldberg 1993; Low 1992; Whyte 1978a). (This is not to deny that some societies are matrilineal or that many accord respect to the roles that women play. Nor is it to argue that patriarchy is desirable or unmodifiable.) Smuts (1995) offers an account of the possible evolutionary genesis of patriarchy, which begins with the argument that female exogamy reduced female kin support and consequently the ability to resist male coercion. In the service of intergroup competition, males developed strong male–male alliances which could also be used to control females. Subsequent to the advent of agriculture and animal husbandry, surplus resources were controlled by a few powerful males and, because these resources were necessary for female reproductive success, female autonomy was further reduced by female–female competition. Finally, the evolution of language allowed men to create and propagate ideologies of male dominance and female subordination.

Anthropologists have documented many folk tales directly supporting patriarchy and discouraging female insubordination (Ortner & Whitehead 1981; Sanday 1981). In our culture, the media and other social institutions propagate images and stereotypes that are prescriptive of the expected behaviour and demeanour of men and women, including the acceptability of aggression. Despite the evolutionary necessity for aggression in both sexes, men's ag-

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

gression has been valorised while women's aggression has been treated as evidence of pathology under patriarchy. In many cultures, values of physical courage, endurance, strength, skill, and honour are associated with male warfare (McCarthy 1994) and successful participation in war is associated with status and increased sexual access to women in, among others, the Sambia (Herdt 1982), the Yanomamo (Chagnon 1988), the Samburu (Spencer 1965), the Masai (Saitoti 1986), and the Dodoth (Thomas 1965). This valorisation is not limited to intergroup hostility but is manifest in ethnographic accounts of assaults committed by young men (Athens 1980; Katz 1988; Polk 1994) and by quantitative studies of masculine values which have identified willingness to use violence as an important component of masculinity (Mosher & Sirkin 1984; Thompson & Pleck 1986).

Women's aggression occurs more rarely than does men's for the evolutionary reasons that I have outlined. It might be argued that its very rarity suggests that women's aggression, more than men's, springs from pathological disturbance. If this is so, then the attributions of pathological gender-role deviance or mental illness are veridical. However relative statistical rarity in and of itself does not invariably result in a more pathological label being applied. The point can be made by considering an area of dysfunction less laden with social condemnation. Dyslexia is four times more common in males than in females, yet we do not therefore assert that men's dyslexia is normal and women's pathological. Daly and Wilson (1994, p. 263) have argued strenuously that despite the rarity of violence "dismissal of violence as pathology cannot be sustained." I argue that the critical distinguishing feature in our understanding of male and female aggression is that male aggression is valorised by a set of "warrior values" (McCarthy 1994) that render it gender congruent even if illegal. But among women, aggression is considered "doubly deviant" in the sense that it violates typical and expected sex-appropriate behaviour (DeLisi & Soundranayagam 1990; Heidensohn 1996; Williams & Best 1990) as well as criminal law.

Why women's aggression has been stigmatised more than men's can only be surmised. Feminist commentators have suggested that it may serve to maintain female dependence upon men for protection (White & Kowalski 1994), to exclude women from warfare and from consequent political power (Lerner 1986), to deflect attention from the fact that much female aggression is responsive to men's domestic abuse (White & Kowalski 1994), or to control the use of aggression by women against dependent children (Macauley 1985). Specifically, the condemnation of female aggression takes two principal forms: (1) Aggressive women are behaving like men either as a result of societal changes or personality abnormality. (2) Aggression in women is the result of a permanent or temporary loss of rationality caused by mental illness or hormonal disturbance.

As an example of the former, the British press has recently reported the "arrival" of girl gangs. These girls have been labelled as "yobettes" indicating the media view that their behaviour is an attempt to emulate male "yobs." (A similar media concern with and analysis of female gang involvement has occurred in the United States, see Chesney-Lind 1993). The hypothesis that girls' assumption of masculine forms of aggressive behaviour is linked to changes in women's roles in wider society was first proposed by Adler (1975). Despite data which confirm that the percentage of female arrests for violence has altered little in the last 45 years (Steffensmeier & Cobb 1981) and that female criminality is more common among women who assume and endorse traditional roles for women (Smart 1979; Weis 1976), the media continue to disseminate the view that women's participation in hitherto "masculine" arenas of legitimate activity will result in increased involvement in masculine forms of illegal behaviour such as aggression. Prior to the women's movement, when social change could not be identified as a factor in girls' involvement in violence, theories dwelt upon the masculinity of female offenders but accounts were framed in terms of individual gender-role pathology (reviewed in Campbell 1992). Empirical studies using both direct ratings of masculinity–femininity as well as scales designed to tap male-typical agentic qualities (e.g., active, independent) have failed to find evidence that female delinquents have more masculine self-concepts than noncriminal controls (e.g., Norland et al. 1981; Thornton 1982). Despite this, a continued attribution of masculinity remains evident in popular treatments of women offenders (Kirsta 1994; MacDonald 1991).

On other occasions, female aggression is regarded as evidence of irrationality or psychiatric disturbance. Late luteal phase or premenstrual dysphoric disorder has been used to explain women's irrationality and aggression despite three decades of unresolved doubt about its medical status, and hormonal and neurochemical correlates (Blumenthal & Nadelson 1988). Many studies fail to find any reliable change in irritability over the monthly cycle (e.g., Ruble & Brooks-Gunn 1979) and critical methodological problems have been noted in many others (Parlee 1973). PMS is listed in the appendix of the DSM-IV pending further empirical support for its existence and it is estimated that only 3 to 5% of women may meet the proposed criteria for diagnosis. Self-report of premenstrual symptoms is more common among those who regard menstruation as debilitating (Brooks et al. 1977), who are experiencing neurotic and emotional problems (Kashiwagi et al. 1976), and who come from cultural groups which hold traditional views about women's role (Al-Issa 1982). The popular availability of the PMS diagnosis offers doctors and women a means of excusing their aggressive outbursts as a result of uncontrollable pathology. Despite the wealth of available research on the impact of testosterone in males (Archer 1991), male aggression is not routinely attributed by doctors to hormonal abnormality.

The tendency to pathologise women's violence more than that of men can also be seen in the criminal justice system. A woman appearing before a British court is twice as likely as a man to be dealt with by psychiatric rather than penal means (Allen 1987; Burns 1992). In Britain in 1995, women constituted only 3.7% of the prison population but 10.5% of those referred to special hospitals (psychiatric prisons). Given that women in the general population are more likely to receive a psychiatric diagnosis than are men, these figures could simply reflect women's generally greater vulnerability to mental disorder; however, a reversal of the normal sex differential in diagnosis is evident. When assigned to a special hospital, women are nearly twice as likely to receive a diagnosis of psychopathic personality than are males despite the 3:1 male to female ratio in the community at large (American Psychiatric Association 1994). This suggests the possibility that the legal definition of "abnormally aggressive or seriously irresponsible conduct" is being applied differently to men and to women.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

Allen's (1987) investigation of 129 London court cases concludes that "reports on males frequently cite histories of criminal delinquency and sexual promiscuity, but hardly ever suggest that these indicate any medical abnormality. A woman who manifests these traits, however, may be labelled as a psychopath" (Allen 1987, p. 81). In the United States also, when psychiatric symptomatology and degree of violence are controlled, girls are more likely than boys to be assigned to psychiatric units rather than correctional facilities (Lewis et al. 1982; see also Feinblatt & Gold 1976). If female aggression were driven by an ego-syntonic and treatment-resistant pathology such as psychopathy, we would expect to see higher recidivism rates for women than men. In fact, quite the reverse is true (Moseley & Gerould 1975; Norland & Mann 1984). Nevertheless, within mainstream prisons, more women's establishments provide psychiatric services and female prisoners are prescribed far more psychotropic drugs than are men (Camp 1974; Edwards 1986).

2.2. Sex differences in accounting for aggression

The stigmatised nature of female aggression has implications for the form of account which men and women offer of their own aggressive actions. Accounts (or explanations) make use of the available social representations which society provides. Social representations (Moscovici 1984) are mental models of phenomenon that encompass attitudes, values, images, and explanatory schema with regard to a particular topic. They are passed between people in the course of their interactions and through media communications. They serve to elaborate and explain commonly encountered experiences and so provide a shorthand guide for social interaction. Social representations stand as contemporary "theories" (Donald 1991) about many aspects of the physical and social world – including aggression. In Western culture there are two popular social representations of aggression – instrumental and expressive, which correspond to and derive from academic theories.

Expressive theories focus upon intrapsychic determinants of aggression within the individual. Expressive theories share a common concern with the buildup of tension, stress, or arousal and its consequent discharge through aggressive behaviour. Some emphasise the noxious motivational aspects (Berkowitz 1993; Bernard 1990; Dollard et al. 1939; Lorenz 1966), while others emphasise the failures of inhibition, self-control, or cognitive mediation which allow the accumulated anger to be expressed in behaviour (Eysenck 1964; Gottfredson & Hirschi 1990; Zillmann 1979). Under an expressive theory, the gratifications of aggressive action are seen as primitive, evident, and virtually instinctive. The goal of socialisation is to suppress and contain such behaviour.

Instrumental theories focus upon the positive interpersonal consequences of aggression for the aggressor. Operant theorists construct their argument in the language of positive or negative reinforcement and expectancies (Bandura 1973; Zillmann 1979). Tedeschi et al. (1974) suggest that the benefits of aggression inhere in the instrumental value of having one's needs met by others as well as the personal benefits of a sense of power and control. Black (1983) views violence as a means of informal justice used to remedy personal affronts and injustices by those who lack access to formal legal process. Impression management approaches share an emphasis upon aggression as a means of establishing and maintaining public "face" and private self esteem (Toch 1969; Wolfgang & Ferracuti 1967). Instrumental theories agree that aggression produces payoffs whether they be extrinsic (material or social benefits) or intrinsic (the gratification of power for its own sake).

These two forms of social representation correspond respectively to excuses and justifications which are used both to account for past acts and to disclaim future acts (Antaki 1994). A justification is a form of account where the actor accepts responsibility for the act but denies the inherent blameworthiness of his actions. An excuse is where the actor accepts the blameworthiness of the act but denies full responsibility for it. It is apparent that instrumental representations are justifications ("Aggression is necessary to get through to some people"), while expressive representations are excuses (" I believe aggression is always wrong. I believe that my aggression comes from losing control."). Given the taboo nature of female aggression and the greater institutional power of men, women should be more likely to employ excuses than justifications.

In a series of studies my colleagues and I have found significant sex differences in the degree to which men and women interpret their own physical aggression as relatively instrumental versus expressive (Campbell & Muncer 1987; 1994a; Campbell et al. 1992; 1993; 1996). Males in general are more inclined to describe their aggression in instrumental terms, viewing it as a form of legitimate social control over others' misbehaviour. Females in general are more likely to view aggression in expressive terms, as reflecting a regretted loss of self-control caused by high levels of stress. The effect size (weighted, unbiased estimate) over 1,674 subjects in 12 samples is $d = .842$. This significant sex difference remains when indirect forms of aggression are considered (Archer & Parker 1994), suggesting that females' tendency to excuse rather than justify is independent of the form which aggression takes. Though these social representations are culturally acquired, this learning takes place as early as 8 years of age (Archer & Parker 1994). I believe that social representations are post hoc rhetorical devices employed by socially situated individuals to explain their actions. By this I mean that the relative position of men and women in society in general and in relation to aggression in particular has an impact on the kind of account they are likely to offer. (Future research may reveal that females' tendency to excuse rather than to justify extends beyond the domain of aggression to other socially condemned and gender-role incongruent behaviours, see Archer & Parker 1994).

This emphasis upon the situated nature of accounting allows predictions about where and when men and women should show a reversal of the typical pattern. As mothers, women are charged with the control of their children and consequently are sanctioned to employ aggression legitimately as a form of discipline. A study of mothers' accounts suggests that in this area, they employ justifications when discussing routine child control which are frequently framed in instrumental terms – "I had to show him who was the boss," "It was a battle of wills and I knew I had to win" (Campbell 1995b). Conversely, men are sometimes placed in positions of powerlessness where they must account for their actions. Court transcripts indicate that male defendants employ excuses ("I just lost control") rather than justifications, when giving evidence (Cody & McLoughlin 1988). Mandatory treatment programs for abusive husbands seek to reduce justification use ("She was asking for

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

it") by stigmatising the target behaviour (Fagan & Browne 1994a). This frequently results in a move toward excuse-giving ("But I was drunk"). A similar effect has recently been reported by Archer and Haigh (in press) in which men's endorsement of instrumental (justificatory) statements about their own acts was significantly reduced when instructed to think about an episode of cross-sex violence as compared to same-sex violence. Another recent study which explicitly asked subjects to justify or to excuse an act of aggression demonstrated that both sexes endorse a significantly greater number of instrumental and expressive statements respectively than at baseline (Duckett et al., submitted). Such situated but predictable variability suggests that modes of account giving are a function of the degree of stigma associated with the act rather than an essential component of the speaker's sex.

In summary, under patriarchy male aggression has been treated as a natural (if sometimes criminal) expression of male competitiveness. Men describe their involvement in aggression in justificatory terms employing an instrumental representation to warrant the use of aggression. Women's aggression has been rendered unnatural and treated as evidence of pseudo-masculinity or irrationality. Consequently women describe their involvement in aggression in exculpatory terms employing an expressive representation which denies their full responsibility for their actions.

3. Conclusions

I have argued that women's aggression is likely to be principally concerned with scarce resources rather than with status and is likely to take low-key or indirect forms. This pattern flows from a consideration of the evolutionary constraints which have shaped contemporary female psychology. Culture accords meaning to actions and patriarchal control has resulted in a view of female aggression as unnatural. The taboo nature of female aggression causes women to employ exculpatory rather than justificatory accounts. Specifically, women use an expressive representation of their own aggression.

The "Madonna" idealisation of women as devoid of competition or aggression has alienated women from their own nature (Miner & Longino 1987). These recent cultural inventions are being challenged by women scientists in papers like "The myth of the coy female" (Hrdy 1986) and "The myth of the nonaggressive woman" (White & Kowalski 1994). It is ironic that some of these myths have been supported by the feminist movement, which has tried to insist that women's aggression is exclusively a response to male violence (see Campbell 1993). The idea that females could have survived without the motivation and ability to compete for scarce resources is, from an evolutionary viewpoint, untenable. Nonetheless it is a viewpoint that is congenial to the continuance of male protection and control over women.

ACKNOWLEDGMENTS

I would like to thank the Psychology Department at the University of Durham who granted me a term of research leave during which this paper was written. I am grateful to Dr. K. Hoyenga and seven anonymous reviewers who provided both theoretical comments and invaluable journal references. Thanks also to Steven Muncer, John Archer, Robin Dunbar, Kirsti Lagerspetz, and many undergraduate students who have discussed these ideas with me.

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Risk-taking, fear, dominance, and testosterone

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Abstract: Campbell's analysis of the evolution of human sex differences to include selection pressures on the female is generally welcomed. This commentary raises some specific issues about the evidence cited: the impact of paternal death on survival prospects; a possible mechanism underlying a sex difference in fear; the selective advantage of dominance hierarchies; and the absence of evidence that testosterone causes human aggression.

Sex differences in aggression have usually been approached from the perspective of selection pressures that make the male more aggressive than the female. Campbell's target article provides a welcome balance to this by considering pressures affecting female aggression. The evidence cited is wide ranging and generally convincing. One reservation is that the various hypotheses are at present supported by narrative reviewing. They therefore require further assessment using the more stringent criteria of meta-analytic reviewing. The remainder of my commentary concerns specific issues raised by some of the supporting evidence in the target article.

Campbell argues that because it is crucial for offspring survival that the mother stays alive, females are less risk prone. Although this is clearly the case, there is still a considerably increased risk for infant survival when the father dies (sect. 1.1, para. 9), so it is also important for fathers to stay alive. It follows from this that we should expect greater risk-taking among single men than among married men, and indeed this appears to be the case (Courtwright 1996; Daly & Wilson 1988a). If staying alive is specifically tied to protecting children, we should also expect differences in risk-taking between individuals with and without children for both sexes.

Campbell suggests that fear is the proximal mechanism underlying the lesser competition and risk-taking among women. Risk-taking would seem to be higher among men, especially young men, but is this because of their higher fear thresholds? There is some evidence that testosterone reduces fear in cattle (Boissy & Bouissou 1994; Bouissou & Gaudioso 1982) and sheep (Vandenheede & Bouissou 1993), but at present little evidence on the association of testosterone and fear in humans. [See Mazur & Booth: "Testosterone and Dominance in Men" *BBS* 21(3) 1998.]

The advantage attributed to dominance hierarchies ("a reduction in the frequency of conflict within the group") in section 1.3, paragraph 2, looks suspiciously group selectionist. [See Wilson & Sober: "Reintroducing Group Selection to the Human Behavioral Sciences" *BBS* 17(4) 1994.] An individual level advantage is clear for dominant individuals (their priority of access to resources) although the costs may be high in terms of fighting, energy expenditure, and effects on the immune system (Archer 1992, p. 132). The benefits to a low status individual of not challenging a more dominant one involve avoiding the high costs such a fight would entail (Barnard & Burk 1979) and follow game theoretic analyses of fighting strategies (Parker 1974). The high cost of challenging a dominant individual is precisely the variable that Campbell identified in explaining the lesser importance of dominance hierarchies among female primates.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

Campbell refers to "the wealth of available research on the impact of testosterone in males" (sect. 2.1, para. 8). She was pointing out the contrast between the use of hormonal explanations for women's but not for men's aggressiveness. However, nearly all the research linking testosterone and aggression is correlational. Overall, it indicates a positive correlation of low magnitude, which is found in some studies but not in others. At present, it is not clear what determines the presence or absence of an association (Archer et al., in press). Regarding the direction of the causation, there is clear evidence from a few studies that the consequence of a competitive or aggressive encounter can enhance testosterone levels in the winners, but at present there is no clear evidence of a causal link in the other direction (Archer 1994b). Despite this lack of evidence, statements indicating that testosterone causes aggression have appeared in both scientific and lay accounts. In relation to anabolic steroid abuse, the media have been quick to attribute male aggression to high doses of androgens.

As indicated earlier, any reservations I have about the target article are minor. Overall, I welcome and accept most of Campbell's argument as a significant contribution to our understanding of sex differences in aggression. Campbell's analysis could be used to direct further research, for example to examine the predicted association between risk-taking, fear, dominance, and testosterone among men and women.

Violence, sex, and the good mother

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Abstract: Campbell's evolutionary explanation of women's typically lower rates of interpersonal aggression is plausible, but some supporting evidence requires scrutiny. Women may not commit less interpersonal violence than men against small children. Women are more vulnerable than men in same-sex encounters. The link between dominance and reproductive success for males is less secure than was once thought.

There are two strands in Campbell's examination of women's aggression, one informed by evolutionary behavioral ecology, the other by feminist essentialism. From the point of view of the former, any organism's behavior – any *woman's* behavior, in the present context – is a product of her genetic endowment, her experience in past environments as manifested in her developmental history, and her present circumstances, all of which contribute inescapably to her beliefs and performance. There is no question of nature *versus* nurture; both are fully present in every act and attitude. From the point of view of the latter, a sentence such as "The 'Madonna' idealization of women as devoid of competition or aggression has alienated women from their own nature," (sect. 3, para. 2) is a meaningful statement.

The behavioral ecological thesis of the target article, that women are more fearful than men in potentially violent interpersonal relations because they generally have less to gain and more to lose, reproductively, from death or serious injury in a violent encounter, is plausible despite the article's failure to derive falsifiable predictions from the thesis. However, some of the steps of the argument need caution or expansion. I deal first and mainly with the literature review on the evolutionary ecology of women's violence.

Campbell makes much of "lower rates of aggression by women" (Introduction, para. 7; see also sect. 1.6; sect. 2.1), but two recent popular books (Kelleher & Kelleher 1998; Pearson 1997) summarize considerable evidence that sex differences in arrests and convictions for violent crimes are as much measures of the behavior of (overwhelmingly male) police officers and judicial authorities as they are registers of the prevalence of violent acts by women. As Campbell points out, seconding these popular authors, men in contemporary Western societies tend to underrate female violence, ignoring it, denying it, viewing it as trivial, and classing it as psychopathology rather than criminality. Over a decade ago, Strauss and Gelles (1986), in a study of family violence, found men and women to be equal in levels of perpetration of domestic violence. Of 137 cases of infanticide by natural parents recorded by Statistics Canada in 1961–79, the mother was the perpetrator in over 100 cases (Daly & Wilson 1984). Of the total of 405 cases of parental homicide of all children under 18 during the same period, women committed 239 (Daly & Wilson 1984). A survey of what cross-cultural evidence exists concludes that in general a child's mother is the individual "who most frequently implements the infanticide decision" (Scrimshaw 1984, p. 448). Evidence that women are less violent than men in all situations is not robust.

Nevertheless, the evidence from infanticide and juvenilicide is broadly supportive of Campbell's position that women tend to avoid the risk of physical danger to themselves more than men. With respect to the victim's ability to inflict retaliatory harm on an aggressor, children are to women as women are to men. Researchers have long argued that infanticide can be an act that best serves a woman's long term reproductive interests under a number of circumstances. The data suggesting that women commit substantial violence against children, perhaps more than men, do not contradict the behavioral ecological argument of this article.

Campbell's evidence that "given an equal degree of objective risk of harm, females will experience greater fear than will males" (sect. 1.2, para. 1) is abundant, but her conclusion that "this is not an argument for greater female vulnerability" (sect. 1.2, para. 7) misses the point. A woman with a small child – and in tribal societies most reproductive age women are accompanied by nursing children most of the time – *is* more vulnerable than a man because she must concern herself not only with the elevated mortality risk to the child that her own death would bring, but also with the elevated mortality risk to which a scuffle would directly expose the child. The danger would have been even more acute for our hominoid ancestors, who presumably clung to their mothers' fur like contemporary anthropoids.

Campbell also makes much of male dominance hierarchies among primates and the elevated reproductive success of the males at the top of those hierarchies (sect. 1.3, paras. 1 and 7). Recent chimpanzee research (Gagneux et al. 1997) on DNA paternity ascertainment has cast considerable doubt on the reproductive advantages of dominance. In addition, in the small hunting and gathering and horticultural societies that are our best contemporary evidence for the social forms of 99% of human history, the most common dominance-relevant characteristic is the absence of any form of coercive authority. When ethnographers speak of "chief" or "headman," they typically mean men who are admired and often emulated. The same ethnographies are full of comments on the inability of these men to compel anyone to obey them. In the best known tribal case in which dominant men are recorded to hold their positions by physical threat in something like the sense in which the word is ordinarily used in primate studies (Chagnon 1988), the correlation between dominance and reproductive success is based on local attribution of paternity, not DNA data. Substantial research effort is now directed to issues of actual paternity, and anthropological gossip suggests that we are in for some surprises.

One prediction that follows from Campbell's model is that in a situation where a woman had a high probability of early death independent of the amount of aggression she manifested, and where there were surrogate mothers to take over the raising of her child, and where, perhaps, her probability of obtaining a high quality mate could be augmented by violent aggression on her part, a woman would "act like a man," and manifest male patterns of aggression. This situation may be approximated in some inner city neighborhoods in the United States.

Finally, the remarks on "patriarchy" and its universality are naïve as social science, whatever may be their ideological virtue. Most of the small scale human societies that have ever existed have lacked the coercive institutions necessary to maintain "upper po-

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

sitions in hierarchies" (sect. 2.1, para. 3) in the sense that Goldberg (1993), the cited reference, understands them. To project modern state power struggles onto societies without hierarchies is inadequate social science.

Females' desire for status cannot be measured using male definitions

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Abstract: The development of physical traits and the formation of alliances are two important means of attaining status for both sexes. The types of physical traits and alliances that are linked with status, however, differ for the two sexes. Sex differences in the characteristics that lead to the acquisition of status must be considered before concluding that females are less concerned than males with status.

The theory that female lower rate of direct aggression is due to the mothers being more essential than the father to their offsprings' survival is compelling and well supported by data. The additional argument that "females are relatively indifferent to status," however, is not convincing. Theoretically, there is little basis for assuming that the relation between status and resources differs for males and females. Empirical data indicating that females are less concerned with status probably stems from a male definition of status.

Research has demonstrated that the characteristics leading to the acquisition of status are not identical for males and females. Yet, Campbell refers to physical toughness as a determinant of status for both sexes, then concludes that females are not concerned with status – for example, "for females public recognition of toughness of status is not important." For both sexes, status acquisition is correlated strongly with physical traits and the formation of alliances as well as with factors such as intelligence, boldness, and persistence (e.g., Ellis 1995; Omark et al. 1980). Whereas some characteristics associated with status may be identical for both sexes, two of the most important ones, physical traits and alliances, are not. In humans, the physical traits associated with status are physical toughness and coordination for males and physical attractiveness for females (e.g., Buss 1994; Tuddenham 1951). The alliances associated with status in humans are related to position in a dominance hierarchy for males and to connection with individuals of high status for females (e.g., Benenson 1990; Eder 1985). Across species, physical traits and types of alliances virtually always differ by sex (e.g., Smuts et al. 1986; Wrangham 1980). Status is so highly correlated with physical traits (e.g., Buss 1994; Ellis 1995) and alliances (e.g., Chapais 1996; Hrdy 1981; Omark et al. 1980) that sex differences in these two characteristics must be considered before concluding that "females show less concern with status than do males."

Studies of the correlates of status in adolescents from all levels of socioeconomic status (SES) have yielded consistent results, at least in the United States: a high degree of consensus on status rankings is found for both sexes, but status is linked with different attributes for males and females. For males, it is associated with strength and coordination and being a member of an athletic team, and for females with attractiveness and being close friends with popular girls (e.g., Coleman 1961; Douvan & Adelson 1966; Eder 1985; Eder & Kinney 1996; Eder & Parker 1987; Gordon 1957; Merten 1996). Similar results have been reported with primary school age children (e.g., Benenson 1990; Tuddenham 1951).

Girls are just as interested in status as are boys, if not more so. Eder (1985) reported that a girl will forfeit just about anything, including her closest friend, to increase her status with other girls. As another example, when upper-middle class white adolescents were asked how they would feel if their closest friends achieved higher status across different domains, the girls wrote they would be significantly more upset than the boys (Benenson & Benarroch 1998). In a third study, observations of working-class African American children and adolescents showed that status was enhanced for males through denigrating others' abilities in face-to-face interactions and for females through forming coalitions that excluded specific peers (Goodwin 1990). Additional studies show that adult females of all SES levels are highly invested in enhancing their own status as well as in mating with high status males (e.g., Buss 1994).

Status is also linked with coalitions. Campbell concludes that the lack of clear dominance hierarchies formed by females indicates that "dominance is more central to boys than to girls." Dominance hierarchies form only in groups, however, and studies have shown that in both human beings (e.g., Benenson 1990; Benenson et al. 1997; Lever 1978b; Savin-Williams 1980) and chimpanzees (e.g., Goodall 1986; Nishida & Hiraiwa-Hasegawa 1987), females interact in intense one-on-one relationships, whereas males interact in loose groups. Groups require clear hierarchies to attain goals. Members with lower status benefit from the accomplishments of the whole group. In contrast, dyads demand more equality. Dyadic asymmetry must provide strong benefits to both members, or each has reason to find a more egalitarian relationship. In an experimental study of male undergraduates in groups varying in size, Bales (1965) showed that compared to larger groups, dyads contained more tension, more agreements, and fewer disagreements. In larger groups, individuals were freer to state their own competing opinions without fearing the collapse of the group. Similarly, in a recent study, both male and female children reported that they preferred to compete in a group rather than against one other individual (Benenson et al., submitted). The studies described by Campbell are naturalistic observations in which boys generally interact more in groups and girls in dyads. Overt expression of competition is easier in groups and therefore higher for boys, but that does not permit the conclusion that girls are less interested in promoting their own status.

Finally, in most species, females maintain more cross-generational ties than do males. In humans and most primate species, the closest and longest lasting bonds are between mothers and daughters (e.g., Belle 1989; Hrdy 1981; Smuts et al. 1986; Troll 1987). This makes evolutionary sense as females are more invested in raising offspring than are males. Cross-generational ties are hierarchical by definition: status is determined by age. In contrast, male primates, including humans, spend more time with unrelated peers (e.g., Benenson et al. 1998; Berman et al. 1994; Biben & Suomi 1993; Goodall 1986; Whiting & Edwards 1988) and status must be negotiated. Although researchers conclude that males are more hierarchical because they continually negotiate small status differentials with peers, in fact, females' relationships with family members of different generations are far more hierarchical.

In summary, if characteristics that lead to the acquisition of status, especially physical traits and alliances, are defined differently for females and males, then data suggest that females are just as interested in status as males are. As Hrdy concludes from her observations of many lower primates: "the central organizing principle of primate social life is competition between females and especially female lineages. Whereas males compete for transitory status and transient access to females, it is females who tend to play for more enduring stakes, (Hrdy 1981, p. 128). Similarly, in his extensive observations of Japanese macaques, Chapais concludes that "high status is highly sought for by females" whenever they have the opportunity (Chapais 1996, p. 13). Although it is more difficult to note status differentials in female chimpanzees because they are solitary or interact only with offspring, compared with males who interact in groups, when females form stable relationships, status hierarchies are as clearly defined as for males (e.g., Goodall 1986). In humans, although a sports car may be

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

more conspicuous than a shapely body covered with jewelry, it is difficult to conclude that women, even married women with many resources at their disposal, are not as concerned as men with status. Campbell's explanation for females' more indirect style of aggression, however, applies equally to females' apparently lower interest in status. Direct confrontation for status, as for resources, could threaten a female's life. More discreet attempts to accentuate relative attractiveness and form coalitions with individuals of higher status are less costly.

When women win

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Abstract: In *Homo sapiens* and other species, promiscuity, risk-taking, and aggression are less matters of sex (having XX vs. XY) than gender (giving PI vs. resources and/or genes). Classic role reversals include: seahorses, polyandrous birds, and a few heiresses in England and Rome. Unlike other females, but like many males, they are assertive, they take chances, and they are not chaste.

Women are born genetic also-rans. Fathers inject DNA (and little else) into nutrient rich eggs that imbed in nutrient rich bodies that give birth to babies dying to get fed (and more) by their mothers for as long as they live. Having left his DNA, a man can walk away. What do women get back? What's the advantage in sex? In two words: better babies. In other words: babies more likely to survive and breed – for example, by winning the fight against parasites (Gangestad & Thornhill 1997; Hamilton 1998; Møller et al., in press). Most women, like most females, work hard for good sperm. The point of being female, in the evolutionary game, is to hitch one's genes to one's better's, and to pay for the ride by carrying the load. The upshot, as Darwin (1871) was sure, is that males risk their lives fighting for females, while females risk their lives fighting to defend their young.

There are a few natural historical exceptions. There are the Syngnathidae, Tinamous, and Phalaropes – pipefish, seahorses, and polyandrous birds – an odd group in which "the male customarily assumes all or most of the burden of incubating the eggs and feeding the young," while "the female is the aggressor in courtship." She is brighter, takes more risks, and is more promiscuous (Williams 1966, p. 186).

There are a few historical exceptions, too. Men and women have more to offer their offspring than their bodies. They offer money. Most of the money (and land, and movable property) is passed on to men. There are good evolutionary reasons for that: rich men can make hundreds of children by hundreds of women; rich women make an order of magnitude fewer. To the extent that their reproductive potential exceeds their sisters', sons should be favored over daughters – and, in fact, they are (Cowlishaw & Mace 1996; Hartung 1982; Trivers & Willard 1973). But sometimes there is no son, and a daughter steps in. She tends to be showier, bossier, and less chaste than her peers.

There are some lovely examples from ancient Rome. The first Roman emperor, Augustus, seems to have had sex with many women; but he had just one legitimate daughter, and no legitimate sons. So he looked forward to leaving the empire to Julia, his daughter – and to Lucius and Gaius, her own legitimate sons. But Julia behaved badly. She failed to embody the Roman feminine ideal: she was neither *morigera* (subservient to her husband), nor *univira* (committed to a dead one); she lacked *obsequentem* (obedience), and *sempiternum* (commitment); she was short on *pietas* (devotion), *fides* (fidelity), and *pudicitia* (chastity). Rather, she was "so dissolute" as to stay up nights drinking in the Forum with boyfriends. Augustus and his third wife (Livia, Julia's stepmother) were not amused: they had her exiled, and a few of her lovers killed. Years later, Julia died of "general debility and starvation" after Tiberius (Gaius and Lucius's step-father, and Livia's son) had her put under lock and key. Two centuries later, Faustina fared a little better. She was the emperor Antoninus Pius's daughter, and became the emperor Marcus Aurelius's wife. Marcus's tenuous hold on imperial power was, in short, through her – of which he was well aware: "If we send our wife away, we must also return her dowry," (that is, Rome) "which he had inherited from his father-in-law." Faustina got away with everything short of murder: she died a natural death (of gout) soon after a lover's insurrection was put down. But she was fondly remembered by her devoted husband, who thanked heaven in the *Meditations* he wrote down shortly before his own death, for a wife "so submissive, so loving, and so artless." As Plautus – who wrote plays in the second century BC – said: "A wife without a dowry is under her husband's thumb; with one, she can condemn him to misery;" or, as Juvenal (who wrote satires in the second century AD) said again: "in the old days, poverty kept Latin women chaste" (see Betzig 1992; quotes from Dio, lv.10, lvii.18; *Historiae Augustae, Marcus Antoninus,* xix.7–9; Marcus Aurelius, *Meditations,* i.17; Plautus, *Aulularia;* Juvenal, *Satires,* vi).

There are some lovely examples from modern England as well. Particularly telling is the contrast between Henry Tudor's daughters. Henry VIII had some trouble getting an heir. The effect was six wives who were (in order) divorced, beheaded, died, divorced, beheaded, survived. On Catherine of Aragon, the first of these wives, Henry got Bloody Mary, Queen of Scots I; on Anne Boleyn, the second, he got Queen Elizabeth I. Mary was well married – to Philip II of Spain, son of Charles V, the most powerful monarch in Europe. She was deeply in love, and wrote Philip's father, "I daily discover in the king my husband and your son so many virtues and perfections that I constantly pray God to grant me grace to please him and behave in all things as befits one who is so deeply embounden to him." Philip was a little less pleased with his wife. She was already thirty-seven, unable to bear him an heir (in spite of a couple of trumped up false pregnancies), and queen of a country already rumbling with democracy. Philip had less and less to do with England; and (four years after she married, soon after her second false pregnancy) Mary became weak and depressed, developed a fever she couldn't shake off, and died while her husband was out of town. It was her little sister Elizabeth's turn. Unlike Mary, Elizabeth never married: the "virgin" queen ruled alone – with a coterie of Protestant capitalist councillors – for nearly half a century, and brought England into the modern age. In Holinshed's words: "After all the stormie, tempestuous, and blustering windie weather of queene Marie was overblowne . . . it pleased God to send England the calme and quiet season" of Elizabeth's reign (Betzig 1998; quotes from Cal. Spain, xiii.28; Holinshed, *Elizabeth,* AR1).

But the loveliest examples of all are here and now. In this century, Indira Gandhi got power the old-fashioned way – she inherited it from her father. But Margaret Thatcher, Sandra Day O'Connor, Ruth Bader Ginsberg, Janet Reno, and Madeline Albright have come into power on their own. In the last few centuries, in a few countries, monarchies have run their course, and democracies have taken their place. Variance in power, money, and reproductive opportunities have all levelled off. To the extent that they have, the incentive to favor sons over daughters is gone. If Trivers and Willard were right, then patriarchy should end with polygyny. That seems to be what's going on.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

Aggression in female mammals: Is it really rare?

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Abstract: The view that female mammals are more docile appears to arise in part from imposing human values on animal studies. Many reports of sexual dimorphism in physical aggression favouring the male in laboratory rodents appear to select circumstances where that expectation is supported. Other situations that favour the expression of conflict in females have been (until recently) relatively little studied. Although female rodents generally do not show the "ritualised" forms of conflict that characterise male sexual competition, they can use notably damaging strategies (especially if they are of short duration). Such considerations might weigh in the selection of strategies by our own species.

Campbell's target article presents the interesting concept that human females may favour low risk, indirect, and verbal forms of aggression because of an evolutionary imperative to preserve their lives (and health) for the general benefit of their offspring (these being more dependent on the mother than the father). Her arguments about the inappropriateness of classifying female aggression as "gender incongruent" or "evidence of irrationality" are certainly worthy of support. Early assumptions about the sexual dimorphism of "aggression" (with human stereotypes of males being robust and aggressive and females caring and nurturiant) appear to have led to an almost total concentration by researchers on male rodents to assess such phenomena (Brain & Haug 1991). Brain et al. (1991; 1992) have reviewed the evidence that prenatal hormonal exposure (by "leakage" of androgens from the placentae of male siblings) will change the predisposition for interfemale aggression in mice. [See also Fitch & Denenberg: "A Role for Ovarian Hormones in Sexual Differentiation of the Brain" *BBS* 21(3) 1998.] Some strains of wild caught mice can also be selectively bred for a high incidence of this behaviour. Such behaviour can serve valuable functions in the social organisation of this species (Brain & Parmigiani 1990).

Female aggression in mice is also associated with non-receptivity, pregnancy, cohabitation with a pregnant animal, and the immediate post-partum period. Interestingly, attacks are often directed by female mice (and male castrates) at lactating females or animals marked with the odour cues of such animals (suggesting that they are perceived as "dangerous").

Post-partum (or "maternal") aggression is characterised in mice by very damaging physical attacks which show none of the restraints used in ritualised intermale forms of aggression (where the head and ventral surface of the opponent are largely avoided as bite targets). Paul (1986) and Parmigiani et al. (1989) have suggested that such behaviour is a counterstrategy to male infanticide (shades of Campbell's arguments which effectively deal with genetic investment). As the behaviour delays (rather than prevents) the killing of neonates by determined males, Parmigiani et al. (1988) have speculated that it is also a form of female sexual selection as current genetic investment is only replaced by males with good fighting ability.

Other commonly used laboratory rodents (e.g., rats, Golden hamsters, Mongolian gerbils, and Guinea pigs) have also been shown to express female forms of aggression in the appropriate circumstances. For example, female rats housed in mixed sex colonies will attack *female* (but not male) intruders (these are potential sexual competitors). Unlike males, they do not become relatively "permanently" submissive after losing an aggressive encounter. [See Mazur & Booth: "Testosterone and Dominance in Men" *BBS* 21(3) 1998.] There is also good evidence that aggression is associated with the post-partum period in this species. Female Golden hamsters are notably more aggressive than their male counterparts, being especially hostile on the day of parturition and when lactating. It has been speculated that females of this desert-living species are only tolerant to other individuals when they are sexually receptive. The accumulated data emphasize the clear link in infra-human animals between reproduction and female conflict behaviours.

There is also increasing interest in female aggression in primates (e.g., Smuts 1991), and the view seems to be developing that physical aggression in females is more common in the animal kingdom than had been assumed. It seems likely that females will select attack strategies where the benefits (in terms of enhancing or protecting reproductive investment) outweigh the costs (in terms of potential injury and energy expenditure). In this sense, Campbell's views are simply an extension of principles widely held in behavioural ecology. Females, rather than being nonaggressive, simply calculate when and how to use available strategies differently from males.

The relevance of sex differences in risk-taking to the military and the workplace

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Abstract: Sex differences in willingness to take physical risks and in concern for peer esteem may be relevant to whether women should serve in combat, since two major fears soldiers experience are of being injured and of not measuring up as warriors. Women's relative aversion to nonphysical risk may have workplace implications, since risk taking is an attribute of most successful executives.

Campbell's analysis of sex differences in risk-taking provides a more complete account than is typically found in the literature, emphasizing that, evolutionarily, women have not only had less to gain from taking risks but have also had more to lose. Because death has greater negative fitness consequences for females, women are more concerned with staying alive than are men and will experience greater fear when exposed to an equivalent degree of physical risk.

This sex difference in willingness to take risks bears on the question of whether women should serve in combat. Combat involves perhaps the starkest physical risk to which civilized people deliberately expose themselves. It has long been understood by those seeking to motivate soldiers that overcoming or at least managing fear is essential to the enterprise (Stouffer et al. 1949). Moreover, willingness to expose oneself to danger is an important attribute of effective combat leaders (Frost et al. 1983).

Men experience two fundamental fears before battle. The greatest fear in men who have never before faced combat is that they will let their comrades down and not measure up to the manly warrior ideal (Dollard 1944). This fear seems to be positively motivating in that it inspires men to act despite their fear, because by not acting a man stands to lose "the one thing that he is likely to value more highly than life – his reputation as a man among other men" (Marshall 1947, p. 153). Supporting the notion that men are substantially motivated by peer pressure is the finding that soldiers who man crew-served weapons, where default is obvious to comrades, are considerably more likely to fire on the enemy than are riflemen.

The greatest fear in men who have previously faced combat, and therefore have less anxiety about how they will react to it, is that they will suffer permanently disfiguring physical injuries, with injuries to the abdomen, eyes, brain, and genitals being at the top of the list (Dollard 1944). These men have seen the carnage of war and quite naturally have no desire to become part of it. This kind of fear is likely to affect combat motivation in a negative way. The conflicting pressures of these two kinds of fear leads to the perhaps unexpected conclusion that green troops can sometimes be motivated to take actions that would be resisted by battle-hardened veterans.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

One would expect substantial sex differences in both kinds of combat fear, with women experiencing less motivation to conform to the manly ideal while experiencing greater concern for physical safety. As Campbell's analysis shows, women are likely to act as though they have less to gain and more to lose from exposing themselves to combat risks. If the effect size of this difference is large and persistent even after training, and if there is no practical way to judge in advance whether an individual will be willing to take necessary risks, the sex differences in risk taking that Campbell identifies may be relevant to the question of whether women should serve in combat.[1]

Although Campbell's analysis of female aversion to physical risk is persuasive, her emphasis on such risks (sect. 1.2) might erroneously be taken to imply women are not relatively averse to nonphysical risks. The dichotomy she draws between concern with "direct risk of injury," for which a sex difference exists, and "openness to experience," for which no difference is found, may not be the operative distinction; instead, the distinction may be between "risky situations" and "novel but not risky situations." Gambling, for example, which is by definition economically risky (but generally physically risky only when the gambler defaults), is a disproportionately male activity, especially when the stakes are high (Wilson & Daly 1985).

Differences in attitude toward nonphysical risk may partially explain sex differences in achievement orientation (Arch 1993). Achievement situations often present uncertainty and opportunities for loss of resources. Just as a mother's loss of life imperils her offspring – inclining women not to risk their lives as readily as men – her loss of resources may likewise endanger her young, inclining women to be more reluctant to risk their resources as well.

Sex differences in nonphysical risk-taking have substantial workplace implications (Browne 1998; 1995). Studies of successful executives routinely find that risk-taking is an important trait (Morrison et al. 1992; MacCrimmon & Wehrung 1990). The risks that successful executives take are typically not physical ones, but rather "career risks" that, if they pay off, will lead to career advancement, but if they do, not may lead to career setbacks.

Sex differences in willingness to take both physical and nonphysical risks have important policy implications. Campbell's insightful target article is a substantial contribution toward our understanding of the origin of those differences.

NOTE

1. This is not to suggest that only sex differences in risk taking are relevant to that question, however, as sex differences in aggressiveness, physical strength, and even cognitive traits may be germane, as is the effect of the introduction of women on unit cohesion (see Henderson 1985).

The evolutionary psychology of patriarchy: Women are not passive pawns in men's game

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Abstract: We applaud Campbell's cogent arguments for the evolution of female survival mechanisms but take issue with several key conceptual claims: the treatment of patriarchy; the implicit assumption that women are passive pawns in a male game of media exploitation; and the neglect of the possibility that media images exploit existing evolved psychological mechanisms rather than create them.

We commend Campbell on an insightful target article, which synthesizes much that is known about the evolutionary psychology of aggression, social status, and the nature of intrasexual competition. She offers a plausible theory of the evolution of female survival mechanisms such as specific fears and avoidance of violent and physically risky confrontations. This commentary contests several key issues, however.

The first issue pertains to the origins and evolution of "patriarchy," in which Campbell seems to assume that males have somehow usurped control over females. There is evidence, as Campbell suggests, that men in all cultures tend to control more economic resources and occupy more positions of formal power. But the implicit assumption in Campbell's analysis is that women are passive pawns in men's game. There are two problems with this assumption. First, it contradicts the general thrust of her theory, which emphasizes often overlooked aspects of women's evolved aggressive and competitive strategies. Second, it ignores women's active role in the creation of male control over resources, position, and power.

Buss (1996) has proposed a coevolutionary theory to explain the origins of "patriarchy," suggesting that women's preference for men with resources and men's competitive strategies have coevolved, the outcome being a tendency for men worldwide to control more resources, power, and position than women. There is strong evidence from a study of 37 cultures involving 10,047 participants that women have a greater desire for long-term mates who not only possess economic resources, but also possess characteristics that are likely to lead to resources over time, such as ambition, industriousness, and social status (Buss 1989). These preferences, operating repeatedly over human evolutionary history, have led women to favor as mates men who possess status and resources and to exclude from mating men lacking status and resources. Men in human evolutionary history who failed to acquire resources and status were more likely to have failed to attract mates.

Women's preferences thus established an important set of ground rules for men's intrasexual competition. Modern men have inherited from their ancestors psychological mechanisms that not only give priority to the attainment of resources and status, but also lead men to take risks to attain them. Men who failed to give the goals of attaining status and resources a high motivational priority were more likely to fail to attract mates. Women's preferences and men's intrasexual competitive strategies thus coevolved. The intertwining of these coevolved mechanisms in men and women created the conditions for men to dominate in the domains of resources, position, and power, according to this theory (Buss 1996).

This evolutionary origin of "patriarchy" is not merely an incidental historical footnote; it has profound bearing on the present. Women today continue to want men with resources, and continue to reject men lacking in status and resources (Buss 1994). Women who earn more than their husbands, for example, divorce at twice the rate of women whose husbands earn more than they do. The forces that originally caused the resource, status, and power inequity between the sexes – women's preferences and men's coevolved competitive strategies – contribute to the maintenance of "patriarchy" today. Women are not passive pawns of a male imposed system.

Campbell's analysis also seems to assume that women are passive victims of men's control over media messages, and we find this assumption problematic (see Kenrick et al. 1996). Specifically, her analysis assumes that media messages are passively adopted by women and men and hence affect their psychology (e.g., in the valorization of men's aggression and the pathologizing of women's aggression). This ignores a plausible suggestion that media messages are *products* of women's and men's evolved psychology that merely *exploit* the existing mechanisms of media consumers rather than create them. With respect to aggression, for example, men are likely to have evolved a coalitional psychology that places high value on physical prowess in other men; and women are likely to have evolved a preference for men with the physical and aggressive prowess to offer them and their children protection (Buss 1994). The media messages may not "cause" the valorization of men's physical prowess, but may be a product of the human evolved value of it and resonate with media consumers precisely because of that evolved value.

Campbell's examination also fails to detail the context-specific nature of whether men's and women's aggression is considered

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

valorous or deviant. The context in which aggression takes place largely determines how it is construed. For example, a man who walks into an elementary school with a gun and starts shooting children is not likely to be valorized by anyone. And a woman who shoots a burglar because he is about to harm her children is likely to be viewed as courageous, not deviant.

Campbell argues that the patriarchally controlled media messages have caused the intriguing sex difference she discovers – that men are more likely to justify their aggression as due to instrumental goals, whereas women are more likely to offer excuses in forms such as lost self-control. Campbell's discovery is important, but her explanation ignores the possibility that these sex differences merely reflect sex differences in evolved competitive strategies. There is no reason to believe that humans are passive receptacles of cultural messages (Tooby & Cosmides 1992).

As a final point, we would like to stress a fact that Campbell clearly acknowledges early in the target article, but subsequently downplays when it comes to her speculations about patriarchy and media control – that men are in competition primarily with other men, not with women. Although the target article clearly acknowledges that men compete primarily with other men for access to women through hierarchy negotiation and aggressive confrontation, this key point is subsequently ignored in Campbell's analysis of patriarchy. Men are not united in their interests. Yes, men do want to control attractive and reproductively valuable women. Men strive for status and resources because these qualities are helpful in successfully besting other men in their competition to attract women. Men deprive other men of their resources, exclude other men from positions of power and status, and derogate other men in order to make them less desirable to women. Men form coalitions, but as Campbell acknowledges, these coalitions are designed primarily to out-compete other men. Neither men nor women are united in their interests with members of their own sex. Neither women nor men are passive pawns of culture, patriarchy, or the strategies of the opposite sex. Discussions of "patriarchy" that neglect these key points are misguided.

Warrior values and social identity

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Abstract: A single evolved psychological mechanism, social identity, may help explain the development of salient sex differences in aggression. Bearing children automatically provides a basis for positive social identity for females. Masculine identity is more problematic, especially where the range of possible cultural roles is small. Ethnohistorical data provides insight into the overlap between masculine values and warrior values.

> She who faces Death by torture for each life
> beneath her breast
> May not deal in doubt or pity – must not swerve
> for fact or jest.
> These be purely male diversions – not in these her
> honour dwells.
> She, the Other Law we live by, is that Law and
> nothing else.
>
> Rudyard Kipling,
> *The Female of the Species*, 1911

I am puzzled as to why Campbell uses crime statistics to motivate her inquiry. What counts as a crime depends on ever-changing cultural values, and as a measure of aggressiveness, criminality may well be an evolutionary aberration. Living in a modern "faceless society" has different social constraints and requirements compared to preagricultural, face-to-face group living. This commentary looks to premodern cultures as a source of hypotheses about warrior values.

Campbell calls the valorization of warrior values, which overlap with masculine values, the critical feature for understanding differences in male and female aggression. She argues that patriarchal culture enhances evolved sex differences by stigmatizing female aggression so as to continue men's control over women. However, this explanation prematurely forecloses examination of *women's* participation in the production and reproduction of patriarchal culture. In effect, Campbell reinforces rather than exposes patriarchy because her argument focuses on the agency and activity of males while females are backgrounded and made invisible – a result I doubt Campbell intends.

The remedy is to shift the focus of analysis from male agency to female agency, a step Campbell begins to make in her analysis of females "staying alive." Although men fight, war engages a society. How do women participate and to what advantage? After all, every man who dies is some woman's reproductive investment or potential economic resource. Why do most women support or valorize war? Why not go on strike and end war?[1] A brief foray into the ethnohistorical literature turns up three interesting observations.

First, women *do* fight. When war is at the threshold of home, sex ceases to be a criterion for who may or may not bear arms. Women have fought without appropriate training or weaponry. There are also occasions when women have engaged in loosely organized violence – riots, rebellions, and "women's wars" (Ardener 1973). As Campbell might predict, these involve a common defense of resources necessary for women's perceived role in providing food. Examples include the Igbo women's war, the babski bunty rebellions, the *femmes san-culottes* of the French revolution, and American women's protests in the 1950s over strontium 90 in milk. In 1958, 7,000 African Kom women responded to an *anlu* (women's war) call to protest colonial policies reducing women's traditional control over farming. A number of women were killed or injured when authorities shot into the crowd. However, it will be important in future research to determine the relationship between defense of resources and defense of female social identity. *Anlu* was a traditional response to sexual insults (such as unflattering remarks about her genitals) that devalued a woman's female identity. Recent court records show that monetary awards in compensation for such insults were considerably higher than awards for divorce or adultery.

Second, on rare occasions, women became warriors. It appears they were required to reject functionally female and socially feminine identity by vowing to remain virginal and adopting the attributes of masculine identity. Joan of Arc is probably the most familiar example. Among certain Germanic groups, a woman could reject a potential husband chosen by her family by swearing virginity and adopting the clothing and life of a warrior alongside male warriors. The Dahomeans, who had a state-level social organization, had a corps of women warriors – all sworn to remain virgins (not all of them did) until receiving the king's permission to marry. Vowing virginity may be anachronistic in modern states, although the expectation that women at war adopt masculine identity may still express itself more subtly. Soviet women fighter bombers began their missions at the end of World War II under the leadership of a woman who tolerated small, hidden infractions of regulations related to feminine identity (e.g., long hair hidden under a cap, bows on underclothes). When she was killed on a mission, her replacement, a male, vigorously prohibited all signs of femininity (Myles 1981). Males in premodern groups often claim that they "are no longer men" because European intervention has ended traditional warfare (Sanday 1981; Turney-High 1971). The importance of warfare as an exclusively masculine activity is one rationale for prohibiting women from participating in combat in the American military (Golightly 1987).

Third, in premodern societies, blood binds childbirth and warfare (Sanday 1981; Turney-High 1971). Among the Spartans, both sexes were perceived to endure pain and risk death for the collective purposes of the state. Men who died in battle and women who died in childbirth were the only people whose names were inscribed in stone at their deaths. The Ashanti also had rituals for women who died in childbirth that mirrored those of men who

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

died in battle. In other cultures, the connection between childbirth and war is also posed as a polarity between "making life" and "taking life." Tacitus (Ger. 30) reports that among some barbarians, it was customary for youth to remain unkempt like a child until they paid for their birth pangs by killing an enemy. Among the North American Papagoes the scalp of an enemy was a "child" that brought satisfaction to its "mother" – the warrior who killed for it.

Perhaps warrior values are in some respects a collusion between males and females rather than a product of patriarchal culture. People adapt to their habitats through groups, and male dominance is highly correlated with the difficulty of an ecology (Sanday 1981). Elsewhere I have argued that the psychological processes of social identity are part of the evolution of face-to-face group coordination (Caporael 1997; Caporael & Baron 1997). Psychologically, people categorize themselves and others in terms of contrast or opposition to another group. In the case of pre-modern women, childbearing provided a highly visible and salient basis for female social identity. However, there was no parallel contrast that provided a basis for masculine social identity – "what men do" and only men do. Masculinity, no matter how it was defined, which was quite variable, had to be culturally constructed. This occurred by opposing and contrasting "what men do" to childbearing and to an equally socially constructed femininity that prohibits and prescribes the behavior of women. Such constructions, however, are never quite secure, vulnerable as they are to debate and argument. Both men and women may fight to defend their social identities, but women would fight less often because their identity, grounded in childbearing, is less often challenged.

So-called "primitive war" lacked tactics, supply lines, coercive recruitment, and the other organizational features – to say nothing of weapons – that make war so deadly. Females participated in the valorization of war because the costs were relatively low and because women, like men, are obligately group-living creatures.[2] Modern conditions have changed dramatically, however. Technology has all but eliminated the pain, danger and mystery of childbirth for women, and at the same time, has increased the risks to males, not only from violence, but from cars, motorcycles, and speedboats as well as the machines that take the place of hunting and gathering. People may shift identities by shifting their primary reference groups, and there are many more ways that masculine identity can be defined than in contrast to childbearing. The hypothesis proposed in this commentary differs from Campbell in that it invokes an evolved psychological mechanism that is the same for males and females, but its operation on visible biological sex differences produces asymmetries in social categorization, behavior, and evaluation.

NOTES

1. In Aristophanes' play, *The Lysistrata,* women bring an end to war by refusing to have sex with their men. Widely known as a "peace play," the comedy closes with the players singing to the glories and honors of past wars and a reminder that Greeks should not be fighting Greeks when there are barbarian hordes to battle. A more complete account of ideas and references for this commentary are from Caporeal (1987).

2. This is not to deny that many women suffered, and continue to do so, under the exploitation of patriarchy (Enloe 1989).

How women compete

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Abstract: Men are more physically aggressive and more risk-prone than women, but are not necessarily more competitive. New data show the gender difference in competitiveness to be one of kind rather than degree, with women and men competing in different ways and, to some extent, over different objectives, but not differing in overall strength of competitive feeling.

Men are indisputably more physically aggressive and more risk-prone than women. But does this mean that they are also more competitive? Hitherto, evolutionary psychologists have stressed that the sex difference in aggression stems from the fact that men have more to *gain* from such behavior: because of polygyny, winning a competitive encounter can produce enormous fitness benefits for men whereas losing can result in fitness failure. Campbell, in this excellent synthesis of her earlier work, points out that women also have far more to *lose* from physical aggression and risk-prone behavior: greater parental investment by women means that their health and survival are essential for the survival of their offspring. These two arguments lead to different predictions. The former, which hinges on the greater variance in male reproductive success, suggests that men will be more competitive overall. The latter suggests only that female competition will take less dangerous forms. In my view, the latter conclusion is unassailable but the former is far from proven.

There are at least three reasons why the extent of female competition has been underestimated: (1) women often suppress their competitive ability in the presence of males (Weisfeld 1986), (2) indirect aggression, the one type of aggression in which women exceed men, is the most difficult to document (that is, after all, its aim), and (3) aggressive and nonaggressive forms of competition require different tools for measurement. Ecologists sometimes distinguish *interference competition,* where one interferes with the ability of one's competitor to gain a resource, from *exploitation competition,* where there is direct competition for resources without interaction among participants (Begon & Mortimer 1981, p. 66). Interference competition is typically expressed by aggression and dominance striving, exploitation competition by the input of time and resources into trying to gain scarce resources. Clearly, competition can be intense without involving direct aggression.

My own data (Cashdan 1998), derived from diaries of competitive interactions and from self-report questionnaires, indicate that the difference in competitiveness between women and men is more one of kind than of degree. Women and men compete in different ways (men use more physical aggression), against different opponents (men's diaries contain more same-sex competition), and, to some extent, over different objectives (women compete more about looking attractive, men about athletics). But I found no difference in the strength of competitive feelings overall; nor were there differences in competitiveness about financial success, getting one's way, or many of the other areas in which people compete in their daily lives. If women are less aggressive then it seems likely that the difference stems chiefly from the greater costs of injury to women, and perhaps also from the fact that different competitive objectives require different weapons and tactics.

Social and psychiatric implications of sex-differentials in aggression

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Abstract: The same aggressive act will – all else being equal – have a different behavioral significance according to whether it is performed by a man or a woman. Such a perspective should have profound implications for legal and psychiatric practice, and for social policy in general.

I once read a splenetic essay in which D. H. Lawrence raged against the women (mostly mothers and school teachers) responsible for the upbringing and socialization of boys, and who inculcated them with an emasculating and anti-aggressive ethos. So far as possible, physical intimidation was discouraged, fights stopped, and violence punished. All this, of course, Lawrence deplored. Yet boys and girls sharing a common "pacifist" education in which ag-

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

gression is stigmatized, nevertheless grow into men and women with very different behaviours and attitudes. Even as the style of upbringing has converged over past decades, sex outcomes with respect to violence remain widely dissimilar.

Thanks largely to an increased understanding of the processes of sexual selection, these matters have been greatly clarified since the days of "DH." Lawrence has proved right in his assumption that they are matters of profound importance to the human condition. But not just in humans: male violence dominates the social life of many great ape societies (Wrangham & Peterson 1996). Such aggression has been analyzed in terms of adaptive strategies; and the typical pattern of male violence can be seen to provide a typology of primate social organization (e.g., coercive sex is characteristic of orangutans, infanticide of gorillas, etc.). [See also Thornhill & Thornhill: "The Evolutionary Psychology of Men's Coercive Sexuality" *BBS* 15(2) 1992.]

Although in my experience violence has little part to play in the world of UK academia, this peacefulness is highly atypical for Homo sapiens. Most human societies – small and large scale, throughout recorded history and pre-history, and throughout much of the contemporary world – are ruled by coercive aggressive males. Even in the richest and most developed countries (where money, rather than muscle, rules; Gellner 1988), violence is the daily currency of social relationships among young men of low socioeconomic status and in those impoverished sub-cultures unfortunate enough to be dominated by this group. [See Mealey: "The Sociobiology of Sociopathy" *BBS* 18(3) 1995 and Mazur & Booth: "Testosterone and Dominance in Men" *BBS* 21(3) 1998.]

By contrast, violence in women has been little explored or understood. Because the prevailing explanation of male aggression is that it is a consequence of female mate choice, this has perhaps distracted attention on female violence away from adaptive explanations and toward considering it as a largely pathological aberration. Campbell has done trail-blazing investigations in this field. She has argued that female violence may – under rather specific and somewhat unusual circumstances – also be adaptive.

Campbell's work seems to me exemplary in its clarity, rigour, and use of multiple sources of evidence; and the evidence for adaptive female aggression is compelling. Yet I remain impressed by the differences between men and women. For women, aggression is tactically motivated, for immediate pragmatic advantage or as a last resort, when all else fails. But even when female violence produces a successful outcome (e.g., she keeps her man, saves her child, feeds her family, etc.) it involves overcoming an aversion to physical risk. Overcoming this aversion is subjectively unpleasant, as befits an evolved deterrence. Added to this is the lack of public value placed on female violence, and the consequent lack of a reward from enhanced social status. Unsurprisingly, therefore, women may become ashamed, emotionally overwrought and exculpatory after participating in a violent episode.

The "double deviance" stigma of female violence is largely understandable on these grounds – it does not require patriarchal conspiracy to deter female violence. Natural selection has made violence psychologically aversive as a deterrent against adopting it as a life strategy, and this is reinforced by a public recognition that this kind of behaviour is maladaptive for the individual woman and lacking in functional value for the group.

By contrast, aggression in men has the potential to form a self-validating long-term strategy: for a man there can be a "profession of violence," which may be reproductively adaptive. Furthermore, male violence is socially important (as defence for the group in a world already populated by other violent males). Male physical aggression may therefore be supported by a "double endorsement" of enhanced subjective self-esteem compounded with enhanced public status.

This reinforcement can overcome considerable cultural disincentive; as happened when D. H. Lawrence's over-mothered boys nevertheless became macho men. Surely this explains why "male aggression is not routinely attributed by doctors to hormonal abnormality." There is no need for such an attribution – men are made like that. Indeed, instinctive male aggression, inbred by manifold generations of sexual selection, is the harsh reality that any society must cope with.

The implication is that those women who do overcome aversive psychological barriers, and go on to perpetrate violent acts, are presumably either responding to an extreme environment (e.g., the "good man is hard to find" situation; described by Campbell 1995a), or else are in an "abnormal" state of mind. Hence, where an unusually strong degree of provocation is apparently lacking, female violence could quite reasonably carry a prima facie assumption of "irrationality or psychiatric disturbance" – at least as a starting point for further investigation.

Certainly, that has been my experience as a psychiatrist. Unprovoked violence may be a warning symptom of psychiatric illness in a women, and psychiatric illness can cause uncharacteristic violence in previously nonviolent women (this is common in manic states). Yet despite these sex differences, no distinction is currently made between female and male aggression in formal psychiatric diagnostic categories. This is exactly the kind of area that needs re-appraisal in the light of Campbell's target article. Prospective studies on the differential significance of violence in men and women in a psychiatric context are certainly indicated, and should prove enlightening.

The legal implications may also be profound. Kingsley Browne (1995) has pointed out that the different nature of male and female psychology implies a different legal framework in those circumstances where these sex differences impinge. Of course there are grey areas, and behaviour varies greatly between individuals; but the same reservations apply to the different laws regulating child and adult behavior – yet such laws are generally accepted (for example, few people would give the vote to eight-year-olds, or lower the age of consent for sexual intercourse to five).

The significance of aggression is not equivalent for men and women. All else being equal, our interpretation of a given aggressive act should take into account the sex of the person who performs it. Just as we take age into account that a screaming tantrum in the supermarket is normal in a two-year-old, but cause for concern in a forty-year-old. Ultimately, the aim is to frame social policies based on a scientific understanding of human nature, policies that – to the greatest achievable extent – go with the grain of instinct (Charlton 1997).

Contextualizing women's violence and aggression: Beyond denial and demonization

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Abstract: This commentary focuses on the role played by constructions of women's violence in the maintenance of male control over women. While actual women's violence tends to be denied, pathologized or minimized, cultural constructions (particularly in the media) of women's violence tend to demonize it. Both of these androcentric cultural processes fail to illuminate the actual sources of the gender gap in violent behavior and instead tend to normalize male aggression and to cultivate female passivity.

There is no denying that women's violence fascinates the general public at the same time that it perplexes and challenges feminist scholars (White & Kowalski 1994). While discussions of this phenomenon tend to focus on why a few women are violent, the more fundamental question is why so many other women are nonviolent.

Whether the gender gap in violent behavior is a product of our evolutionary past, as Campbell argues, differences in the socialization of girls and women (Block 1984), greater supervision and

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

control of women (Morash 1986), or differences in the moral development of men and women (Gilligan 1982) should be the subject of far more research and consideration than it has received to date.

Attempts such as Campbell's to theorize the gender gap in violent aggression correctly address both "behavioral sex differences in aggression" and "aggregate cultural processes which give meaning to [behavior]." What emerges from this discussion is the need to construct theories of violence that place gender at the center rather than at the periphery of studies of aggression and violence. The absence of such a focus in conventional theoretical accounts of aggression tends to normalize male violence while constructing "true" women as passive.

Of the many issues surrounding the study of gender and aggression, the ways in which women's occasional violence is constructed and represented are extremely important. Consider that while girls' and women's actual lethal violence is a relative rarity, media representations of women's violence abound.

Media discussions of youthful violence, as an example, have increasingly asserted that girls, particularly girls of color, are acting out in violent ways – usually in gangs: "Some girls now carry guns. Others hide razor blades in their mouths" (Leslie et al. 1993, p. 44). Displaying a picture of a young African American girl pointing a gun at the camera, the article notes that "The plague of teen violence is an equal-opportunity scourge" (Leslie et al. 1993, p. 44).

For adult women, "the rampaging female has become a new cliché of Hollywood cinema, stabbing and shooting her way to notoriety" (Birch 1994, p. 1). Movies like *Thelma and Louise* and *Basic Instinct* have not been the only instances of media attention to adult women's violence. The print media have also discovered violent adult women. "You've come a long way, moll" focused largely on increases in the number of adult women arrested for violent crimes. Opening with a discussion of women in the military, it noted that "the armed forces already are substantially integrated" and moved from this point to observe that "we needn't look to the dramatic example of battle for proof that violence is no longer a male domain. Women are now being arrested for violent crimes – such as robbery and aggravated assault – at a higher rate than ever before recorded in the US" (Crittenden 1990, p. A14).

Comparing the media hype about adult women's versus girls' violence, there are many similarities as well as some key differences. The links to women's quest for equality (particularly in the workplace) is more at the center of the construction of adult women's violence. For younger women, race seems more central, perhaps extending into the present centuries of masculinizing African American women so as to make harsh treatment more palatable (Horton 1998). In both cases, though, media accounts of women's violence are deployed to caution women about the "dark" side of the quest for social justice.

Generally, though, patriarchal interests are served when actual women's violence is denied, minimized, pathologized, or ignored. Like the slave owners who argued the "passivity" of African American males (Horton & Horton 1993), it is best to avoid or deny the normalcy of violent resistance among the oppressed. To further constrain women's violence, it may also be thought important that an occasional violent woman be vigorously and publicly demonized (and cast out of the ranks of true womanhood) so that her experience will serve as a cautionary tale to all women about the profound risks associated with women accessing male strategies of violence.

While the threat of actual women's violence is a challenge to women's universal domination by men, contemporary constructions of women's violence are anything but that. Instead, they routinely misrepresent the actual character and context of women's aggression and violence while functioning as a component of the backlash against women's centuries' long struggle for equality and justice.

The origins of aggression sex differences: Evolved dispositions versus social roles

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Abstract: The ultimate causes of sex differences in human aggressive behavior can lie mainly in evolved, inherited mechanisms that differ by sex or mainly in the differing placement of women and men in the social structure. The present commentary contrasts Campbell's evolutionary interpretation of aggression sex differences with a social structural interpretation that encompasses a wider range of phenomena.

Campbell attempts to identify universal, inherited mechanisms that underlie sex differences in aggressive behavior. Her analysis contrasts with an interpretation based on the differing placement of women and men in the social structure (e.g., Eagly 1987; Eagly & Wood 1998), which accounts not only for the phenomena described by Campbell but also for variability in aggressiveness sex differences in human societies.

Campbell's evolutionary account rests on her effort to establish universals across primate species and across human societies, specifically the universals of females' greater concern for personal survival and consequent lesser use of direct, physically dangerous forms of aggression. However, our reading of the primate literature yields little evidence for such broad generalizations. According to Manson and Wrangham (1991), "among humans and chimpanzees, males are actively involved in intergroup aggression whereas females are largely limited to a supporting role. This low level of involvement by females is unusual among primates" (p. 372). Their summary of 46 studies revealed that primate females were regularly involved in intergroup aggression in species in which females breed in their natal groups and act cooperatively with kin to defend resources. Similarly, Smuts (1987) concluded that "among primates as a whole, females show aggressive behavior (supplants, threats, chases, and fights) as often as do males" (p. 411) In Smuts's (1987) view, the incidence of aggression for both sexes depends on contextual factors "rather than on inherent sex differences in the potential for violent combat" (p. 404).

The cross-cultural literature also fails to support the existence of such universals, even among the hunter-gatherer societies that are, according to Campbell, "analogous to the circumstances in which 99 per cent of human history took place" (sect. 1.1). For example, Knauft (1991) argued that in simple, egalitarian hunter-gatherer groups the overall level of violence was low and competitive male dominance hierarchies were relatively absent, whereas in "middle-range" hunter-gatherer groups, characterized by greater socioeconomic complexity and political hierarchies, violence was valued as a dimension of masculinity. A very different picture of prehistory from the one Campbell proposes emerges if Knauft is right that "the bulk of our genus's evolution was spent as simple foragers" (p. 408).

Variability in hunter-gatherer social organization also challenges Campbell's claim about the universality of patriarchal social structure. In simple foraging societies, men and women have relatively egalitarian relations, despite having a sex-typed division of labor (Wood & Eagly 1998). Patriarchy developed much like other types of social stratification, as a byproduct of innovations (e.g., plough agriculture, animal husbandry) that appeared well after the era identified as the environment of evolutionary adaptedness (EEA) (e.g., Ehrenberg 1989; Harris 1993a; Leibowitz 1983; Lerner 1986; Sanday 1981). In general, as social and technological complexity increased in preindustrial societies, women's status fell (Schlegel & Barry 1986; Whyte 1978b).

Another prop of Campbell's argument is the universality of juveniles' dependence on maternal care. Although, among all mammals, infants are dependent on their mothers until weaned, even when nursing, human mothers show considerable cross-societal

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

variation in patterns of childcare. For example, early supplemental feeding is especially likely in societies in which women actively participate in subsistence activities (Nerlove 1974). Furthermore, in many societies, childcare is performed by relatives, including fathers (Crano & Aronoff 1978), maternal relatives, especially grandmothers (Hurtado et al. 1992), and elder siblings (Zeller 1987). Thus, especially after weaning, the dependence of children on maternal welfare is highly variable across societies.

Given the inconsistency of the empirical support for Campbell's assumptions, it is appropriate to consider alternative explanations. We suggest that sex differences in aggression follow from the placement of women and men in the social structure (Eagly & Wood 1998). This viewpoint assumes that men and women have inherited essentially the same evolved psychological dispositions and that sex differences in social behavior arise with two organizing principles of human societies; the division of labor according to sex and gender hierarchy.

The division of labor is associated with the physical sex differences of men's greater size and strength and women's reproductive activities of childbearing and lactating (Wood & Eagly 1998). These factors provide opportunities for certain types of task performance and constrain performance on other tasks. Men's physical attributes give them priority in roles involving certain types of strenuous activity and women's give them priority in roles involving the care of very young children while hindering the easy performance of tasks that involve extended travel and long periods of uninterrupted activity. The way these physical differences direct the specific roles performed by men and women depends on a society's economic system, technological development, and cultural beliefs. For example, in postindustrial economies, women's childbearing and lactation constrain role assignments minimally because of very low birthrates and the use of alternatives to lactation for infant feeding.

Women and men seek to accommodate sex-typical roles by acquiring the specific behaviors, skills, and resources linked to successful role performance. In this view, the tendency among hunter-gatherers for men to assume roles of warriors and hunters of large game reflects physical differences (e.g., strength, lactation) in conjunction with the economic and social organization of societies (e.g., women may be prohibited from assuming warrior roles when marital residency is patrilocal because women then have contradictory loyalties if their husbands wage war on their fathers; Adams 1983). Hunter and warrior roles require that men learn specific skills associated with aggression and these roles generate expectations that men possess attributes consistent with them.

According to social structural theory, women's accommodation to roles with less power and status in society produces a pattern of behavior that might be described as subordinate, and men's accommodation to greater power and status produces more dominant behavior. These status and power differences, which do not occur to the same extent in all societies, influence aggression, because people with more access to status, power, and other resources have a greater possibility of obtaining positive outcomes through physical aggression, direct forms of verbal aggression, and other behavioral displays of dominance. Members of subordinate groups have little success with this behavioral repertoire because they rarely occupy roles in which such behavior would be considered appropriate. Therefore, given women's typically weaker power position in society, they can readily discern that they are more likely to maximize their outcomes through indirect aggression and probably some types of verbal aggression than through physical aggression.[1] Consistent with Campbell's emphasis on beliefs about aggression, the impact of each sex's structural position on its aggressive behavior is mediated by social learning that produces their contrasting construals of aggression, which are important proximal determinants of behavior (Eagly & Steffen 1986).

Women should be more aggressive in situations in which their role performance requires control over others' behavior and they have relatively more power – namely, in the domestic sphere. Although in many societies husbands are accorded higher power than wives for major domestic decisions, women have considerable power over everyday domestic decisions, especially in relation to children. As reviewed by White and Kowalski (1994), research on aggression between heterosexual partners suggests that women may be slightly more aggressive physically and verbally than men in these relationships, although men's physical aggression more often produces serious physical injury. As also reviewed by White and Kowalski (1994), mothers may engage in more physical abuse of children than fathers. Consistent with the social structural view of aggression, women's relative parity in aggression in partner and parental relationships follows from the greater legitimacy of women's aggression in these relationships and women's relatively greater amount of social power.

NOTE

1. Whether men's greater size and upper body strength confers the potential to aggress physically and thus contributes directly to sex-differentiated aggressive behaviors is interesting to consider. Among nonhuman primates, the relative size differential between males and females does not appear to affect the likelihood of female aggression. Manson and Wrangham's (1991) review of 46 studies of primate intergroup aggression revealed that females were no more likely to engage in intergroup aggression in species in which males and females were of similar size than they were in species in which males were considerably larger than females.

Defending the young: Female aggression, resources, dominance, and the emptiness of patriarchy

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Abstract: Points of criticism of the target include: the extreme violence of females in defence of young despite high potential cost, the reality of female dominance striving, differences in male and female ritualization of aggression, the real existence of institutionalized female instrumental aggression, and the uselessness of "patriarchy" as defined as a category for differential analysis. It is concluded that it may in fact be the decline of patriarchy in the strict sense that leads to the female use of exculpatory explanations for aggression, thus reversing Campbell's proposed causal sequence.

Anne Campbell has been one of the pioneers in social psychology in taking female aggression seriously and analyzing some of its extreme mainfestations, for example in female gangs. One criticism of the work has been that it does not take account of possible evolved differences in aggressive behavior between the sexes. This target article is obviously her – very effective – reply to such criticism. She undertakes to reconstruct the evolutionary history of such differences using primate data as a baseline and to locate the major selection pressures involved. Her account is plausible and well documented and I have no overall quarrel with it, but I do have one or two observations.

Throughout the mammalia, females show extremes of violence in the defence of their young. It is true, as Campbell says, that in the calculations of sociobiologists the cost to females is high, particularly when dealing with conspecific males. Therefore, in circumstances where the females are dependent on males for protection against predators, they are indeed likely to have evolved submissive strategies towards those males. But in ungulates, for example, where males are not permanent members of the female group, or in nongroup living animals, females generally avoid the males except for mating at rutting time. But towards predators they show violent aggression if the young are attacked. The cost may be high if they are themselves injured or killed, but this does not affect the risk taken and violence employed in defence of the young. In primate and Palaeolithic human groups, the constant presence of males may well have reinforced the submissive tactics

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

of females, but these are still mammalian females, and again will often "risk all" where defense of the young is concerned. I would ask Campbell therefore to reconsider defense of the young as at least as important as resource competition as an evolutionary source of female aggressivity, and one that has a high risk-taking factor in it.

One area Campbell does not examine is the comparative ritualization of aggression between males and females. Margaret Mead once noted (not in an academic article) that, as she put it in her forceful way, it was a good thing that wars were in the hands of men since, although they were very good at starting them, they were equally adept at knowing how to bring them to an end. This, she thought, was because war was always at bottom a status game for men, and men had an inbuilt capacity for ritualizing such games. Women, on the other hand, she argued, would take war far too seriously. They would see it as protecting their children and nothing but a total fight to the death would satisfy them. If there is indeed a greater capacity for ritualization of violence in males, it would affect Campbell's argument and should be examined.

On female aggression and resource competition versus male aggression and dominance competition Campbell makes a good argument again. But females do strive for dominance status, and it can affect their reproductive success quite directly among primates where the sons of high-ranking females themselves have a high chance of achieving high rank, and hence high reproductive success. Campbell does not cite the large literature on this but it has direct bearing on her argument. It would make female aggression in dominance competition as important as resource competition, and again it would be necessary to assess to what extent this differed from male–male dominance competition. It would certainly be lower keyed, but it would be there, and there is ample evidence that human females strive with each other for status – usually to do with competition for high status males. Even if the aggression is largely verbal in this case, it is there.

On the instrumental-expressive dichotomy: Although the dichotomy is compatible with the positions of the authorities cited, it was worked out much earlier by Talcott Parsons and applied directly to the family situation in which, not surprisingly, instrumental roles were assigned to men and expressive ones to women. From the start, the dichotomy so used had its critics, and it fares no better here. Let me combine my reservations with a protest about the use of concepts like "patriarchy," which are empty of meaning. Strictly speaking, patriarchy does not mean what it is quoted as meaning, although this Humpty-Dumptyism is unfortunately all too prevalent nowadays; it means "rule by fathers" (just as matriarchy means "rule by mothers.") Under the strict *patria potestas* the aggression of sons was far more viciously controlled than that of daughters. Australian Aboriginal sons, in a classical patriarchy, were subjected to adolescent circumcision and subincision (the lengthwise slitting of the urethra) as well as lengthy initiation hazing, none of which was visited on girls. Countless similar examples could be cited. The point is that "patriarchy" can be infinitely more savage in its suppression of male aggression than female, and that females are not necessarily singled out. Used, however, as Campbell uses it – essentially as a synonym for male dominance, and being, as she says, "universal" – it is also useless as a category for differential analysis.

Let us consider the instrumental-expressive dichotomy from this angle. There are many examples from "patriarchal" societies of the female use of explicitly instrumental aggression. Consider the classical patriarchal extended families of China and Japan. "Daughters-in-law" had to leave their natal homes and move to their husbands' homes where they came under the strict and punitive rule of their mothers-in-law. Aggression in the form of constant harrassment, abuse, and beatings was used to "train" these unfortunate girls in the ways of their new households. The males had virtually nothing to do with this. A girl could only hope to have sons quickly to improve her status and eventually put her in the "mother-in-law" position where she could herself become the aggressor. Something like this situation was common throughout East Asia and indeed in most forms of the paternal extended family that characterized societies with plough agriculture. One could extend the examples, but the point is that females can engage in quite explicit instrumental aggression towards each other even in – evidently particularly in – truly patriarchal cultures. In fact, with the *decline* of "patriarchy" – that is, the abolition in modern democratic societies of the *patria potestas* (which, note, following the correct use does not necessarily mean a decline of male dominance in the public sphere) – one sees a concomitant decline of such instrumental female aggression.

Thus, far from "patriarchy" causing females to use exculpatory explanations for their own violence, as Campbell suggests, it could be that the *absence* of strict patriarchy is the cause; that is, lacking institutionalized justifications for instrumental aggression, females fall back on exculpatory explanations. And don't forget that what we have here is a sample of only western European women – not necessarily representative of their sisters worldwide. Chinese mothers-in-law under the old regime gave quite straightforward instrumental explanations of their aggression. One might add that examples of female violence occur in quite patriarchal societies, as Campbell knows – Aborigines, Spanish Gypsies, European peasants, and so on. In other "patriarchal" societies, such violence is rare and prevented by the males.

Our problem as comparative sociologists or psychologists is to account for the differences, which we cannot do if empty categories like "patriarchy" as defined by Goldberg (1993) and other feminists (for ideological rather than scientific purposes) are used. There are degrees and differences in universal male dominance; we need to recognize them and discover their correlations in female aggressive behavior, and not hide behind fashionable ideological buzz-words. I feel this mars an otherwise interesting and useful analysis.

Explaining gender differences in aggression: An ambitious but inconclusive attempt

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Abstract: Campbell's ambitious target article attempts to explain gender differences in both aggressive behavior and cultural representations of aggressive behavior. I comment on some of the specific arguments that require further clarification, some areas that merit expanded discussion, some topics which should be mentioned, and some research and theoretical questions raised by the article.

Gender differences in aggression are not a subtle phenomenon known only to researchers and theorists. Parents, teachers, physicians, police officers, judges, therapists, and anyone who reads a daily newspaper or watches television are well aware of the fact that human males are more physically aggressive than females. Campbell's ambitious target article attempts to explain gender differences in both aggressive behavior and cultural representations of aggressive behavior, not just the "women's intrasexual aggression" of its title. I will comment here on some of the specific arguments that require further clarification, areas that merit expanded discussion, topics which should be mentioned, and some research and theoretical questions raised by the article.

The general thesis of the target article, that females have more to lose and less to gain from aggression than males, because the mother's presence is more important to reproductive success than the father's, is supported by a body of evidence and reasoning and generally persuasive. However, some of the derivations from this thesis are far less compelling, lacking either direct evidence or logical reasoning, or both. A lack of precision in the writing also leads to questions which the article fails to answer. I will mention four

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

instances in which specific derivations or descriptions need further explanation.

First, in discussing attacks from stepfathers, Campbell argues that "the mother plays a primary role in protecting the infant from such attacks," yet she provides no evidence for this statement. Is the mother effective in providing such protection? If so, why are so many children injured and killed by stepparents? Certainly the cases which receive media attention are not ones in which mothers are injured as they try to defend their offspring but rather ones in which the mothers demonstrate a lack of awareness or protectiveness.

Second, the reference to menopause is puzzling. Campbell implies that there is a greater advantage for women than for men in surviving after producing one's last child. However, the theoretical issue is not why women (or men) remain alive after producing their last child, but rather why women should lose the ability to reproduce. What is the evolutionary advantage of ceasing to reproduce at a much younger age for women than for men?

Third, the discussion of the effects of polygyny contains a number of logical inconsistencies. To ascertain the effects of polygyny, it would be necessary to compare polygynous societies (or individuals) with monogamous ones. Yet the only data provided concern male–female differences. For example, the assertion that "polygyny is associated with earlier death among males" or that it affects a male's likelihood of desertion are not supported by evidence from cross-cultural comparisons or by a causal model. Nor can polygyny explain gender differences in the rate of extramarital affairs in "monogamous societies."

Fourth, Campbell argues that sex differences should be smaller for larceny/theft than for robbery. Yet the article does not report the proportion of females or males involved in either type of crime. It indicates that from 1934 to 1979 the proportion of female involvement in violent crimes was stable, the proportion of arrests due to petty property crime increased, and the proportion of single women in poverty increased. This sounds like comparing apples, oranges, and pumpkins, none of which indicates whether gender differences are greater for violent crime than for larceny/theft.

In addition to the instances in which the basic argument needs clarification, parts of the article could benefit from expansion and further consideration of relevant issues. For example, Campbell mentions that "Boys' aggression becomes increasingly motivated by social status and self esteem," but does not discuss gender differences in the variables associated with self esteem. Being identified as brave may or may not increase self esteem more for males than females, but being identified as cowardly ("a wimp") is definitely more of an insult and a threat to self esteem for males than for females (Harris 1993b). As another example, Campbell indicates that robbery is frequently conducted for reasons other than financial need or access to resources but she does not mention shoplifting, a predominantly woman's crime which also seems to be performed for the thrill more than for the actual resource. Contrasting the two crimes, which may be performed for similar reasons but carry different physical risks, might strengthen her argument. A third example relates to the suggestion that leadership styles (and preferred styles) often differ by gender. It seems relevant to mention that widely admired men are more likely to have achieved their prestige by virtue of their individual accomplishments, whereas widely admired women are more likely to be renowned because of their relationships to and sponsorship by others (Young & Harris 1996).

The article fails to address two important issues. The first is the magnitude of the gender differences in aggression. Measures of effect size would show that gender differences are substantial on many measures but contribute relatively less of the variance on other measures, particularly ones involving indirect and verbal aggression. Second is the interaction and frequent confounding of the gender of the aggressor and the target of the aggression. Most physical aggression outside the home has male targets as well as perpetrators. Aggression directed towards males and females is evaluated differently (Archer & Haigh, in press; Harris 1996). To draw clear causal inferences about effects of aggressor gender, analyses should not confound the gender of the perpetrator and the victim.

One of the major contributions of the target article is that it leads to the formulation of interesting research questions. For example:

1. If an offspring's survival is more affected by a mother's survival than by a father's, is there a lifespan developmental trend in the gender difference in fearfulness?
2. Why does risktaking behavior by men decline noticeably after the midtwenties?
3. Wouldn't stronger female dominance hierarchies be predicted in matrilineal societies, in which resources would be more likely to accrue to women?
4. Although weapons like spears might serve to magnify differences in strength, modern weapons like handguns require minimal strength or skill. Would Campbell expect certain weapons to increase or reduce the gender differences in aggressive behavior?
5. Although women's aggression may be "pathologized" more than men's, women in general receive more psychiatric treatment. Is the gender differential greater for violent prisoners than for other individuals receiving psychiatric care?
6. The argument that culture equates female aggression with social or individual psychopathology seems to be referring solely or primarily to physical violence. Are indirect aggression, verbal aggression, and aggression in defense of one's young equally stigmatized for women? If so, why?

In summary, the target article makes an interesting attempt to explain some of the gender differences in aggressive behavior. It also raises a number of important questions and issues. Certain derivations of the argument are not clearly explained and justified, however, and further refinement is clearly merited.

Stigmatizing women's aggressive behavior: Who does it benefit and why?

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Abstract: Why is female violence a taboo? We suggest that both men and women actively contribute to the creation of this stigma. Men may benefit because nonaggressive women may make better mothers and be more faithful and fertile. Females may benefit by downplaying their aggressive nature because they will be perceived as more valuable mates and because they will be more accepted within female social groups.

Campbell suggests that men stigmatize women's aggressive behavior by actively discouraging it and by promoting the idea that female violence is somewhat abnormal (sects. 2.1, 2.2, and 3). While this is probably true, the motivation behind male inhibition of female violence remains unclear. Campbell suggests that this enhances male control over women but does not specify how this actually benefits men (sect. 3, para. 2). Lerner (1986) has suggested that men attempt to limit female violence to exclude women from warfare and from consequent political power. We argue in this commentary that the male inhibition of female aggressive behavior is more likely to be related to reproductive costs and benefits in ancestral environments, and less related to modern politics. In addition, we suggest that females also benefit from discouraging aggressive behavior in other females and from downplaying their own aggressive nature. We disagree with theories that view all men as part of a consciously orchestrated conspiracy to curb female aggressive behavior in order to further political control over them.

Males may prefer nonviolent women and therefore stigmatize female aggression because less aggressive women are likely to

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

make better mothers. As Campbell suggests, a mother's ability to care for her children is contingent on her being alive and healthy (sect. 1.1). Since females have little to gain from a high risk strategy, it follows that they should use nonviolent, low-risk competitive tactics (sect. 1.5). As a result, males will be attracted to less aggressive female behavior, especially in potential long-term mates, and may be expected to encourage this type of behavior in their mates to further the survival chances of their own offspring. Females may be expected to downplay their aggressive nature to be more attractive to males and increase parental investment.

Males may also be attracted to less aggressive women because they are more likely to be faithful. Even though males will be sexually attracted to both chaste and unchaste women, men are more likely to make long-term parental investments when they are reasonably sure of their paternity. Cashdan (1995) has shown that an increase in number of sex partners, high self-regard, and other behaviors associated with dominance are positively correlated with increased amounts of androgens in co-residential college women. This suggests that there may be a link between aggressiveness and promiscuity in human females. The causality of the relationship remains unclear. However, even a noncausal correlation between these two variables suggests that men should be more attracted to less aggressive women and should attempt to promote nonaggressive, chaste behavior in their female mates. Cashdan (1993) hypothesizes that human females may adopt different strategies depending on socio-environmental circumstances. In environments in which females compete for males in order to gain access to resources women will (a) have fewer sexual partners in order to advertise their chastity and (b) may suppress their assertiveness and competitive ability to advertise their need for male investment. In environments in which females compete more directly for resources, women may be expected to show increased assertiveness and be less concerned with perceived chastity. Increases in androgen levels are also linked with health risks and reduced fertility in women (Singh 1993). Therefore males may be attracted to less aggressive women and women may downplay their assertiveness in order to advertize their fertility and hence their value as a potential mate.

Male and female kin also benefit from encouraging less aggressive behavior in a related female. This is because (1) it will directly increase the female's fitness and therefore their own inclusive fitness and (2) it will increase the chance that the female will attract a high-quality mate and therefore secure parental investment for their grandchildren. Other nonrelated women may also be promoting more passive behavior in women. Campbell cites a number of studies by several authors that confirm this (sect. 1.5, para. 4). It appears that from a very early age, women are promoting less aggressive behavior amongst themselves. Intra-sexual female cooperation seems to work best when power is equally shared among females. Aggressive women or women in positions of authority are generally disliked and shunned by other women. Therefore a woman attempting to cooperate with other women is likely to downplay her aggressive tendencies in order to be accepted within a female group.

In sum, the stigmatization of female aggression in society is probably related to ancestral reproductive behavior, male parental investment and intra-sexual female cooperation. The taboo on female violence is endorsed by men, women, and the woman's kin. The evolved psychology of men is probably more concerned with avoiding cuckoldry than it is with limiting female political power itself. Promoting female nonaggressiveness may be a means that men use to achieve the goal of increased paternity confidence and increased survival of their own offspring. Women also benefit from downplaying their own aggressive behavior and therefore contribute significantly to the social stigma of female violence. They benefit because (1) they become more attractive mates, and (2) they are more likely to be accepted by other females. The male and female kin of women will also be expected to discourage female violence to the extent that it promotes their inclusive fitness.

Traditionally, men have had most control over various types of media (including television and folk tales). In today's society, the media and other social institutions continue to promote stereotypes of male and female behavior. To the extent that men dominate the media and social institutions, they are most responsible for promoting different views of male and female aggressors. Would female-dominated media and social institutions behave differently? Would they interpret male and female aggression equally? A recently distributed eye-catching poster, funded by the Victorian women's trust (a Canadian feminist movement), reads: "Women don't belong in cages," and explains that most female criminals are motivated by poverty and should therefore not be punished. This suggests that some female dominated institutions may also be promoting gender stereotypes and encouraging the differential treatment of male and female aggression.

Saturday night social constructivism

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Abstract: In contrast to evidence for evolved sex differences, support for the argument that female aggression was suppressed by patriarchial ideologies is thin. One empirical test of the differential stigmatization hypothesis is proposed, utilizing the four standard criteria for judgments of abnormality.

Campbell walks boldly into a neighborhood that may be scarier than Brooklyn on a Saturday night. Few men (or women) have ventured onto the tiny turf where evolutionary psychologists meet social constructivists. There are potential intellectual profits there. Although often assumed to be arbitrary, there is reason to believe, with Campbell, that socially constructed sex-role norms interact with human nature (Kenrick 1987). One suspects, for example, that more indoctrination would be needed to induce a woman than a man to choose a hunting club, boxing team, or military career. Yet we have little hard data about how evolved inclinations are shaped by society, or how norms are shaped by evolved affective and cognitive mechanisms.

Campbell's opening arguments about the evolutionary origin of sex differences in extreme coercive violence are based on a mountain of research spanning developmental psychology, cross-cultural anthropology, and comparative biology. The idea of a sexually selected difference in dominance striving seems especially well supported at this point (e.g., Daly & Wilson 1988a; Gould & Gould 1991; Wilson & Daly 1985).

Campbell's suggestion that economic pressures similarly affect aggressiveness in both sexes is thought provoking. The evidence here is less overpowering, though, and things get complicated because economic pressures enhance sexual competition amongst males (e.g., Dabbs & Morris 1991). Nevertheless, she develops a promising lead here.

Is there evidence for patriarchial enhancement? When Campbell enters the theoretical zone between social construction and evolution, though, the light dims considerably. The suggestion that initially lower levels of female aggression were further suppressed by patriarchically constructed social norms is not well supported by evidence.

Campbell offers media accounts declaring that female gang violence is novel, when it has not really changed in decades. But the media (and social scientists) are fond of naming ancient problems as newfound epidemics. When one journalist asked why older powerful American chief executives marry younger attractive "trophy wives," social scientists were quick to (1) accept the premise that the phenomenon was new, and (2) explain it in terms of recent societal and normative changes in America. None seemed aware that the marriage patterns of these young women and older men were precisely mirrored across other societies and historical

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

periods (Kenrick & Keefe 1992; Kenrick et al. 1995). Maybe the media are especially inaccurate in reporting historical variations in female violence, but this is an open empirical question.

Campbell also argues that, whereas female irritability is sometimes attributed to premenstrual syndrome (PMS), male aggression is not routinely linked to hormonal abnormalities. But what of all the discussion of testosterone and male violence? [See Mazur & Booth: "Testosterone and Dominance in Men" *BBS* 21(3) 1998.] Whether the testosterone–aggression link is stronger than the PMS–hostility connection is a separate question – the point is that aggression in both sexes is often viewed through the lens of biomedical pathology. Maybe PMS is *more* stigmatized than "testosterone poisoning," but again this is an unanswered empirical question.

Campbell reviews some empirical data that women in British courts are more likely than men to receive psychiatric treatment rather than imprisonment. But does this really suggest a more accepting and socially tolerant view of male than female violence? Instead, supported by lower recidivism among women, perhaps people are less fearful that a woman who acts antisocially is a chronic menace to society.

Are men really repulsed by female dominance? Other evidence suggest that men have no particular antipathy to social power in women, but are simply unattentive to it. For instance, men judging the attractiveness of strange women do not avoid social dominance, they just find it irrelevant (e.g., Sadalla et al. 1987). In choosing long-term mates, men still pay little attention to social dominance, regarding it as, if anything, slightly desirable (Kenrick et al. 1990; 1993).

Possible empirical tests. Is female aggression really differentially stigmatized? If subjects were asked to judge scenarios in which both sexes committed identically violent acts, I suspect scenarios regarded as valorous in men would be judged equally valorous in women. Imagine, for instance, a parent who shot a member of a street gang that had been chastising his or her children. Or imagine an undercover police agent using martial arts to seriously injure several bodyguards who worked for a Colombian drug lord. I would predict that either sex would be judged valorous in these scenarios. On the other side, imagine an individual who tied up, tortured, and then murdered a sexual partner. I would predict both sexes to be equally stigmatized under these circumstances.

Assume for the moment that women engaging in intermediate levels of violence (e.g., beating up a schoolyard playmate) were more stigmatized. This would still be interpretatively ambiguous because one criterion used for deciding "abnormality" is statistical unusualness (and girls indeed do this less). The other typical criteria for psychopathology are (1) violation of social appropriateness norms (2) violation of social ideals, and (3) damage to self or others. If subjects were asked to judge various aggressive acts in terms of all four criteria, I would predict that any different results for male versus female actors would be small, and accounted for less by judgments of norms and ideals than by judgments of statistical unexpectedness. I would further predict that men's violence would be regarded more harshly by the criteria of damage to others.

Let us assume that such empirical tests showed female aggression to indeed be more stigmatized. It would still be unclear whether that stigma had been historically created by patriarchs, or whether it was simply based in an aversion found naturally in both women and men (among other possibilities). Thus, I would challenge Campbell to propose more rigorous empirical tests of the historical hypothesis.

Do we owe it all to Darwin? The adequacy of evolutionary psychology as an explanation for gender differences in aggression

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Abstract: Gender differences in aggression are highly variable; there is significant evidence that this variability is as much a function of social and cultural conditions as evolutionary processes. While some of these conditions may reflect resource scarcities as Campbell proposes, others are inconsistent with her perspective or are explained equally well by other perspectives.

Within various cultures and over various time periods, women's rates of aggression appear to be consistently lower than men's. While relatively little disagreement exists over this general proposition, the controversial notion that evolutionary psychology is the primary cause of this phenomenon remains unproven. Cross-cultural research, laboratory studies, and empirical criminological data all indicate that social and cultural forces dramatically influence women's rates of aggression and violence, and indeed, elevate such rates over those of males in other cultural contexts.

Consider, for example, the results of a particularly novel investigation of the influences of biological, social, and cultural factors on involvement of males and females in violence. Archer and McDaniel (1995) asked subjects in eleven nations to generate stories to solve a set of imaginary conflicts. Within every nation men were more likely to write violent stories than women were but these gender differences were relative to the national samples, not absolute. Women from Australia and New Zealand wrote more violent stories than men from Sweden and Korea. On a smaller scale, this phenomenon has been replicated in the United States where the violent crime rates of black females approach, and sometimes exceed, those of white males (Kruttschnitt 1994). Campbell argues that this kind of sex similarity can be explained by "socio-economic indicators of relative resource shortage." There are at least two problems with this explanation. First, among other impoverished minority groups (e.g., Latinos), women's rates of violence never exceed those of white men (Wilson & Daly 1992); second, others have raised and more effectively addressed this point without relying on an evolutionary perspective (e.g., Simpson 1991).

Although much of the psychological literature on gender differences in aggression corroborates Campbell's thesis, it also stresses the importance of social contexts (e.g., the presence of supportive observers, the level of provocation) in eliciting aggressive responses. What remains most problematic about this research, however, is that it often lacks external validity and generalizability. Criminological research, which focuses on actual violence, provides stronger evidence concerning the influence of social contexts. Empirical studies, for example, find that female gang members have delinquency rates that exceed those of male nongang members (Kruttschnitt 1994). The path-breaking work of the National Research Council's Panel on Criminal Careers found participation rates for violent crimes among females well below those of males but few gender differences in offending frequencies for those active in a crime type (Kruttschnitt 1994). These findings are consistent with the view that gender differences in violence are socially influenced.

Campbell's thesis also seems inconsistent with what is known about the targets of women's aggression. Women direct their anger primarily against family members. In the case of spousal violence, their aggression frequently relates to survival; women assault and kill their partners in response to their partners' violence toward them (Fagan & Browne 1994). Although children generally represent a smaller percentage of women's homicides in the United States, mothers are slightly more likely than fathers to kill their children (Widom 1987) and in some cultures women are more likely to kill their children than their spouses (Kruttschnitt

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

1995). Studies of child abuse also show that women may be at least as aggressive as men (Kruttschnitt 1994). If women avoid aggression to protect themselves and to perpetuate the species, why do they abuse and kill their own children? The answer must be related to socially structured opportunities rather than an evolutionary or genetic predisposition.

Finally, evidence from historical studies indicates that patterns of social control are also important for understanding rates of female aggression. Campbell acknowledges the supportive role of social institutions by drawing attention to the ways in which patriarchal societies create cultural images to enhance male aggression and stigmatize female aggression as "gender-incongruent." Legal sociologists and historians concerned with crime trends, and most notably women's movement to the periphery of violent crime in the twentieth century have generated equally compelling theses. Here, however, the focus is on the interplay between formal and informal social controls. Changes in the household economy, law, and the development of courts addressing predominantly female crimes had a substantial impact on our understanding and knowledge of women's violence (Kruttschnitt, forthcoming).

Gender specific analyses of aggression and violence raise difficult questions. Campbell should be applauded for attempting to answer these questions with an impressive array of evolutionary and psychological data. While these data support her perspective on intra-female aggression, they cannot explain the substantial variations that exist between cultures in men's and women's aggression, the targets of women's violence and the role of social institutions in defining and interpreting women's aggression. I would therefore assign an independent causal role to the cultural and social forces Campbell sees as intervening mechanisms, as these forces are pivotal in determining not only how aggression is played out but whether and how it comes to our attention. As Gerson (1998, p. 230) so aptly states: "the concept of gender matters because social arrangements have systematically divided men and women into separate and stratified groups." While evolution may drive some behaviors, these behaviors will always be shaped in substantial part by immediate social forces.

Theories of male and female aggression

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Abstract: Sociobiology has ignored the results of psychology, which is the discipline between biology and society. Campbell's target article fills some of the gaps beautifully, but the fact that women's direct and physical aggression has increased during the past 20 years, undermines Campbell's evolutionary explanation of female aggression. The two classical types of theoretical explanations of aggression are that (1) aggression is a drive and (2) aggression is instrumental behavior. Expressive aggression, assumed to be typical of women, is no more drive aggression than is men's aggression.

The problem with sociobiology has long been that attempts to explain human behavior on the social level using the basis of biology, but the evidence derived from psychology, which lies "between" biology and the social sciences, is ignored (Lagerspetz 1984a). Some of the evidence from psychology fits the assumptions of sociobiology, and some does not fit. As an example, the discussion on gene altruism has generally not considered experimental work by social psychologists on helping behavior, which does not always support evolutionary explanation. Evolutionary psychology has lately begun to fill in the gaps.

The present target article by Campbell takes up precisely this area between the disciplines when it discusses evidence from psychology in support of evolutionary hypotheses about female and male aggressive behavior. New insights are presented which dispel myths about women's aggression. For instance, the fact that women also compete for scarce resources is very clear, if anybody ever doubted that. Also, the point that women think about and describe their own aggression differently from the way men do, both to others and to themselves, rings true and is documented by ample research by the author and her collaborators. However, these differences perhaps do not need backing from evolutionary theory, but could be explained on the basis of social theory alone.

Campbell's paper is scholarly, well documented and well researched. She argues her points clearly and has found examples from many areas to fill the gaps between evolutionary explanations and behavior. Her arguments are exciting and convincing in themselves. The question always remains, however, when are we convinced? Have the points been proved, or does there exist other, contrary evidence supporting a different kind of view? In this particular case: Are differences between men's and women's aggression due to evolutionary cause or is it enough to say that the differences are caused by the way society has developed, exerts pressure on, and expects certain behavior of its members? In many cases, this type of question cannot be answered except by history. Some contrary data can, however, be presented.

Women's aggression has increased. If society changes, women's (and men's) aggression may change. In fact, there is evidence that women's use of physical aggression has increased during the last 20 or 30 years in the Western world. For example, statistics from Finland show that assaults made by women have increased from 2–3 percent of all assaults in the 1950s and 1960s, to nearly 10% in 1994 (see Fig. 1). There is conceivably similar evidence from other countries. Several psychological follow-up studies have shown an increase in girls' use of direct and physical means of aggression in the last decade (Huesmann et al. 1998; Viemerö 1992). In contrast to the years before 1970, female characters are now depicted as highly aggressive in films, in literature, and in computer games.

There may be several reasons for the increase in women's aggression. One possible explanation is, paradoxically, the improvement of the position of women in society. Experience from revolutions and the movements of oppressed groups (worker's movement, anti-colonial movements, etc.) shows that as long as a group remains deprived of possibilities to assert themselves, they are not aggressive, but rather depressed or at least passive. There is more unrest when the position of an unprivileged group improves. When the burden lifts somewhat, new goals and aims are established, which previously seemed impossible to attain. At first, these new aims are likely to be thwarted. The frustration–aggression the-

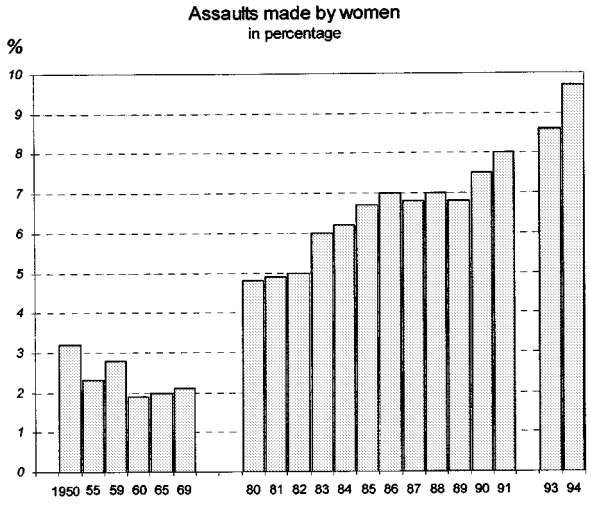


Figure 1 (Lagerspetz). Percentages of assaults made by women in Finland during 1950–1994. Source: Finnish National Institute of Legal Policy, 1998.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

ory predicts that when somebody's goal directed behavior is frustrated, the result is aggression (Berkowitz 1993; Dollard et al. 1939). Presently, when women have more rights and possibilities, they begin to set new goals. Then they become aggressive if the goals are not achieved or not achieved quickly enough. In short, women try to improve their position and to maintain it by aggression.

Another reason for the increase of women's aggression, not incompatible with the one stated above, is that aggression is "in" or "modern" for women in present Western societies. The parents and other educators of girls, as well as the women themselves now see aggressive behavior as a possible option even for women. There are plenty of models of female aggression available for young women. More than earlier, being "tough" is a norm even for girls and not only for boys. In sum, contrary to Campbell's argument based on older data (sect. 2.1, para. 7), women's direct and physical aggression has increased lately. This change may weaken the argument about women's aggression being determined by evolutionary sources.

Do academic theories of aggression correspond to the representations of women's and men's aggression by Campbell? In the last part of the target article Campbell describes the ways in which the (evolutionarily caused) differences between the aggression of the sexes have been accounted for in the culture. Seeing men's behavior as instrumental and women's as expressive, as originally suggested by Talcott Parsons, has some truth in it. Campbell extends this to the area of aggression, suggesting that men's aggression is typically explained as instrumental, and women's as expressive. According to her, the gratifications of expressive aggression are seen as more primitive and virtually instinctive, whereas the gratifications of instrumental aggression are positive interpersonal consequences (sect. 2.2, paras. 3 and 4).

Contrary to what Campbell seems to believe, the division into instrumental and expressive aggression does not correspond to the traditional theories used to explain aggressive motivation. Two opposing theories have usually been presented (see, e.g., Cofer & Appley 1964; Lagerspetz 1984b): aggression has been seen either (1) as an instinct, that is, as a primary drive (Lorenz 1966), or (2) as a secondary reaction, which is instrumental for satisfying some other motive, that is, reaching some other goal. The goal activity of a primary drive or an instinct is rewarding in itself.

Pure "instinctive aggression" is seldom encountered in human life. Mostly aggression is a mixture of the instinctive and the instrumental type. A lust-murderer who kills just for the excitement of it perhaps comes nearest to instinctive aggression. Armed robbery is an example of instrumental aggression: The perpetrator kills in order to obtain money. My point here is that the two explanations used by Campbell do not correspond to the traditional models used to describe aggression. Expressive aggression, which Campbell presents as typical of women, is also instrumental. Its goal is social communication.

Individual differences and the adaptiveness of patriarchal ideology

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Abstract: Campbell's target article significantly advances the field but fails to give adequate weight to individual differences. Moreover, there is no convincing rationale why males gain by making females less aggressive than they would otherwise be. It is also as likely that patriarchal ideology serves women's interests by canalizing genetic influences on individual differences within a more adaptively circumscribed range as it is to counter their interests by preventing them from challenging male hegemony.

While the evolutionary analysis of sex differences in aggression has been well-recognized for quite some time, this target article significantly advances the field by providing an evolutionary rationale for the fine-grained patterns of these sex differences. Campbell makes a variety of critical distinctions (e.g., direct and indirect aggression, fears of personal safety versus fears of novel sensory and aesthetic experience, different mechanisms of establishing and maintaining dominance, different patterns of criminality [robbery versus larceny/theft], etc.); and she shows that the sex differences in these areas are expectable consequences given the positive evolutionary logic she develops for each sex separately.

Sex differences may be conceptualized either as involving mean differences but with overlapping distributions of individual differences (e.g., height) or as involving qualitatively different adaptations (e.g., reproductive organs). Throughout the paper, aggression is viewed as a human universal with predictable patterns of sex differences and predictable eliciting conditions, particularly mate competition and resource scarcity. Nevertheless, Campbell clearly adopts the mean difference model. The overlapping distributions model is a better fit with Campbell's overall scheme because of the correlation between men's and women's aggression and her theory that the cultural manipulation of patriarchy lowers women's natural tendencies toward aggression. On this account, women have the same adaptations that men have and respond to the same eliciting conditions but at a higher threshold. Within-sex individual differences are not discussed in the article but are actually implied by Campbell's finding that some women even under patriarchy adopt dangerous forms of aggression. There is good evidence that physical risk-taking and sensation seeking, aggression, and criminality are substantially heritable (e.g., Rowe 1986), that individual differences in male aggression are correlated with testosterone levels (e.g., Harris et al. 1996), and that law abidingness is an aspect of individual differences in life history strategy (Rushton 1995). Individual differences may be expected to lead to genotype-environment correlations such that people prone to aggression and criminality are more likely to live in conditions of resource scarcity in contemporary societies.

It is difficult to test the idea that female behavior would change in the absence of patriarchy given that all societies are regarded as patriarchal. Moreover, I was not convinced by the reasons given why males gain by making females less aggressive than they would otherwise be. Campbell provides some admittedly speculative possibilities, including the idea that patriarchal suppression of female aggression functions to prevent women from engaging in warfare and thus to exclude women from obtaining political power; or that it functions to make women depend on men for protection. It seems odd to argue that there are sound evolutionary reasons why women would avoid dangerous sensation seeking and aggression and then to suppose that only the power of patriarchy prevents them from going off to war to supplant males in the status and power hierarchy or from protecting themselves with dangerous forms of aggression rather than relying on men to do it for them.

Ideologies involving sex stereotypes surrounding aggression may indeed have some effect on female aggression, but they may serve women's interests by canalizing genetic influences on individual differences within an adaptively circumscribed range rather than countering their interests by preventing them from challenging male hegemony. On this view, patriarchal cultural influences moderate the aggressive tendencies of women genetically prone to be maladaptively aggressive but these women would be more likely to have adaptively aggressive sons. After all, the evolutionary logic indicating that women should be less involved in violent aggression and less concerned about status in a dominance hierarchy is impeccable. Moreover, men may well reject violent, aggressive women as mates with the same evolutionary logic – another form of male control over female aggression, so that women who exhibited such behavior would be at a severe disadvantage in finding mates.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

Novel status contests, archaic evolved psychologies

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Abstract: Women and men have evolved psychological traits adapted to different types of competition in the EEA (environment of evolutionary adaptedness). While women appear not to be as well adapted as men for violent status struggles, the decline of routine violence in status contests raises interesting questions about gender and status competition in contemporary societies.

Campbell's excellent synthesis and evolutionary interpretation of research on male–female differences in intrasexual aggression is a valuable addition to the growing literature on evolved male and female psychologies. She is very persuasive in her claim that fear is an evolved adaptive mechanism that causes females to behave more cautiously when they are likely to incur bodily harm, thereby enabling them to survive and care for their highly altricial offspring. While violent aggression may pay males sufficient fitness dividends to justify such risky behavior, this is rarely the case with females. As numerous evolutionary theorists have observed, however, strategies that were adaptive in the EEA may not be adaptive in the modern world. And what was adaptive for ancestral male and female hominids may not be adaptive for men and women living in contemporary societies. This raises interesting questions about how archaic, sex-specific evolved psychologies might operate in the modern world.

For example, if females evolved to compete effectively in situations that do not pose the threat of bodily harm, how might they fare in a social world that inhibits the expression of violence? Consider the prospects for using violence routinely as a device for resolving interpersonal conflict, especially in public settings like the workplace. In modern industrial societies, an entire institutional complex consisting of law enforcement officers, attorneys, judges and juries, and professional "corrections" officers has been mobilized by the state to inflate to almost unaffordable levels the costs of using violence to win status contests. At the same time, modern societies have generated unprecedented wealth and have strengthened the link between wealth and status, thereby raising the stakes for status competitors. By dissuading competitors from using violence and by enabling women as well as men to compete for status (and its attendant benefits) in new social arenas such as the paid labor force, modernity has created a novel social world for which evolved male and female psychologies may not be entirely well suited.

For example, as more women enter the paid labor force, their access to resources becomes less contingent on their having a relationship with a resource-rich male. Rather, their ability to acquire resources depends more on their individual attributes, such as the jobs they hold. This places women squarely in the arena of status competition with both males and other females, a circumstance for which Campbell explains that men may be better adapted than women. However, the same forces that have drawn women increasingly into status contests have not relaxed the pressure on men to compete for status. Rather, they have *intensified* these contests in a number of ways: (1) As bureaucracy has become the dominant force of administration in the modern world, status hierarchies have proliferated in the "organizational society." (2) Status distinctions have become ever finer-grained and more subtle, thereby elevating status anxiety among competitors. (3) Both material and symbolic resources have become even more closely linked to status attainment. (4) Status attainment has become ever more highly regulated by organizations and their representatives, with a growing emphasis on credentials (e.g., education, examination scores, certifications) as prerequisites for status attainment.

These and other such changes now pose new sorts of competitive challenges to female and male psychologies that appear adapted to the archaic social conditions that define the EEA. How will females fare in a world where they are encouraged and even required to compete for status rather than resources alone? Initially, one is tempted to hypothesize that status competition may induce fearfulness among women, thereby reducing their effectiveness as competitors in the modern world. This, however, may not be true. If, as Campbell argues, it is not competition per se to which women are averse, but rather, only competition that poses the threat of bodily harm, then women may have evolved psychologies that equip them perfectly well for status competition in settings such as the modern workplace. Freed from the fear of routinely encountering violence in the workplace, women may be able to take advantage of adaptations they evolved in resource competition and to press these adaptations into service for status competition. In fact, following Campbell's logic, women may be better adapted than men for competition in a world that promotes nonviolent status striving.

Simultaneously, if Campbell is right in her claim that men's anxieties are especially aroused by "psychological and social facets of fear" (sect. 1.2, para. 3), then the new forms of status competition created by modern, industrial societies may take an especially harsh toll on the male psyche. If, as I suggested earlier, life in modern societies intensifies status competition, then the male psychology may be disproportionately sensitive to this change. Furthermore, if modern societies successfully inhibit men's use of violence in status contests, and if males truly suffer greater psychological and social fear than women do, then status competition in modern societies may be particularly stressful for the evolved male psychology.

Thus, the novel nature of status competition in contemporary industrial societies may present *both* females and males with behavioral challenges for which neither sex is particularly well-adapted. While it is clear that millions of women have risen to the challenges presented by status competition in modern societies (despite the formidable resistance posed by patriarchal culture and social institutions), we have yet to determine the psychological costs (if any) that they may have incurred by stepping directly into the status fray. Similarly, the social institutions of modernity may have thrust men into an equally alien world of behavioral requirements. Life in the modern office may present men with their worst evolved fears; the need to cope with indirect aggression (expressed by both women and other men), gossip, interpersonal intrigue, and numerous other psychological and social terrors, none of which can be eradicated with old fashioned violence. And while it is obvious that both women and men benefit from a social environment in which people are free to compete for status with other people without fear of routine violence, Campbell's analysis raises extremely interesting and provocative questions about the challenges faced by a Pleistocene ape that has incarcerated itself in a post-Pleistocene zoo.

Costs and benefits of female aggressiveness in humans and other mammals

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Abstract: Sex differences in aggressive behavior are probably adaptive but the costs and benefits of risky aggression to women and men may be different from those suggested in Campbell's target article. Moreover, sex differences are more likely to reflect differences in the costs of aggression to females and males rather than differences in its benefits.

Campbell argues that, in humans and other primates, females are less likely than males to engage in risky forms of aggression

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

(Campbell focuses on intra-sexual aggression, but most of the sex differences described apply to inter-sexual aggression as well) because risky aggression is both more costly and less beneficial to females than to males. In her view, aggression is more costly to females than to males because the mother's presence is more critical to her offspring's survival than is the father's. Aggression is less beneficial to females than to males because variance in reproductive success (RS) is lower for females than for males and hence, females have less to gain than males from the use of aggressive competitive tactics. We agree that the sex differences in aggression may be adaptive, but the costs and benefits of risky aggression to males and females may be different from those mentioned by Campbell.

With regard to the costs of aggression, the statement that the mother's presence is more critical to her offspring's survival than is the father's is generally true for all species of mammals. Thus, if Campbell's hypothesis were correct, females should be less aggressive than males in all mammalian species, and particularly in all the polygynous ones. However, in some species, females are more aggressive and more dominant than males (e.g., in hyenas, Frank 1986; in several species of lemurs, Pollock 1979; Kappeler 1990; Kaufman 1991). Moreover, in virtually all mammalian species for which data are available, females are more aggressive toward both male and female conspecifics during the early lactation period, when the mother's presence is crucial to offspring survival, than in any other stage of their reproductive cycle (Maestripieri 1992; 1994). This is exactly the opposite of what Campbell's hypothesis would predict. In rodents, the early lactation period is also accompanied by a general reduction in fearfulness and anxiety (Maestripieri & D'Amato 1991), and this may be true for humans as well (Carter & Altemus 1997). Again, this contradicts Campbell's hypothesis, which predicts that females should be most anxious, fearful, and phobic when their survival is most crucial to their offspring. Thus, the variation in female aggressiveness across both species and the reproductive cycle suggests there must be more to sex differences in aggression than just differential effects of mother's and father's presence on offspring survival. One possibility is that the characteristics of female intra-sexual aggression are constrained by those of inter-sexual aggression. In all species in which males are on average larger than females, females are at risk of being physically dominated by half of the population, and other things being equal, by engaging in risky aggression females are more likely to suffer serious injury than males. The different costs of aggression to males and females would explain why, in these species, females may be generally more prone to using indirect competitive tactics than males.

With respect to the benefits of aggression, although it is true that in polygynous species aggressive competitive tactics can bring about a higher increase in male than in female RS, it is also true that, for the most part, males are engaged in reproductive competition with other males, and females with other females. When competing with individuals of the same sex, survival and other benefits of risky aggression are just as critical for female RS as they are for male RS, and therefore both females and males are expected to compete to the best of their abilities. This suggests that, as far as reproductive competition is concerned, the benefits of risky aggression are probably similar for males and females, and that sex differences are more likely to reflect differences in the costs of aggression to females and males rather than differences in its benefits.

Campbell argues that, among nonhuman primates, the relationship between dominance and RS is weaker and less consistent for females than for males. Based on our reading of the primatological literature, the relationship between dominance rank and RS, for both males and females, is not as clear-cut as described. Rather, there is a great deal of discrepancy among studies of dominance rank and RS in primates. Part of this discrepancy is due to environmental variability (e.g., captivity vs. field studies) and part is due to the variability of primate societies themselves. Although the primate data must be interpreted with caution, Campbell argues quite convincingly that in those human cultures on which patriarchal control has condemned female aggression as unnatural or aberrant, cultural influences may have acted upon and enhanced evolutionarily based psychological differences.

Some reflections on sex differences in aggression and violence

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Abstract: Four issues relevant to sex differences in human aggression and violence are considered. (1) The motivation for play and serious aggression in children and juvenile animals is different. Consequently, the evolutionary explanations for each may be different. (2) Sex differences in intrasexual aggression may be due to effects of the attacker or the target. There is evidence that both males and females are more physically aggressive against males and less physically aggressive against females. The evolutionary explanation for each component of the sex difference in intrasexual aggression may be different. (3) Aggression and violence are defined. The former is the attack, and the latter is the consequent injury or death. The evolutionary explanation for each may not be the same. (4) Most men and women are neither physically aggressive nor criminally violent. The evolutionary explanations of sex differences in aggression and violence should take this polymorphism into account.

Campbell states that human males engage in aggression more than human females and, that this sex difference in aggression is universal for children and for adults. She also proposes that this is due to a higher cost for aggression in females than in males, which is related to higher parental investment of females than males. Here, I will consider the evidence for and the relevance of the alleged sex differences in human aggression.

Juvenile rodents, carnivores, primates, and humans are known to engage primarily, if not exclusively, in play rather than in serious aggression (Fagen 1981). Attack and defense but not threat and submission occur in play fighting. Also, the motivation for play and serious fighting is different (Boulton 1994). In rodents play and serious fighting are distinguished by the body target attacked and defended (Pellis 1988). It has been suggested that in rodents, these are precocial expressions of sexual rather than agonistic motivation. Similarly, in lemurs and monkeys, there is a distinction between play but not serious fighting (Pellis & Pellis 1997). In ring-tailed lemurs and patas monkeys, play but not serious fighting is preceded by an open mouth face, whereas in spider monkeys, play but not serious fighting is preceded by head shakes. Similarly, play fighting in Zapotec children are preceded by play signals. As a consequence of this play fighting, there were very few injuries (1 percent), and these were relatively mild (Fry 1990). A similar low incidence of injury (3.7 percent) was reported for play aggression in British grade school children (Humphreys & Smith 1987). Sex differences in serious fighting but not in play fighting of children may be explained by the evolutionary hypothesis of Campbell. Unfortunately, it is difficult to tell from the literature how much of the sex difference in aggression of children involves play fighting and how much serious fighting. Regardless, the sex difference in aggression of children is small and not universal. According to Rohner (1976), it occurs in 71 percent of measured societies.

There are several meta-analyses of sex differences in aggression in humans (Bettencourt & Kernahan 1997; Bettencourt & Miller 1996; Eagly & Steffen 1986; Hyde 1984). These conclude that males are more likely than females to engage in aggression that inflicts pain or injury. The conclusions about physical aggression are based mostly on studies involving the administration of electroshock or other noxious stimuli in laboratory paradigms. In most of these studies, the sex of the shock or noxious stimulus administrator and recipient is the same. This confounds sex of subject with

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

sex of target. However, some studies included pairs in which the sex of subject and shock recipient were not the same. Taken together, these indicate that both male and females are more physically aggressive toward male targets than female ones, and that both sexes are less physically aggressive toward female targets than male ones (Baron & Richardson 1994). The same conclusions were reported in the narrative review of Frodi et al. (1977). A similar effect is seen for criminal violence (Albert et al. 1993; Baron & Richardson 1994). Thus, part of the sex difference in intrasexual aggression of adults in these laboratory studies and for intrasexual violence in adult crime may be due to the sex of the target rather than sex of subject. Effects of the sex of target on sex differences in intrasexual aggression and violence would not be explained by the evolutionary hypothesis of Campbell.

Some authors have distinguished between aggression and violence (Archer 1994a; Campbell & Muncer 1994b). Here, aggression is defined as verbal, emotional, or physical attacks with the intention of harming or hurting another, and violence is defined as attacks which actually cause injury or death and which are subject to criminal prosecution. They have also suggested that even where there may be no sex difference in aggression, there may be a sex difference in violence, such as for domestic partner abuse. Campbell states that males are more criminally violent than females. I suggest that this may reflect factors other than sex differences in aggression. There is a sexual dimorphism in body size and strength which may result in more injury or death from male than from female physical attack. This sexual dimorphism would be due to sexual selection rather than Campbell's evolutionary hypothesis. Also, knives, guns, and other weapons are involved in much of the injurious and lethal consequences of aggression (Archer 1994c), and there is cultural approval for male but not female familiarity with and use of weapons. This may be part of Campbell's hypothesis that culture discourages and stigmatizes aggression by females. A consequence of this might be sex differences in violence in the absence of a sex difference in aggression.

Most males and females are neither physically aggressive nor criminally violent, and sex differences in aggression and violence are reflections of differences between males and females for this polymorphism. Within-sex polymorphism occurs for both laboratory aggression and criminal violence. For laboratory studies, the sex difference in physical aggression is small and accounts for very little of the individual variation in physical aggression (Hyde 1984). For criminal violence of males, 75 percent is committed by chronic delinquents; these individuals constitute about seven percent of all males (Tracy et al. 1990). Also, most men are not homicidal (Archer 1994c). Women are also perpetrators of criminal violence (Pearson 1997), but, as with men, few women are criminally violent (Archer 1994a). There is another indication of polymorphism among males in violence. During the Civil War and World War II, very few infantrymen fired their weapons in combat, and during World War II, less than one percent of fighter pilots accounted for 30 to 40 percent of aircraft destroyed in aerial combat (Grossman 1996). It has been also estimated that 98 percent of soldiers have to be rigorously trained to attack the enemy with their weapons. The other two percent are "natural" soldiers who do not need to be trained to attack and kill. The same variation may occur in women. During the Civil War, at least 400 women are known to have joined the army and to have taken part in combat by disguising themselves as men (Horowitz 1997).

An evolutionary theory of sex differences in physical aggression and criminal violence should be based on population variation rather than typological universals. This would account for variation both within and between the sexes by explaining on the one hand why most men and women are not physically aggressive or criminally violent, and on the other why the frequency of these behaviors is greater in males than in females. Unfortunately, Campbell's view of sex differences in physical aggression and criminal violence and theories about them appear to be typological.

How deep is your love?

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Abstract: The thesis that women will be more intent on staying alive fails to take into account that current strategies are those of the winners in the evolutionary race. Moreover, because like tends to mate with like, risk taking will be averaged out between the sexes. Finally, Campbell's narrow view of parental investment fails to acknowledge the indirect contributions of males.

Campbell has written an interesting and provocative target article which should stimulate debate on the role of women's aggression in natural selection. Much of what she says about women's aggression is interesting and informative but there are a number of flaws in her argument.

First, we do not think that we will find anyone accepting her premise that "females should be more concerned with staying alive than men." Presumably the central premise of her Darwinian world view is that the fittest will survive and this includes men as well as women. While there is clear evidence that men use higher risk strategies to achieve this goal, and as a consequence have a slightly higher mortality, this should not obscure the fact that we are all descendants of the men who were using winning strategies. Winning is what the risk game is all about and to the winners come the spoils – successful mating, offspring, patrimony, and the accoutrements of K strategy.

Second, and following from the first observation, we have to decide Campbell's thesis by calculating the net benefits and losses in the overall population survival equation for each sex. If Campbell's thesis is correct we should have an unbalanced gender ratio with many more women than men. This does not seem likely. Those who mate will follow the time honoured principle of homogamy (McKnight & Sutton 1994) and will marry those who are very similar to themselves, including making fine calculations of what is acceptable risk-taking in a mate. [See also Rushton: "Genetic Similarity, Human Altruism, and Group Selection" *BBS* 12(3) 1989.] So, a general matching principle will average out risk taking between the sexes, to the detriment of Campbell's thesis. This will lead to interesting patterns. For example, in the swings and merry-go-rounds of pursuing a lower risk strategy, some women will be total losers, and this small differential summed across our species may well show compensating losses to those experienced by men. It would also be interesting to compare the net reproduction and survival rates of offspring, against the total percentage of women who are mothers. These sorts of calculations would be exceedingly difficult to do in an era in which social evolution (reliable contraception) obscures natural reproduction rates but might possibly be done using the evidence from studies of the pre-pill days (e.g., Vincent 1946).

Although our observations may sound as if we are straying towards the heresy of group selection, we cannot evaluate Campbell's proposition in strictly individual terms. [See also Wilson & Sober: "Reintroducing Group Selection to the Human Behavioral Sciences" *BBS* 17(4) 1994.] At the end of the day it will be the sex ratio benefit across the species that decides her argument. The nature of a winning strategy is that eventually it becomes the population norm. So a balancing act will come to fixity between the sexes, and the last time we looked there were roughly as many males as females trudging around the planet.

Campbell may well reply that these are interesting criticisms but fail to address her central point that women have the larger share of ensuring their children survive. We reject this proposition. We believe that she has fallen into the trap of seeing immediate child care as the entirety of parental investment. One of the many spin-offs of the K versus R strategy debate has been to see just how difficult it is to quantify resource investment. To make this point starkly we could paraphrase the Bible at this point: "no

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

greater love have any man that he would lay down his life for another" including protecting his children from harm, or when the group hunt goes terribly wrong. While we acknowledge that immediate child care was and still is a female responsibility, we feel that Campbell has a quite feminocentric view of child care. We would also observe that while men have the K versus R choice, virtually all men end up following the K path. Their wives would not have it any other way, and occasional male wanderings aside, there are very good reasons for so doing – ensuring paternity certainty and the like. That in the past our species may have been uncertain of who the father was simply shifts the K responsibility from an individual to the group of individuals within the extended family or tribe. Another point worth making is that research is suggesting that women are as likely as men to seek extra pair copulations (Baker & Bellis 1995). While women are usually quite certain who their child's mother was, the same research demonstrates that fathers are as certain, but often quite mistaken if blood tests are taken into account (Macintyre & Sooman 1992). Cuckoldry is a high stakes game regardless of who plays it.

Evolutionary models of female intrasexual competition

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Abstract: Female competition generally takes nonviolent form, but includes intense verbal and nonverbal harassment that has profound social and physiological consequences. The evolutionary ecological model of competitive reproductive suppression in human females, might profitably be applied to explain a range of contemporary phenomena, including anorexia.

It is unclear to me what Campbell's goal is in this target article. The Introduction suggests that the purpose is to reconcile four empirical facts about sex differentials in physical, criminal aggression. This task, however, has already been admirably accomplished by Wilson and Daly (1985; Daly & Wilson 1988a), whose work is well-cited in the rest of the Introduction. What then follows in sections 1.1 and 1.2 (attempts to explain these differentials from an ultimate and a proximate perspective, respectively) does not add significantly to our understanding. Indeed, the content of these introductory sections ranges so broadly that several complicated and controversial issues (e.g., the evolution of menopause, sex differentials in anxiety disorders) are treated with such superficiality that a significant complement of logical errors has been introduced. This is unfortunate, as these sections constitute a quarter of the article, and yet their content is not a requisite foundation for what follows.

Sections 1.3 through 1.6 (constituting a bit less than half of the target article) provide a good review of the literature of sex differentials in type and style of aggression, with a focus on the less physical forms of female intra-sexual competition and dominance. Better for the target article to have begun here. This is the area of the author's expertise, and one that deserves significantly wider attention. Campbell is one of a small number of researchers who have pointed out that, while competition is typically regarded as a feature of male, rather than female, interactions, this is true only with respect to physical aggression. Both sexes engage in what Schmitt and Buss (1996) call "competitor derogation," and women and girls are more likely than men and boys to use subtle forms of aggression such as starting and perpetuating rumors, talking "behind someone's back," or otherwise trying to manipulate the social "Who's Who" (Buss 1988; Cashdan 1996, 1998; Hood 1996). These nonphysical, but otherwise intense forms of competition between women are probably universal across cultures (Burbank 1987).

In this regard, Campbell says

> It is worth highlighting the analogy between humans and nonhuman primates with respect to indirect aggression. . . . higher status females engage in mundane harassment of lower-status females which can cause suppression of oestrous and abortion . . . Such tactics diminish the reproductive success of the victim and elevate the material resources available to the victor and her offspring. (sect. 1.5, final para.)

This is a key point. I would go even further and say that what we are seeing in human behavior is not merely analogous, but homologous – this more parsimonious interpretation also provides a better explanation for the cross-cultural universality of the pattern taken by female aggression.

That nonviolent forms of female competition can have profound effects on the reproductive system seems to be true for humans as well as for nonhuman primates and other animals. In their 1983 review, Wasser and Barash cited studies of reproduction among !Kung women showing that during a ten-year period, fewer than 50% of reproductive-age women had two or more children while over 40% had none at all. Applying their mammalian "reproductive suppression model" to the human data, they interpreted this "inequality" in terms of reproductive manipulation of subordinate women by dominants.

The existence of this evolutionary mechanism may have profound social consequences. I would argue that in contemporary Western society, one outcome of socially mediated reproductive competition is anorexia. Although "the media" are generally blamed for promoting thinness as a cultural ideal, consumers "call the shots," and it is women, not men, who claim that the "ideal" female figure is one of below average weight. (Men actually prefer plumper female figures than do women; Anderson et al. 1992; Cohn et al. 1987; Fallon & Rozin 1985; Furnham & Radley 1989). When it comes to assessments of physical attractiveness, women are more influenced by the opinions of other women than by the opinions of men (Graziano et al. 1993); dominant women may use this fact to manipulate others. Thus, the role of culture *as a means of,* or *tool for,* intra-sexual competition becomes an interesting evolutionary and political question (Mealey 1997).

Campbell's discourse on culture (sects. 2.1 and 2.2, constituting the remaining quarter of the target article) goes in a different direction, however, and these sections, like sections 1.1 and 1.2, also lose focus. Several different kinds of cultural models are addressed, but they are not sufficiently differentiated to determine whether Campbell thinks they are mutually incompatible, simultaneous but antagonistic, or just different ways of looking at the same thing. The cultural "condemnation of female violence" and "valorization of male violence" that Campbell describes seem to reflect and enhance, rather than to counter, evolved sex differences; yet Campbell's conclusion seems to be that patriarchical culture is imposing upon us an "unnatural" and erroneous belief. Certainly *inter*-sexual conflict can be called upon to help explain sex differences in the expression of aggression, but the *intra*-sexual competition that provided the core of the target article seems to have been lost here in the concluding sections.

I think the worth of Campbell's contribution has to be assessed by treating the three topics (sections) as independent of one another, rather than as a single, linear, and causally determined argument. As such, sections 2 and 3 raise many interesting and potentially important social questions that future research should endeavor to answer.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

The dual selection model: Questions about necessity and completeness

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Abstract: Human mating and parenting are more complex than has been implied by many evolutionarily based theories of sex differences. While focusing on sex differences might shed some light on the evolution of mating and parenting, this level of analysis is rather imprecise. More important, it ignores several ecological variables that should have influenced mating/parenting decisions and behaviors in both sexes.

Campbell proposes that two distinct selection processes explain why women weigh the costs of physical aggression (and other forms of risk-taking that could result in debilitating injuries) more heavily than men. According to this "dual selection" model, intense intrasexual competition for mates amplified by "female choice" should have led men to engage in riskier and more dangerous activities. This explanation for the origin of sex differences in aggression, competition, and risk-taking is not new. What *is* new is the suggestion that a second, countervailing selectional force may have operated on women. Specifically, given the greater importance of the mother's survival for the survival of her offspring (and, ultimately, for her reproductive success), Campbell contends that women should have evolved chronically lower thresholds for fear in situations that could lead to physical injury (even in intrasexual encounters, when sexual dimorphism is not an issue).

Most of the data reviewed are consistent with this general hypothesis. However, no evidence demonstrates that *separate* selection pressures polarized each sex. In fact, most of the sex differences can be explained just as easily – and more parsimoniously – by a single selection process that led men to be more aggressive, status-oriented, and risk-prone than women. Stronger and more compelling evidence that "dual selection" actually operated is needed. Specifically, it must be demonstrated that women's lower fear threshold not only enhanced their survival and eventual reproductive success, but that their greater risk-aversion has the properties of "special design" (Buss 1995; Williams 1966).

Human mating and parenting were probably much more varied and complex in the environment of evolutionary adaptedness (EEA) than many evolution-based theories of sex differences have suggested (e.g., Symons 1979; Wilson 1975). Moreover, early human societies may have been less structured around competitive male dominance hierarchies and more structured around egalitarianism and resource sharing than many evolutionary psychologists have assumed (Knauft 1991). One drawback of the dual model, therefore, is its overreliance on a simple and perhaps misleading theoretical perspective of sex differences in mating and parental investment. In species with internal gestation, the sexes do differ considerably in their *initial* (but not necessarily their long-term) amount of parental investment (see Trivers 1972). Over time, this initial disparity usually decreases in species which must provide intense biparental care. Among mammals, humans are the most biparental species (Daly & Wilson 1988b), and human fathers undoubtedly played a major role in influencing the survival of their offspring in the EEA. Unfortunately, the dual selection model does not specify how several important ecological variables (such as the father's or kin's ability to provide for the infant in the mother's absence, the child's age, health, and specific needs, the mother's age, health, and social status, and the quality of the rearing environment) should have modulated maternal decision-making (see Daly & Wilson's 1988b; 1995 theoretical treatment of discriminative parental solicitude). Given the wide array of environments in which humans raised children in the EEA, threat sensitivity and risk aversion in women should have been ecologically contingent, yet none of these contingencies are considered.

The most direct evidence that offspring survival may have depended more on maternal than paternal survival comes from research on orphans (see Hill & Hurtado 1996; Voland 1988). What these studies show, however, is that the benefits of maternal survival are most pronounced during the first year of an infant's life, when maternal death doubles the risk of infant mortality compared to paternal death. Offspring mortality uniquely associated with maternal death declines quickly as children age. Because neonates cannot survive without maternal milk until they are able to digest solid foods, maternal survival during the first year of life should have been critical to an infant's survival. However, the importance of maternal survival may have declined more precipitously over the infant's lifespan than Campbell suggests, especially after maternal milk was no longer the main source of nutrition. Moreover, as mothers aged and their older children could help care for younger siblings, the importance of maternal survival should have diminished, especially if fathers or extended family could raise offspring and environmental conditions were favorable.

If maternal survival was most critical to a woman's reproductive success (a) earlier in her reproductive life and (b) during the first year of each child's life, why didn't selection pressures fashion a more fine-tuned and well-designed solution to the "problem" of maternal survival? Campbell contends that women evolved to have significantly lower fear thresholds than men, thresholds which remain chronically low across the entire lifespan and very different kinds of relationships and social encounters. The lone exception to this "risk-aversion" rule occurs when an infant's life is threatened or in jeopardy. If maternal survival was specifically selected for, why is it "designed" in such a static, inflexible, imprecise, and ecologically noncontingent manner?

Male dominance hierarchies and women's intrasexual competition

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Abstract: In their competition for higher-status men, women with higher socioeconomic status use indirect forms of aggression (ridicule and gossip) to derogate lower-status female competitors and the men who date them. Women's greater tendency to excuse their aggression is arguably a cultural enhancement of an evolutionarily based sex difference and not solely a cultural construction imposed by patriarchy.

Interview and survey data from college students, medical students, law students, and adult professionals indicate that men's status in a particular hierarchy is a major determinant of their attractiveness to women (Townsend 1998). Consequently, men's attractiveness changes dramatically as they move from hierarchies in which their status is high and known to hierarchies in which it is low or unknown (Symons 1979; Townsend & Wasserman 1997). As women move through different hierarchies (e.g., high school to college, college to professional school), they form new standards by comparing the men in the new environment to each other and to their own achievements. Hence, as women's socioeconomic status (SES) increases, their socioeconomic standards for mates increase accordingly. Men are relatively indifferent to women's income and occupational status in choosing partners. Higher-status women are thus forced to compete with lower-status women for higher-status men.

Campbell argues that, compared to men and boys, girls and women are more likely to compete through indirect forms of aggression such as shunning, stigmatizing, gossiping, and spreading false rumors (sect. 1.6). One of the ways that individuals compete sexually is to make themselves appear more attractive compared to their peers. This can be accomplished by making themselves

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

more attractive or by making the competition less attractive (Buss & Dedden 1990; Schmitt & Buss 1996). A common method of making someone appear less attractive is to derogate, slight, and insult them. Buss and Dedden (1990) found that men and women slighted and insulted exactly those qualities that would have been critical to survival and reproductive success in evolutionary history. Men derogated other men's manhood, ambition, achievements, and strength. Women criticized other women's physical appearance, and implied either that they were promiscuous or that they were sexual teases. The authors also found that women were more likely than men to insult competitors' intelligence (although they did not predict this finding). A study of sexual competition among female medical students suggests that this practice may result from two causes (Townsend 1998). First, it makes tactical sense to criticize competitors on traits in which the competitors appear weak, for example, an intellectual but plain woman whose ex-boyfriend is going out with a fashion model would be foolish to put down her competitor's looks. This would only draw attention to her competitor's superiority and her own deficiencies in that area. Instead, she would probably slight her rival's intelligence – perhaps also using her opponent's youth and physical superiority as proof of her intellectual inferiority. A second reason professional women might derogate a competitor's intelligence is that their own criteria for attractiveness – which are largely socioeconomic and include intelligence (Kenrick et al. 1990) – seem natural and right (Townsend 1998). Consequently, criteria that men favor such as youth and beauty often seem foreign, incomprehensible, and degraded to women. Numerous women in the study deprecated female competitors with lower SES by calling them bimbos, airheads, and dingalings (Townsend 1998). These women also derogated male peers who dated women with lower SES – particularly if those women were younger. Similarly, organizational limitations on dating between men and their status inferiors may serve the ostensible function of protecting against sexual harassment, but they also tend to limit the ability of lower-status women (who are often younger and therefore more sexually attractive to men) to compete with higher-status women for higher-status men.

In her conclusion, Campbell writes that patriarchal control has caused female aggression to be viewed as unnatural, and this taboo causes women to excuse rather than justify their aggression. She argues cogently that in ancestral populations direct aggression did not produce the reproductive payoffs that it did for men; consequently, compared to male aggression, female aggression is more likely to be low-level and indirect. If this is true, *direct* aggression in females would presumably fit better with expressive theories than instrumental theories, and expressive and instrumental theories correspond respectively to excuses and justifications (sect. 2.2). If the sex difference in the use of excuses and justifications remains, even when indirect forms of aggression are considered (Archer & Parker 1994), then women's greater tendency to use excuses is perhaps an example of cultural enhancement of an evolutionarily based sex difference, but it is not solely a cultural construction imposed by patriarchy. Similarly, phrases like "the myth of the coy female" and "the myth of the nonaggressive women" can be politically useful (sect. 3, Conclusions), but they can also be misleading. It is important to deconstruct the myths of the coy and nonaggressive woman, but it is equally important to deconstruct the myth of the absence of evolutionarily based sex differences in behavior. Campbell's target article does an admirable job of this.

How is maternal survival related to reproductive success?

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Abstract: Campbell's target article is a stimulating attempt to extend our understanding of sex differences in risk-taking behaviors. However, Campbell does not succeed in demonstrating that her account adds explanatory power to those (e.g., Daly & Wilson 1994) previously proposed. In particular, little effort was made to explore the causal links between survival (staying alive) and reproduction.

As Darwin (1859; 1871) noted, evolution is a matter of differential reproduction rather than differential survival. For human males, reproductive success and personal survival is often a trade-off. The greater variance in reproductive success among males selects for greater acceptance of risk in male-male competition; according to Daly and Wilson (1994; Wilson & Daly 1985), this is why males are more risk seeking than females. In contrast, for human females, reproductive success and personal survival tend to be interdependent goals. Thus, according to Campbell's "staying alive" account, natural selection would favor risk avoidance in females because infant survival depends more on maternal than on paternal care and defense.

Both accounts mentioned attempts to explain sex differences in the acceptance of risk, in particular with regard to aggression. Daly and Wilson attribute these differences to male adaptation to the greater variance in reproduction, whereas Campbell suggests two distinct mental adaptations, one for men and one for women. Is the additional female adaptation necessary? In our view, Campbell fails to convince the reader that it is.

As Campbell points out, there are four important empirical facts that any adequate theory of male and female patterns of aggression have to explain. The first two facts – that human males engage in aggression more frequently than females, and that this sex difference increases as a function of increasing seriousness of the aggressive behavior – are well captured by Daly and Wilson's account. The third fact is a high correlation between rates of male and female aggression across geographical areas. Campbell explains it in terms of a mutual response to the same ecological conditions (e.g., resource shortage) – an argument which seems to be extraneous to both accounts. Finally, the fourth fact – a high correlation between rates of male and female aggression over the life span – appears to be inconsistent with Campbell's account.

What is behind the age-related patterns of criminal violence? In both sexes, criminal violence is most likely to occur between the ages of 14 to 24. One explanation of this high correlation is that the intrasex competition for mates becomes most intensified after puberty for both males and females. However, according to the "staying alive" hypothesis, we could expect that females, especially in hunter and gatherer societies, would be most risk-avoiding at this life stage, when they are most fecund and most likely to be involved in maternal care and defense. Given Campbell's claim that this female adaptation occurs because the mother's survival is critical for her own reproductive success, the finding that criminal violence by females peaks at this life stage is unexpected. In order to explain this phenomenon, Campbell simply switches to a mating resource competition account: "The rise in female aggression during adolescence, like that of males, is associated with mate selection."

Future research on whether there is a significant age effect upon risk acceptance and criminal violence may provide the data with which to judge whether or not a female risk-avoidance adaptation is required. For instance, a testable prediction from Campbell's "staying alive" hypothesis might be that women near or after menopause become more risk seeking because both their own reproduction and offspring's survival are less dependent upon their personal survival.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

What links maternal survival to reproductive success? The pivotal point of the "staying alive" hypothesis is that maternal care is more important for offspring survival than paternal care. Why is this the case? What are the causal links between maternal survival and reproductive success? Had Campbell tried to search for possible causal links, the "staying alive" hypothesis could have been tested more rigorously. We can think of at least three possible causal links: (1) The maternal proportion of parental investment is greater than the paternal proportion. (2) Given the close physical proximity between a mother and her infant, risk avoidance by the mother will enhance the survival chances of her offspring, thereby enhancing her own reproductive success. (3) The kinds of parental care that mothers give (e.g., breast feeding) are more crucial for infant survival than the kinds of care given by fathers (e.g., protecting both mother and offspring from the dangers imposed by predators). However, the third postulate is open to the argument that paternal protection is more crucial than maternal feeding for infant survival.

The causal links identified here, while tentative, can be systematically tested. The sex differences in aggression, for instance, can be examined under two comparable conditions where a proposed causal relation is reversed or differs across conditions. For example, considering the relative amount of parental investment, one way to conduct such a test would be to compare female risk taking or aggression patterns under both high and low paternal investment conditions. If the relative amount is the crucial causal factor, then female risk taking should be lower in low paternal investment conditions where maternal care and defense are more important for offspring survival. This logic of hypothesis testing with a reversed causal structure has been successfully applied by George Williams (1966) and Robert Trivers (1972) in testing their evolutionary hypotheses. Similarly, if physical proximity is the crucial causal factor, one could examine whether female risk taking changes with varying degrees of physical proximity between mother and infant. Such analyses would make Campbell's theoretical claims empirically testable.

As we suggest, there are several possible ways to examine Campbell's theoretical claims. At this point, we are left with a stimulating hypothesis which attempts to incorporate the existing literature in the area of sex differences in risk-taking behaviors; however, without demonstrating the causal links between maternal survival and reproductive success, we can say little about the theoretical and empirical validity of this hypothesis.

Author's Response

The last days of discord? Evolution and culture as accounts of female–female aggression

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Abstract: When aggression is conceptualised in terms of a cost-benefit ratio, sex differences are best understood by a consideration of female costs as well as male benefits. Benefits must be extremely high to outweigh the greater costs borne by females, and circumstances where this occurs are discussed. Achievement of dominance is not such a circumstance and evidence bearing upon women's egalitarian relationships is reviewed. Attempts to explain sex differences in terms of sexual dimorphism, sex-of-target effects, social control, and socialisation are found to be inadequate. The suggestion that the stigmatisation of female aggreession arises not from patriarchal imposition but from statistical rarity (resulting from evolutionary pressures) is given serious consideration. Two hypotheses ("internal read-out" versus social/epidemiological representations) are described to explain the relationship between sex differences in behaviour and corresponding lay explanations.

It is a rare treat to have a series of world renowned researchers climb into the academic boxing ring for 27 rounds with my proposals. It is especially gratifying because debating bouts on female aggression are usually relegated to the equivalent of the local youth club rather than an international venue. Because most commentators were kind enough to keep their gloves on, I am unbloodied, if slightly bowed, as I take this opportunity to respond. My thanks to all the commentators for the time and thought that they devoted to evaluating and refining the ideas expressed in my target article. Though unable to address every point raised, I have grouped the main issues into nine areas of controversy.

R1. Do we need a second mechanism for sex differences in aggression?

The impact of Daly and Wilson's (1988a) seminal analysis of male violence has been immense – and rightly so. Although some commentators take issue with their analysis (**Beckerman** queries the relationship between male dominance and reproductive success, **Cashdan** queries the domain-generality and sex-specificity of competitiveness), **Mealey** seems to believe that I am merely rehearsing their position, whereas others, **Simpson, Brain,** and **Archer,** question whether my additions to their model are really necessary.

Following Alexander's (1979, p. 241) notion that "the entire life history strategy of males is a higher-risk, higher-stakes adventure than that of females," Daly and Wilson (1990) pursue these twin concepts by treating risk as variance in the magnitude of the payoff for a given course of action and stakes as the possible gains. Hence their analysis focuses heavily, though not exclusively, upon the positive incentives for aggression by males ("males typically compete for bigger prizes than do females. Bigger prizes warrant bigger gambles," Daly & Wilson 1988a, p. 163). Stakes, however, refer more properly to the magnitude of the bet that is made (and hence to how much can be lost) and risk usually refers to the likelihood of losing (we do not normally speak of the risk of winning the lottery but may refer to the risk of losing our stake). It was this observation that prompted me to think that women had more to lose than men in terms of reproductive success and to wonder whether women might therefore avoid risky situations. The burden of my argument is that women actively seek to avoid direct combat and, where this is impossible, to minimise its lethality or to use indirect means of competition. **Cashdan** argues that a focus on male payoffs predicts greater male competitiveness in general, while an emphasis upon female costs predicts only that female competition will be less intense than that of males. She believes, and I concur, that the latter prediction is better borne out by the data.

So what began as semantic hair-splitting turned into a new way of looking at sex differences in aggression. But do we need it? While Daly and Wilson emphasise the benefits of aggression for males, I emphasise the costs for females.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

Yet we both use the same fundamental game theoretic equation that aggression is the result of the cost–benefit ratio (as do most behavioural ecologists; see **Brain**). Could a focus on reduced payoffs for female aggression do just as good a job as my emphasis upon increased costs? Because dominance does not increase a female's quality or quantity of sexual partners, the possible benefits of female aggression must lie elsewhere – perhaps in preferential access to food resources about which females, given the necessity of resources for reproductive success, should be particularly competitive (Hrdy 1981). Here the payoffs for females are at least equal, if not greater, than for males yet primate studies do not suggest that females fight more intensely than males over food. Given women's economic reliance upon males under monogamy, both the acquisition of an optimal mate and the preservation of the marital relationship should be equally (if not more) critical to women than to men. Though female aggression is heightened in these circumstances as I would predict, it does not match men's more intense levels of jealousy-motivated physical aggression. Experimental studies hold constant the payoffs for aggression in subjects of both sexes, yet find a marked sex difference in physical aggression. If we conceptualise anger as the proximal emotion that drives aggression and fear as the counteremotion that inhibits it, then the fact that the frequency and intensity of anger in women and men are identical (Frost & Averill 1982; Hyde 1986; Tavris 1989) while their levels of physical aggression are not also suggests that the sex difference resides in the emotional costs (fear) rather than the emotional payoffs (anger expression). **Maestripieri & Carroll** concur that the benefits of aggression are equal for both sexes so the sex difference must result from differential cost. In a similar vein, **Archer** notes that a male's decision to challenge or submit to an alpha male is not the result of differences in the benefits of dominance but the differential likelihood of incurring costs. This suggests that emphasis upon the costs of aggression can be of real assistance in understanding individual differences as well as sex differences.

Simpson asks for evidence of special design to support a separate selection pressure that operated on women. I have proposed that a sex-linked alteration in the fear threshold constitutes such a specialised design and results in the same objective costs being weighted more heavily in females than in males. (Indeed, for criminal victimisation, where the objective probability of injurious costs is *smaller* for women than for men, women are *more* fearful than men). In support of this argument, I presented evidence of sex differences in fear using psychometric measures, clinical diagnosis, survey instruments, and experimental studies in areas as diverse as preventive health, personality structure, and accidental injury. I suspect that Simpson's concern stems from the difficulties of empirically distinguishing between Daly and Wilson's proposed design adaptation and my own. Daly and Wilson identify risk taking as the psychological mechanism predisposing to violence among men, while I specify fear as the psychological mechanism inhibiting violence in women. Unfortunately, from the point of view of clarifying our position, these are sometimes two sides of the same coin. "Dangerous" behavioural choices can be driven either by high sensation seeking or by low fear. (Do people avoid roller coasters because they are low in risk taking or high on fear?) However, "safe," behavioural choices are unlikely to be driven by low sensation seeking and I accord special significance to these indicators. It is implausible to argue that men avoid doctors because they seek the excitement of an undiagnosed illness or are less likely to suffer from agoraphobia because they seek the danger of walking down a street.

R2. Motherhood and aggression

Questions are raised concerning the relationship of my argument to two aspects of motherhood – maternal defence of young (**Fox, Maestripieri & Carroll, Harris, Brain**) and infanticide (**Beckerman, Kruttschnitt**).

Regarding the first, **Brain** describes the ferocity of female aggression in rodents at the time of parturition and lactation suggesting that it represents a counter-strategy to male infanticide, supporting my contention that the mother-infant bond is a crucial one for infant survival. **Maestripieri & Carroll** appear to believe that maternal aggression represents a problem for my argument but in fact its absence would be more problematic since an evolutionary successful strategy involves maximising rather than minimising reproductive success. It would be extraordinary if females routinely acquiesced to the killing of viable infants in whom they have invested both time and calories. The intensity of maternal aggression is legendary and primate males give new mothers a very wide berth. Fox notes that maternal aggression occurs despite the high potential costs and so draws attention to a cost-benefit analysis. The benefit is the saving of an offspring's life – one who certainly carries half its mother's genes and in whom the mother has already invested heavily. The costs are possible injury to herself which might jeopardise her own reproductive future and the survival of an older sibling (though I take **Wang & Hertwig**'s point that dependence on the mother may bear a nonlinear relationship to offspring age). Assigning mathematical values to rewards and costs (in the absence of empirically derived values) is a dangerous enterprise since any desired outcome of the equation can be achieved. However, I would expect mothers to fight vigorously in defence of young but not be willing to sacrifice their own lives unless they are at the end of their reproductive life and have no other dependent children. One mechanism through which maternal aggression may operate is through a hormonally controlled reduction in fear (see Maestripieri & Carroll for references), the effect of which is to discount costs and so increase the likelihood of attack. **Harris** suggests that infanticide by step-fathers is evidence that mothers do not take risks to protect their offspring. On the contrary, it is clear evidence that some mothers are not successful in protecting their offspring. This may be the result of sexual dimorphism (Maestripieri & Carroll) or, as Brain suggests, a sexually selected strategy to ensure that the lost infant is replaced by a more viable one.

This brings us to a paradoxical aspect of motherhood – why should females defend one offspring so vigorously while killing another? The answer lies in the fact that women are sensitive to infant quality as well as quantity. Infanticide is more likely where the infant is sickly, handicapped, one of twins, excessively demanding of parental effort, where the mother lacks the material and social resources to raise the child, or the child stands in the way of her pursuing a new and superior reproductive relationship (e.g., with a step-father). Post-partum depression may

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

be a mechanism which inhibits emotional attachment to the infant, opens the possibility of infanticide and ensures that women do not throw good reproductive effort after bad. **Kruttschnitt** concludes that infanticide must be the result of socially structured opportunities "rather than an evolutionary or genetic predisposition" apparently, though not uncommonly, assuming that evolved dispositions are context-insensitive. **Beckerman** points out that infanticide is congruent with my argument that women should be more willing to aggress against those who are unable to inflict harm on them. It is also true that children are in less danger of domestic killing as they age (and become stronger). While differential size and strength may affect the feasibility of maternal aggression against children, its fundamental motivation derives from reproductive strategies.

R3. The form and targets of women's aggression

Commentators raise issues connected with the severity of male and female physical aggression (**Brain, Fox, Maxson, Maestripieri & Carroll**) and the sex-of-target effect (**Harris, Maxson**), while others offer suggestions as to the form of female indirect aggression (**Brain, Mealey, Townsend**).

Maestripieri & Carroll argue that sexual dimorphism means that females are more likely to be injured in intersexual conflicts. This is doubtless true, but as it stands it does not help us to explain why intra-sexual aggression should be so much more common among men than among women given that opponents in both sexes are roughly matched for size and weight. To circumvent this objection (and to pursue **Maxson**'s point), one might argue that males in many species have greater body weight, sharper canines, and other means of inflicting serious injury not only upon females but upon one another. Male-male encounters can be thought of as a contest between two opponents armed with machetes while in female-female aggression the combatants are armed with pea-shooters. Much primate work suggests that males do indeed carry more scars and suffer more wounds than do females (Smuts 1987) and among humans men commit 93% of all same-sex homicides worldwide (Daly & Wilson 1990). In response to **Harris**'s query concerning the magnitude of sex differences as a function of dangerousness, meta-analyses (Archer 1997; Bettencourt & Miller 1996; Eagly & Steffen 1986; Knight et al. 1996) indicate that effect sizes favouring males are higher for physical aggression, whether measured experimentally ($d = +.30$ to $+.91$) or by self report ($d = +.63$ to $+.79$), than for verbal aggression measured experimentally ($d = +.05$- to $+.46$) or by self report ($d = +.33$ to $+.39$). Now let me pose what I hope is a rhetorical question – would you be more willing to enter a pea-shooter fight or a machete fight? If female-female attacks are less injurious than those of males, we have to explain why females are less disposed to fight one another even when the probability of injury is low.

Fox speculates that women may be less capable than men of ritualising their aggression. To avoid falling into the group selectionist fallacy, I will assume that "ritualisation" refers to an individual's tendency to seek non-lethal means of establishing his opponent's strength and fighting ability and so to withdraw from an encounter that he is likely to lose. Such an ability would of course be more important for machete fights than for pea-shooter fights. Ritualisation of this sort is likely to be acquired in the course of development through what **Maxson** terms "play fighting" and what others call rough-and-tumble (RT). Maxson believes that since RT is not usually injurious, I should predict no sex differences. However, when RT viewed as a necessary preparation for managing dangerous forms of adult fighting, I would expect males to engage in it more frequently, and they do (see Boulton 1996; Boulton & Smith 1992).

During the last 20 years, a number of people have suggested to me that female aggression appears more emotionally and physically "out of control" than that of men. If this is true (and there are as yet no systematic behavioural studies) it might result either from females' lack of early training in ritualisation ("reading" opponents and taking strategic decisions) or from the fact that women's higher levels of fear mean that only a very strong impetus can overcome their reluctance to engage in physical aggression. This would be an interesting avenue of research.

Both **Maxson** and **Harris** cite laboratory studies which demonstrate that both sexes are more willing to attack male than female targets. Hence the low levels of female intra-sexual aggression that I describe derive from an inhibition on the part of both sexes to attacking women. My response to this observation is theoretical and empirical. From a Darwinian perspective, it is hard to conceive of a naturally selected adaptive mechanism that places a higher value on the safety of one's opponent rather than oneself. Empirically, the laboratory sex-of-target effect does not generalise unproblematically – the reluctance of males to attack females is far from evident in the marital violence literature (Fagan & Browne 1994b) and sex-specific assault rates from Massachusetts show that, even under the age of 24 years, 48% of men's assaults are against women (Campbell et al. 1998). However, if the level of female intra-sexual aggression were a spurious effect of sex-of-target rather than sex-of-actor, then we should expect male-to-female aggression and female-to-female aggression to be equally frequent (as should female-to-male and male-to-male). Studies of homicide confirm that male killings of females massively exceed female killings of females. In the United States, 9 out of every 10 female homicide victims is murdered by a man (Craven 1996). In a five year period in Phoenix (Jurik & Winn 1990), men committed 141 homicides of female victims compared to the women's total of 9. Cross-culturally women perform approximately 10% of all homicides (Kruttschnitt 1993); United States data suggest that about 11% of these are against another woman while approximately 20% of male homicides have a female victim (Goetting 1988).

With regard to indirect forms of aggression, **Mealey** makes the fascinating suggestion that anorexia is a form of reproductive suppression encouraged not by men but by women and directed at other women. The obvious difficulty with such an account follows from **Townsend**'s equally interesting observations on female rivalry. He notes that women medical students typically devalue rival women's intelligence because this is a dimension on which they themselves excel. It makes little sense to select a dimension of comparison on which a rival is better than oneself. Hence dominant women could only credibly criticise others for being too fat if they themselves were substantially thinner. This would result in dominant women suppressing their own reproductive success even more effectively than that of their rivals.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

R4. Do women engage in status competition?

Some commentators (**Benenson, Cashdan, Fox, Harris**) argue that females do engage in intra-sexual status competition. While boys and men compete in the domain of physical strength and co-ordination, girls and women compete in terms of physical appearance (see Cashdan) and association with high status males. Although Benenson cites appearance and association as separable processes, the evolutionary psychology of mate selection tells us that they are highly correlated. It is evident that females engage in competitive epigamic display – they advertise and enhance those features that are attractive to the opposite sex. Buss (1989) has established that men seek youth (a constant among teenage girls) and beauty (where female competition is manifest in the consumption of cosmetics, hair dyes, and clothing). Indeed the effort expended by girls in cultivating their looks is a clear indication of two-way sexual selection under monogamy. It is also true that attractive girls tend to form friendships with one another (Coleman 1961; Eder 1985), a fact that I would attribute it to the well-established social psychological principle of similarity found in many studies of friendship. Benenson suggests that these friendship groupings can be ranked according to popularity and that this constitutes evidence that girls do indeed have status hierarchies. In evaluating this proposal, it is important to draw distinctions between competition and status, inter-group and intra-group status, and between rank and status.

First, the thrust of my article is that females are highly competitive but the object of that competition is resources rather than status. Evidence of female–female competition is not evidence of female status-seeking (**Fox, Harris**). Second, girls' intergroup relations can best be understood using social identity theory (Hogg & Abrams 1988). Membership in a group composed of highly attractive girls is doubtless sought after as confirmation of one's own attractiveness, and ingroup–outgroup dynamics enhance the separation between social groupings. Groups everywhere seek to emphasise their positive distinctiveness, that is, to claim superiority on a dimension of comparison at which they excel. But these are psychological processes associated with establishing a positive group identity, not with individual identity, which depends upon position *within* the group. The claim of hierarchical relations among boys rests upon the public recognition of the individual's relative position within a group and not upon the superiority of one's own group over others. To demonstrate that girls compete for status in the same way boys do requires evidence that they jockey for position within the group.

Before examining this proposition, we should note that membership-group status and individual popularity are negatively related for girls. Eder (1985) drew an illuminating distinction between visibility and popularity in order to resolve her (initially) paradoxical finding that girls considered to be popular were not liked by their peers. What the interviewees understood by the term "popular" was "visible," that is, groups of girls who were good-looking (as indexed by being, or associating with, a cheerleader). Members of these groups were widely regarded as stuck-up and unfriendly. "One consequence of the negative stereotype of popular girls was a growing tendency to avoid interaction with them" (Eder 1985, p. 162).

Within groups, it is important to distinguish between rank and status. Polymorphism means that in any group there will be variance with respect to a given trait such as attractiveness and that an observer can rank individuals relative to one another. Rank is an inevitable and implicit result of variation on an evaluation dimension. Status, however, is public, explicit, and sought after. The question then becomes: Do girls show evidence of seeking to outdo others and to advertise their relative superiority on a given evaluative trait? The answer from empirical studies is unanimously negative. Goodwin (1990, p. 44) observes that girls differ from boys "in their attitudes toward the activity of ranking itself . . . a girl who positively assesses herself or explicitly compares herself with others may be seen as showing character and attitude that the other girls find offensive. Girls constantly monitor each others' behaviour for displays that might be interpreted as showing that a girl is trying to differentiate herself from others in the group." What is of chief importance to girls is to "belong" in the sense of conforming to group expectations while not exceeding them. Boys also need to belong to a group but having achieved this they then strive for public recognition of status within it. The same behaviour in girls is likely to result in exclusion and rejection as Eder notes, "girls strongly uphold an egalitarian norm and view members who are better or worse than other group members as less desirable friends. Consequently, girls are concerned about being more successful than their friends and about being less successful" (Eder 1985, p. 162).

Benenson argues that girls associate in dyads which by their nature cannot be internally hierarchical. Other researchers, however (Adler & Adler 1995; Eder 1985; Goodwin 1990), while acknowledging that girls' groups are substantially smaller than those of boys, use the term "clique" to describe them and note that they "involve more intricate arrangements than simple dyadic ones" (Goodwin, p. 48). Purely dyadic arrangements would not permit the use of the exclusionary tactics, which Benenson describes, since the breaking of a dyadic friendship would be self-punitive. She notes that dyads require equality and implies that if girls associated in larger groups they would show hierarchy. Naturalistic studies, however, show that cliques are girls' preferred mode of association and such a preference is probably the result of a desire to avoid status competition rather than an unintended byproduct of it.

Benenson also argues that females show hierarchical relations between generations. With regard to this point (and to **Harris**'s query whether hierarchies should be more common in matrilineal societies), I have discussed status rankings between female lineages among female-bonded primates. The point was that the advantages of status are enjoyed by females provided they can be achieved by descent rather than by engagement in risky combat. (Parenthetically, Benenson is not quite right that status is determined by age. In female-bonded species, daughters show rank reversal so that the younger ranks above the older.) I am unclear what point Benenson is making here. Men as well as women respect and defer to parents and grandparents of either sex (or at least feel they should). If intergenerational deference indeed constitutes hierarchy, then men and women both show it. Women's greater effort to maintain contact with family probably results from human patrilocality.

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

R5. Individual, life-history, and contextual variation

Maxson describes my approach as "typological." If, by this, he means that I do not recognise (1) within-sex variation, (2) overlap in the distributions of male and female aggression or (3) the rarity of physical aggression, then he has clearly misunderstood my position. Individual differences are the life blood of evolutionary theory. Without variation there is nothing from which natural selection can select **MacDonald** correctly and explicitly identifies my position as a "mean difference" model.

Kruttschnitt raises the question of population differences. (I use the term "population" in preference to her term "cultural" because the latter subsumes the putative cause as part of the description.) Men's aggression in any population exceeds that of women, although between-sex correlations exceed .90. Population (and subpopulation) variation in the absolute levels of male and female aggression are found. In the United States, violence by black females approaches the rate of white males. However, the ratio of black male to black female total personal crimes is slightly *higher* than the white ratio, (see Laub & McDermott 1985). For evolutionists, population differences are often explained through recourse to features of the local ecology that influence the severity of resource competition. Kruttschnitt notes that in other impoverished groups such as Latinos, female aggression is not as high as it is among black women. (Actually the percentage of Latino children in poverty is 32% compared with 40% among blacks, so the two groups are not perfectly equated for resource shortage; Snyder & Sickmund 1995). If they were equated for poverty, we would need to identify factors which drive up aggression of both sexes but that are more prevalent in black than Latino subpopulations.

As candidates I would nominate two inter-related factors. The first is the marked matrilineal and matrilocal nature of the black community (see **Beckerman**) and the second is a high rate of father absence as a result of unemployment, drug abuse and imprisonment. Males in such circumstances exhibit high rates of violence as they struggle to achieve status under adverse economic circumstances. [See Mazur & Booth: "Testosterone and Dominance in Men" *BBS* 21(3) 1998.] Anthropologists characterise most human groups as patrilocal while noting considerable flexibility in living patterns. One factor bearing upon matrilocality might be the absence of investing fathers and the consequent need for female kin support. Strong female kin support may in turn decrease men's willingness to invest in their family. Female bonded groups tend to display higher levels of aggression as they cannot rely on males to defend their territory, resources, or young (see **Eagly**).

I offer these as speculative suggestions for further work – work which would be redundant if **Kruttschnitt** were correct that Simpson (1991) had already effectively addressed the problem. Simpson attempts to explain the rate of black female violence by applying (and then rejecting) three theoretical positions: neo-Marxism (which fails to explain the gender effect), and power-control and socialist-feminist theories (which fail to explain the race effect) before she concludes that we currently have "only a murky picture of essential differences between and among males and females of different classes and races" (Simpson 1991, p. 129).

Harris asks whether there is a life-span developmental trend in fearfulness. The age effect is ubiquitous in crime statistics and both women and men show a rise in assault rates during adolescence and early adulthood. **Wang & Hertwig** argue that this is problematic for my argument because females show decreased fear at the very time (according to them) when they are most fecund and most likely to be involved in child care. In fact during the teenage years, though a girl's reproductive value is high (and this makes her a very attractive potential long-term mate), her fecundity is not. After puberty girls experience several years of subfertility and fecundity peaks during the mid-twenties – precisely the time when females show a drop in crime.

Wang & Hertwig go on to suggest that menopause is the time at which women might be expected to show the greatest fearlessness and consequently the greatest aggression because offspring survival is less dependent upon their survival. However, we might apply the same logic to Daly and Wilson's theory (which Wang & Hertwig accept more readily than mine). The prospects of reproductive death for a childless man increase with every year that passes. Hence we would expect old nulliparous males to be the most desperate and most risk-taking. Manifestly they are not. Daly and Wilson suggest that the critical evolutionary importance of mating and reproduction make youth a time to take chances. The proximal mechanism they propose is a change in time horizons which causes young males to discount the future. Another might be an age-dependent change in fear levels that causes young females (and perhaps young males, too) to take more chances in the pursuit of optimal mates. Analogous to **Fox**'s point that the universality of patriarchy makes it empirically inscrutable, Gottfredson and Hirschi (1990) have argued that the age effect in crime requires no explanation because it is an essential and universal quality of the nature of crime. The age effect survives controls for most of its known correlates – marriage, fatherhood, employment, and independence from parental scrutiny. It seems that youth energises risky behaviour in most cultures and epochs in both sexes.

Some commentators have derived hypotheses from the staying-alive argument. These relate to the age and number of offspring and to the age and reproductive future of the mother (**Archer, Simpson, Wang & Hertwig**). A number of variables are proposed to moderate the degree of risk a woman should be prepared to tolerate in entering aggressive encounters. In connection with such hypotheses, there are two points to be made. First, although such variables address the perceived costs of aggression in any given conflict, the degree of aggression also depends upon the benefits, which are likely to be highly variable across conflicts. The circumstances of the incident are of some importance when we come to formulating explicit predictions. Second, the derivation of hypotheses is far from straightforward. Should a woman be more likely to risk her life to save a son or a daughter (whose reproductive value varies as a function of caste and marital arrangements of the society)? Should she be more concerned to save a younger child (whose dependence is greater) or an older one (in whom she has invested for longer)? Does the presence of older siblings even enter into the split-second emotional decision a mother may have to make?

Despite these complications, it is important that testable hypotheses be derived and there are two that I would en-

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dorse. **Wang & Hertwig** suggest that fear should increase and aggression should decrease as a function of the relative parental investment by mothers and fathers. A recent report by Allman et al. (1998) finds that over several species of primates, including humans, there is a positive association between degree of parental care and age of death. In titi and owl monkeys, males take primary responsibility for infant care and in both species male age of death exceeds that of females. The underlying mechanism is not yet known, but as a candidate I would suggest a higher level of fear and a more conservative attitude to risk among these primate "single-parent" fathers.

A second plausible hypothesis from **Archer** is that nulliparous females should display lower levels of fear and greater willingness to engage in more risky confrontations. In a longitudinal study, Nash and Feldman (1981) found that after the birth of their first baby, women showed a very marked increase in gender-appropriate behaviour; it is reasonable to suppose that this might also manifest itself in decreased riskiness.

When contextual variation is discussed in evolutionary psychology, the assumption is that environmental circumstances cause alterations to the parameters of evolved adaptations. This viewpoint obscures an alternative – that circumstances are to some degree a product of genetic dispositions. Hence it would be important to establish (via longitudinal studies) that fear levels or risk taking alter as a function of parturition rather than the alternative hypothesis that prevailing individual differences in fear and risk taking predispose individuals to have children. Such gene–environment correlations are discussed by **MacDonald.** According to this view, natural selection might produce mean differences in fear between men and women while within-sex variation would be related to the likelihood of child bearing.

This brings us to **Simpson**'s concern with why natural selection would be such a blunt instrument in creating a mean sex difference in fear. Natural selection operates by removing non-adaptive genes from the gene pool. Fine tuning is to be expected only if its absence is deleterious for the individual in competition with others. The question therefore becomes whether there would be deleterious consequences of a generalised avoidance of physically dangerous situations by females. In childhood such a trait would make a girl more likely to survive to childbearing years. In resource competition with other females, it would ensure that she desisted from escalating to potentially dangerous levels. After giving birth, it would increase the probability of her children surviving to adulthood. I therefore expect sex differences to be apparent throughout the life span of men and women and have reviewed the supporting data.

R6. Do we need Darwin?

McKnight & Bond's objection to my thesis appears to result from a general rejection of the principle of genetic sex-linkage. Their argument, that homogamy will result in an "averaging out" of male and female traits, seems to rest on a misunderstanding of sexual selection. Though males and females rate many attributes as equally important (warmth, sense of humour), there are many others on which they show markedly different preferences as **Buss & Duntley** note. An attractive female trades her good looks for a well-resourced male, rather than an attractive one. To argue that sex-linked evolved preferences must regress to the mean is analogous to arguing that continued sexual reproduction by a male and a female will eventually result in hermaphrodite offspring. Their belief that my position argues for a female-biased sex ratio reflects the same basic misunderstanding. Since sex differences in aggression are evident in many species of animals, the evolutionary pressures that produced them were probably in operation over millions of years. According to my argument, low-fear females would have left fewer descendants of both sexes than more fearful ones and this would have had the effect not of skewing the sex ratio (a long-term impossibility, see Fisher 1930), but, under sex-linkage or sex-limitation, of skewing the distribution of fear in contemporary females.

Some commentators seek to replace an evolutionary analysis with a menu of alternative social theories. Although diverse, they can be broadly grouped into two clusters. Social control theories (**Kruttschnitt, Lagerspetz, Chesney-Lind**) hold that women's lower rate of anti-social behaviour is a function of the greater control exerted over them by agents of formal control (government, education, the criminal justice system) and informal control (parents, husbands). The principle thesis is that women are deterred more effectively from engaging in prohibited behaviour and the assumption is that the attraction of such behaviours is equal for both sexes. Lytton and Romney's (1991) meta-analytic review of 172 studies of differential socialisation by parents finds a nonsignificant effect for restrictiveness ($d = .08$) and for discipline ($d = .08$). (The effect suggests that boys receive fractionally *more,* rather than less, social control.) Studies of the relationship between family control variables and delinquency show a similar pattern for both sexes (Hirschi 1969) but despite this, the delinquency rate for boys is far greater than for girls (Snyder & Sickmund 1995). This strongly suggests that girls' desistence from delinquency involves more than differential social control (Gottfredson & Hirschi 1990). In my target article, I noted that aggression is subject to a sexual double standard by formal institutions such as the media, the criminal justice system, and the medical establishment. I emphasise that I am not arguing that these institutions in themselves cause the low rate of female aggression. If that were so, it would be impossible to explain its existence in many species of animals and its very early developmental onset. Rather, I am suggesting that the pre-existing sex difference is enhanced by the disproportionate censure attached to the very few women who do commit violent offences.

The alternative theory, socialisation (**Eagly & Wood, Chesney-Lind, Lagerspetz**) holds that society encourages different behaviours in the two sexes and that during childhood sex-specific beliefs, skills, and expectations, which then control behaviour, are internalised. To this view, social role theory adds an account of the genesis of these gendered patterns of socialisation. This second is an incentive-based view that, via socialisation, the two sexes learn to value and display different behaviours. Archer (1996) has already compared evolutionary and social role approaches and concluded that the principle difficulties for the latter are in explaining social class effects, the rise in aggression during the teenage years and the fact that similar sex differences appear in most other mammalian species. To this I would add that sex differences in aggression appear from the age of two (Koot & Verhulst 1991; Maccoby 1990) be-

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

fore children are able to reliably classify facial photos of men and women (see Ruble & Martin 1998), which would be a necessary precursor to the acquisition of sex-congruent beliefs and attitudes.

Because **Eagly & Wood** argue that the division of labour is driven by men's greater size and strength and women's reproductive activities, they clearly accept that there are differences between men and women in primary and secondary sexual characteristics. Presumably they would also acknowledge that such physical differences are the result of evolution. However, their argument suggests that natural selection "stopped at the neck," having no impact upon the minds of the two sexes. It seems arbitrary to exclude from the purview of evolution the most expensive and behaviourally critical organ of the body (and one incidentally that is intimately involved in the endocrinological processes that maintain the physical differences they do acknowledge). The products of the mind which differ between the sexes (e.g., fear, aggression) are suggested to be acquired during socialisation yet behavioural genetic studies strongly suggest that psychological traits are only minimally influenced by the home rearing environment (Plomin 1994). [See also Plomin & Daniels: "Why Are Children in the Same Family So Different From One Another?" *BBS* 10(1) 1987.]

It is surprising that **Eagly & Wood** object to two aspects of my argument that would seem to be equally critical to their own: the importance of maternal care and patriarchy. Maternal care is one of their two proposed bases for the division of labour, so it seems self-defeating to argue that childcare can be performed equally well by fathers, grandmothers, and siblings. If this is the case, why do societies everywhere assign the principle role in child care to the mother (Ember 1981)? And why would the division of labour be universally organised around the arbitrary assignment of mothering to women? They also argue that although men and women occupy different roles, the relations between the sexes can be egalitarian, and patriarchy appeared only with the arrival of complex technology. (I do not profess to be a historian but the status equality of men and women is not evident in my recollection of ancient European political arrangements.)

Having thus dispensed with patriarchy, **Eagly & Wood** resuscitate it by arguing that "women's accommodation to roles with lesser power and status" results in a "weaker power position." But, without the concept of patriarchy, how did women's previously egalitarian role get demoted to one of lower status? The status relationship between the sexes is a critical component in their argument because it is used to explain women's low levels of aggression. As I have already noted, such an account cannot speak to the low levels of female intra-sexual aggression. In addition and contrary to their argument, high status women do not engage in higher levels of aggression than those of lower status (Carlen 1988; Triplett & Jarjoura 1997).

R7. Patriarchy: Existence, form, and possible demise

Beckerman and **Fox** have reservations about "patriarchy" though whether their objections are semantic or conceptual is not clear. Fox wishes to restrict the term to "rule by fathers" which, if taken literally, would transmute patriarchy into what is more usually called male dominance and would restrict its scope to the family. Beckerman is uneasy about the use of the term in the context of small-scale societies, although presumably he would not wish to argue that such societies are run by women. Although he asserts that male occupation of upper hierarchical positions requires coercive institutions (which are allegedly absent in small societies), such institutions are equally absent in chimpanzees who nonetheless exhibit a hierarchy in which males typically occupy the higher positions. It is true that as resource differentials between men increase, hierarchy becomes more evident, but even in hunter–gatherer societies there is clear variation between men in their hunting prowess, number of wives, and reproductive success (Hawkes 1990).

This brings me to another point raised by commentators – women's contribution to patriarchy. In summarising Smuts's (1995) article on the evolution of patriarchy perhaps I did not emphasise sufficiently strongly that women do indeed play an active role. Where men control resources needed by females and where male variance in resource holding is great, women pursue their reproductive interests by preferring to marry well-resourced men, by supporting customs which enhance paternity certainty, and by favouring sons over daughters. Thus, as **Buss & Duntley** note, female choice tends to sustain patriarchy and in turn patriarchy, as **Fox** notes, tends to enhance female competition. I also concur that patriarchy works to control male as well as female behaviour – arguably more so because males constitute a greater threat to the status quo by virtue of their lower levels of fear and greater thirst for dominance. The criminal justice system is overwhelmingly concerned with the control of male not female criminality. Fox rightly points out that Aboriginal boys were subject to circumcision and subincision by adult males but his assertion that girls were exempt from this kind of violence is belied by data on clitoridectomy and infibulation from a number of other cultures (Sanderson 1986).

If Smuts (1995) is right, patriarchy depends upon male control of resources and hierarchical relationships among men. In her agenda for reform, she accords a fundamental place to political and economic changes designed to reduce inequality among men. In a similar vein, **Fox** and **Betzig** suggest that democracy has already reduced variance in power, money, and reproductive opportunities and that this has in turn eroded the incentive to favour sons over daughters, which will ultimately bring an end to patriarchy. I hope these speculations prove to be correct. Speaking as one underqualified to enter a political debate, democracy seems to me to favour capitalism and hence larger rather than smaller income and wealth differentials. Given its ancient evolutionary basis, I am doubtful that male competition and status seeking will be dispatched with any lasting degree of success either by sexual equality of inheritance or by ideological imposition (as in the Soviet Union).

It is true that women's economic role has improved dramatically in the last three decades; **Machalek** speculates that they may be particularly successful in the world of work where modulated and indirect forms of competition prevail. Be that as it may, women have notably failed to break through the glass ceiling to positions at the top of the business hierarchy – a fact that I attribute not to their lesser achievement orientation (**Browne**) but to the greater value that they place upon child-rearing and the lower value they place on the seeking and advertising of status. Under capitalism, status is established by the degree of monetary com-

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pensation an individual receives and in these terms women's work continues to be inferior to that of men. Notwithstanding the rise of the woman executive, the fact remains that most women have jobs rather than careers, and they work sporadically, and on a part-time, low-pay basis in order to support (or help support) their families. This state of affairs has been enhanced by higher rates of divorce, single motherhood, and paternal default on child support, which has resulted in the feminisation of poverty. Democracy is unlikely to lead to the Utopian abolition of income differentials within and between the sexes (freedom and equality being incompatible) but it could recognise both economically and socially that child-rearing is a job of an importance equal to or greater than those that women hold in industry and commerce. At present we seem unable to reconcile women's roles as primary caregivers and as salaried employees, creating invidious stereotypes of "earth mother" versus "career woman." Women in hunter–gatherer societies not only bear and rear children but also provide the lion's share of the calories consumed by their families. They appear to derive satisfaction, respect, and self-esteem from both (Shostak 1990).

R8. Who stigmatises female aggression?

In the target article, I argued that patriarchy responds with particular vigour to female aggression and, to a greater degree than that of males, condemns it as either gender-incongruent or pathological. **Maestripieri & Carroll** concur with this viewpoint and **Mealey,** while appearing to disagree with me, also asserts that cultural influences seem to enhance evolved sex differences. I continue, however, to be troubled about why it is in males' interest to pathologise female aggression. Why do men not treat women's fights for male attention with delight or indeed encourage women to go to war in defence of their country? Setting aside group selectionist arguments (such as maintaining a pool of reproductive females for the good of the species), the result would be flattered male egos in the first case and a larger, more successful army in the second.

Caporael suggests that men reserve war to themselves as a means of garnering a unique social identity that women naturally possess via childbirth. But if the issue is merely one of identity, why not exploit a less dangerous but exclusively male area to define it, such as penile intromission or hunting? Caporael also undermines her "male uniqueness" argument by pointing out that, at various points in history, women have been warriors. **Chesney-Lind** suggests that female–female aggression presents a potential challenge to men's domination of women. In fact, men's domination of women would be more threatened if women united against men rather than fighting amongst themselves. I remain sceptical of these ideas as well as the other candidates identified in the target article.

A second answer, proposed by some commentators, is that there is no need for a patriarchal state to stigmatise female aggression. They suggest that the low level of female aggression is adequately explained by evolutionary theory and that, although cultural disapproval may indeed enhance evolved female psychology, it is an unnecessary accessory. (Parenthetically, the target article did not argue for a "conspiracy," as some commentators suggest. I have never subscribed to any notion of international male gatherings in smoke-filled rooms. I argued only that when a homogenous group holds power it is likely to view social issues from its own perspective and that view will inform the power-perpetuating policies it pursues. Patriarchal values result from convergence of different male groups in this process, not from an orchestrated conspiracy.) **Johnston & Crawford** and **MacDonald** argue that, in contemporary as well as ancestral societies, aggressive women would be less successful than their less aggressive peers because they would be rejected as partners by males. This rejection flows from male reproductive interests because such women would be less likely to survive (and hence to ensure the survival of their partner's offspring), more likely to be promiscuous (and hence pose a risk of cuckoldry), and less likely to advertise their need (and hence to achieve) male investment and protection. The argument of these commentators is similar to that made with regard to incest – since Westermarckian processes adequately suppress the likelihood of incest, what is the point of superfluous cultural taboos which merely duplicate the effect? This position essentially denies the relevance of higher-order psychological and social processes to an understanding of evolved behaviour. [See van den Berghe: "Human Inbreeding Avoidance" *BBS* 6(1) 1983.]

A third answer is that female aggression is stigmatised not by a patriarchal state but by the population as a whole, both male and female. According to this position, female aggression is rare because it is maladaptive for the reasons identified in the target article. Female aggression is popularly stigmatised because people implicitly and directly recognise it as maladaptive (**Mealey, Charlton, Kenrick, Buss & Duntley**) or because they generally react to statistically unusual behaviour with stigmatisation (Kenrick). With regard to the first option, Buss & Duntley are most explicit in arguing that contemporary media messages (and perhaps values and beliefs more widely) are themselves the result of our evolved psychology. Applauding altruism, valorising war, and stigmatising crime in general (and female aggression in particular) are all examples of this.

This viewpoint is appealing and promises to build a bridge between behaviourally oriented evolutionary psychology and traditional social psychology which has focused heavily upon values, beliefs, and attitudes. The most obvious challenge is to reconcile apparently conflicting social values ("An eye for an eye" versus "Turn the other cheek") and to identify how these values are differentially applied as a function of the individual's own social positioning and interests. The more important theoretical challenge is to address how self-conscious and self-reflective values emerge in relation to adaptive human behaviour. For example, do humans have some inchoate form of evolutionary introspection that allows them privileged access to successful behavioural strategies which are formalised as values (e.g., the prospect of incest causes me distress, so it must be a maladaptive behaviour)? Or do humans observe the social world and deduce from it values that encompass the strategies that seem most successful (I observe that incest produces a higher rate of genetic abnormality in offspring)?

Kenrick argues that the chief distinction between male and female aggression lies in its statistical frequency: the psychopathology of an aggressive act is evaluated in terms of its statistical abnormality, its violation of norms and ideals and the degree of damage caused. Female aggression

https://doi.org/10.1017/S0140525X99431814 Published online by Cambridge University Press

would be judged psychopathological chiefly with regard to the first. Though I would welcome the kind of empirical test he proposes, I am less sanguine that these dimensions can be treated as independent. The fact that women are rarely violent has implications for different norms and ideals being applied to the two sexes.

In general I find the latter arguments persuasive. According to the patriarchy argument, male institutions promote the stigmatisation of female aggression (for reasons that are not established) while according to the statistical rarity argument, people in general react to statistically unusual behaviour by stigmatising the actor (which does not require any specifically masculine or patriarchal motivation). Empirical tests could be used to examine such questions as: (1) Do female-run institutions and media stigmatise female aggression as much as male-run institutions (see **Johnston & Crawford**)? (2) Do men and women differ in the stigmatisation of an actor when all circumstances of the act except the sex of actor are held constant (see **Kenrick**)? (3) How early in life do children show a differential reaction to the aggression of the two sexes? (4) Is male engagement in a stereotypically female behaviour stigmatised as much as the reverse (holding social damage constant)?

In acknowledging the possibility that statistical rarity may cause stigmatisation of a behaviour, I do not accept the more extreme view that statistical rarity constitutes veridical evidence of pathology (**Charlton**). Individual variability exists on every psychological trait so far measured but I would not accept that mere extremity on the distribution necessarily denotes pathology. Doctors do not regularly offer treatment or diagnostic labels to people who are too altruistic or too intelligent. Pathology is invoked, as **Kenrick** points out, when the behaviour violates norms and ideals that society espouses. I do not deny the reality of pathology – dramatic increases in violence can result from brain injury and some congenital conditions. Doubtless some proportion of female aggression does indeed reflect pathology, as in males. The article described evidence that female aggression is more liable to receive a psychiatric label and treatment. We should not automatically conclude that the statistical rarity of women's aggression denotes mental illness. In many cases it may be a normal response to abnormal circumstances.

R9. What is the status of lay explanations of aggression?

Noting that men tend to justify their aggression while women tend to excuse theirs, I suggested that this difference arises from the differential blame attached to aggression in the two sexes, which is itself a direct result of patriarchal manipulation of values. However **Buss & Duntley** suggest that sex differences in rhetorical style reflect sex differences in competitive strategies – from which I infer that they believe humans have insight into their emotions and behaviour resulting in different explanations by men and women. **Charlton** makes the point more explicitly: aggression by women involves overcoming an evolved aversion to physical risk which acts as a natural deterrent and causes women to feel emotional and exculpatory after such an act.

But how might such a process occur? In Sperber's (1994) terminology, the discrete perceptions and emotions experienced during an act of aggression can feed into a first-order conceptual module ("intuitive belief") which unifies, identifies, and characterises the experience. If the inputs were different for men and women then the experience itself would be formatted differently. How to access individual experience is a perennial question for psychologists but one solution may be via language, if Pinker (1997) is right that "mentalese" reveals itself in linguistic metaphor. As an example of the pervasive metaphor of force and resistance in language, "Larry didn't close the door" and "Larry refrained from closing the door," differ in that the second implies resistance to a psychological force opposing his action. In any act of aggression there are opposing forces of anger (which propel aggressive action) and self-control often based upon fear (which opposes it). If women experience higher levels of behavioural inhibition than men we would expect that their accounts of aggression would involve metaphors reflecting the overcoming of restraint as in "I just lost control" and "I don't know what came over me." Where men engage in aggression despite efforts at self-control (as in some incidents of domestic violence), we might expect a similar reference to loss of restraint, for example, "I was drunk and I didn't know what I was doing" or "She pushed me too far." The problem with such an analysis is that women's social representations involve more than reference to loss of control – they also invoke guilt, shame, and concern for others' feelings, which are not easily linked to a simple "opposing forces" model. In addition, men's justifications involve not only less concern with guilt and loss of control but also active assertion of the moral rectitude and necessity of the act (see Hearn 1998; Katz 1988).

Contrary to this "internal read-out" explanation, a number of factors point to the socially constructed nature of explanations. Types of explanation vary both historically and culturally (Averill 1982; Burbank 1994); they also vary as a function of the blameworthiness of the act and the power relations between actor and victim and between account-giver and account-receiver. I continue to believe that accounts can best be seen as "social representations" (Moscovici 1984), "meta-representations," or "epidemiological representations" (Sperber 1994; Tooby & Cosmides 1992). The degree of cultural contagion of a meta-representation depends upon its relevance and its ability to successfully organise and integrate material derived from different situations and contexts (Sperber 1994). (Despite **Eagly & Wood**'s equation of such representations with the sex-linked "beliefs" of their model, meta-representations are high-level modules which process representations about representations and hence go far beyond simple beliefs about what actions are socially appropriate for men and women.)

The question then remains, why sex differences exist in the preferred mode of explanation for aggression. Instrumental and expressive representations might be associated with sex to the extent that they accurately reflect first-order concepts or "intuitive beliefs." In this view, women generally espouse expressive beliefs because it "feels right" as a way of understanding the conceptual input they experience during aggression. Or sex differences might result from the deployment of rhetoric in the service of rescuing a threatened identity, with women more prone to negative evaluation of their aggression and hence tending to excuse rather than to justify it. Further work will be required to examine these competing hypotheses.

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Finally, much has been written about the relationship (or nonrelationship) between genetic and cultural evolution (Boyd & Richerson 1985; Donald 1991; Durham 1991b; Lumsden & Wilson 1981; Tooby & Cosmides 1992). In the interests of developing a general theoretical position, these discussions have often been mathematical, hypothetical or decontextualised. What I have attempted to do in the target article is to sketch how the two forces might interact with regard to the concrete issue of female aggression. Whether I got the answer right or not, I think it was worth the attempt. If evolutionary theory is to succeed in cross-disciplinary integration, it must construct and test theories about how socially transmitted meaning is accorded to evolved human behaviour. Until we do this, evolutionary theory will be disregarded by many social sciences, which will continue to argue that evolution is of limited relevance to humans whose behaviour is guided by values and meaning about which evolutionary theory is silent.

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Letters "a" and "r" before author's initials refer to target article and response, respectively.

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