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Sex differences in aggression: The role of inhibitory control.

DRISCOLL, HELEN,PATRICIA

Sex differences in aggression: The role of inhibitory control

Helen Patricia Driscoll

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Department of Psychology

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Women engage in far less direct aggression and crime than men. Given the potential rewards of aggression, women's desistance requires explanation. This thesis examined Campbell's (2006) proposal that sex differences in aggression are mediated by women's greater fear and inhibitory control. Campbell (1999) argued that women are more fearful of activities associated with risk of physical harm due to high fitness costs incurred by offspring as a result of maternal death or injury in the ancestral environment. In a large adolescent sample (Chapter 3), harm avoidance emerged as the primary mediator of sex differences, though inhibitory control was a significant partial mediator.

Campbell's theory has been extended to explaining sex differences in experiences of aggression ('social representations'). Women's more expressive experience (as a loss of control) may represent an accurate 'readout' of their experience, whereby superior inhibitory control of anger results in behavioural expression at a higher level of arousal. Chapter 2 reports the results of a confirmatory factor analysis, which confirmed the superior psychometric status of the Revised Short Expagg (which measures the experience of aggression); This measure was incorporated into the study reported in Chapter 3. Women's lesser aggression was also explained by their relatively more expressive representation, providing support for the 'readout' theory.

Research which has established sex symmetry in partner-directed aggression (Chapter 4) presented a critical test of Campbell's theory. It was proposed that women experience a reduction in fear and inhibitory control in intimate relationships. To test this, a context-specific measure of inhibition was developed (Chapter 5). Women from community samples reported significantly less inhibition than men on this measure (Chapters 5 & 6). In the study reported in Chapter 6, women's perpetration of partner aggression was associated with lower inhibition on one measured domain (the tendency to express honest appraisals rather than engage in tactful dishonesty). Women's aggression was associated with an instrumental experience, indicative of control motives. However, fear was positively associated with aggression perpetration, though it was unclear whether fear was a precursor to, or a consequence of aggression. Implications for avoidant and appetitive theories of sex differences are discussed in Chapter 7.

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Declaration

The material in this thesis has not been accepted in contribution to any other degree, and is not being submitted in candidature for any other degree.

This material in this thesis is my own independent work except where otherwise indicated.

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Acknowledgements

Chapter 1: Introduction and review of the literature of sex differences in aggression

1.1: Thesis structure and scope of this chapter

This thesis is structured in two parts. The first part (Chapters 1-3) is concerned with sex differences in intrasexual aggression and the second part (Chapters 4-6) considers sex differences in aggression towards intimate partners. Although the same theoretical framework is applied to both contexts, they do draw on large and somewhat distinct literatures. As such, this chapter will provide an introduction to the first half of the thesis, giving a general overview of theory and research relating to sex differences in intrasexual aggression, whilst literature relating to sex differences in aggression towards intimate partners is reviewed in Chapter 4.

This chapter begins by outlining the different forms that aggression can take, in order to establish general patterns of sex differences in aggressive behaviour. Sex differences in the triggers to aggression and the experience of aggression are also discussed. These preliminary sections emphasise the key patterns of sex differences which an adequate theory must explain. Following this, theories of sex differences in aggression are reviewed, beginning with accounts based on social role theory (Eagly, 1987; Wood & Eagly, 2002), and then more recent evolutionary accounts based on i) selection for increased appetite for aggression (or 'taste for risk') in men (Wilson & Daly, 1985) and ii) selection for increased fear of harm and inhibition of aggression in women. Campbell's (1999, 2002, 2006) theory of fear-based inhibition of women's aggression forms the theoretical basis of this thesis. Campbell's theory is reviewed in detail, and is considered alongside a related theory which also

emphasises inhibition of aggression in women ('Tend and befriend': Taylor, Klein, Lewis, Grunewald, Gurung & Updegraff, 2000).

1.2: Definitions and forms of aggression

Aggression and violence have long been considered a normal part of male psychology since men are responsible for far more direct aggression and violence than women (discussed in Section 1.3.1). However, the way in which sex differences in aggression are understood depends crucially on how aggression is defined. Traditionally, the definition of aggression was restricted to direct physical and verbal acts. Such a narrow understanding of the nature of aggressive behaviour helped to justify the claim that aggression is primarily a behaviour associated with men, whilst neglecting the impact of a number of other behaviours which inflict substantial harm on others.   Researchers have begun to reconceptualise aggression as the intent to harm to another, rather than simply the means by which harm is inflicted. Anderson and Bushman (2002) defined aggression as any behaviour which has the intention of causing deliberate harm to another individual, and this is the definition adopted in this thesis. It is also worth considering briefly the distinction between aggression and violence. Anderson and Bushman view the two concepts as continuous, with violence being the intent to cause extreme harm. Some authors disagree with this; for example, McCall and Shields (2008) consider violence to be physical attack, whereas aggression is rather vaguely defined as "a state of arousal manifested by various emotional communicative strategies" (p.2). There is little to be gained from a long discussion of the minutiae of definition. This thesis will follow Anderson and Bushman's (2002) definition of both aggression and violence as the intent to cause harm, with violence representing more extreme physical harm. Whilst this thesis

mainly refers to aggression, it does not make a clear distinction between aggression and violence; they form part of the same continuum of intent to harm.

There are many ways in which harm can be inflicted on another person; direct physical aggression can be considered one end of a spectrum of aggressive behaviours, with more covert, indirect strategies located at the opposite end. Buss and Durkee (1957) first discussed the distinction between direct and indirect aggression. However, they referred to acts such as slamming doors and throwing things which are perhaps better considered as examples of displaced aggression, rather than covert behaviours aimed at harming another individual. Feshbach (1969) introduced the concept of indirect aggression, reporting a tendency for girls to favour social exclusion as a means of inflicting harm on other girls. However, it was not until the late 1980s that researchers seriously considered the importance of studying indirect aggression. Lagerspetz, Bjorkqvist and Peltonen (1988) referred to children's attempts to exclude other children from a social group and labelled this indirect aggression. In line with the definition of aggression provided above, for the purpose of this thesis, indirect aggression is defined as any behaviour which has the intention of causing deliberate harm to another individual by indirect means. Indirect aggression includes rumour spreading, ostracism, and any other means of inflicting harm on another individual which does not involve a face-to-face encounter.

The term *relational* aggression (Crick & Grotpeter, 1995) is also used frequently in the literature, often synonymously with indirect aggression. Although relational aggression can be (and often is) indirect, it is not exclusively so. Relational aggression refers to social manipulation and it encompasses all forms of aggression which cause damage to interpersonal relationships, such as the use of threats to end the relationship if the target refuses to comply with demands. The next section

reviews research on sex differences in aggression, considering both direct and indirect forms.

1.3: Patterns of sex differences in aggression

1.3.1: Sex differences in direct (physical and verbal) forms of aggression

The sex difference in direct (physical and verbal) aggression is well established in the psychological and criminological literature. The results of several meta-analytic reviews (Archer, 2004; Bettencourt & Miller, 1996; Eagly & Steffen, 1986; Hyde, 1986; Knight, Fabes & Higgins, 1996) have established clear sex differences in the male direction for physical and verbal aggression, though the effect is more pronounced for physical aggression. Eagly and Steffen's (1986) meta-analysis of laboratory studies of sex differences yielded a moderate effect size (d = 0.40) for physical aggression. Archer's (2004) meta-analysis reported a much larger effect for direct aggression in data from real-world settings than has been found in experimental settings (range from d = .30 for self-reports to d = 0 .49 for observations and d = 0.63 for peer reports). This suggests that laboratory studies may underestimate the size of the sex difference. For verbal aggression, Archer (2004) reported a range of effect sizes from d = 0.09 to d = 0.51, all in the male direction. Again, these effect size estimates are drawn from a range of methods. Estimates from peer reports showed the largest effects: (d = 0.24 to 0.51) with estimates based on self-report studies somewhat lower overall (d = 0.19 to d = 0.30) and lower still for observational studies (d = 0.09 to d = 0.14). Overall, estimates of the effect sizes for physical aggression are substantially higher than for verbal aggression, and this is the case cross-culturally (Archer, 2004). This suggests that

the magnitude of the sex differences may increase in line with increasing severity of aggression.

1.3.2: Sex differences in perpetration of crime

Aggression and crime are not synonymous. However, many crimes involve the intent to harm others, and crime statistics have provided a rich source of data for aggression researchers. Analysis of crime statistics reveals similar patterns of sex differences to those identified in academic research. Women are responsible for far less crime than men (Steffensmeier, 1980). In the USA, Greenfeld and Snell (1999) reported a rate of violent offending six times that for women. In the UK, East and Campbell (1999) found that the proportion of males (57 per cent) who self-reported committing any one of 27 offences in the previous year was higher than the proportion of females (37 per cent). This pattern is not unique to the US and the UK. Simon and Baxter (1989) analysed the proportion of males and females engaged in a number of types of violent crime across 31 countries over an 18 year period; women never exceeded men in perpetration of violent crime. Daly and Wilson (1988) provided an extensive analysis of homicide data from a number of cultures and clearly established that same-sex homicide is overwhelmingly perpetrated by men, concluding that, "*The difference between the sexes is immense, and it is universal. There is no known human society in which the level of lethal violence among women ever begins to approach that among men*" (p. 146, original italics). The sex difference in direct aggression and violent crime appears to be a human universal (Brown, 1991; Simon & Baxter, 1989).

Just as data from meta-analyses of sex differences in aggression shows greater effect sizes in the male direction for more severe forms of physical

aggression, analysis of crime statistics shows a greater proportion of male perpetration with increasing severity of crime. The magnitude of the sex difference is more pronounced for the most dangerous and violent forms of crime. Weapons are rarely used in female perpetrated attacks (Campbell, Muncer & Bibel, 2001). When less serious, less confrontational crimes are considered, the proportion of female perpetrators increases. Property offences can be considered an indirect and relatively low risk crime (confrontation is unlikely and the probability of detection is low). The proportion of female perpetrators is greatest for property offences (Campbell et al., 2001); estimates range from 35-47 per cent, compared to 9.8 per cent for robbery, 11.9 per cent for burglary and 18.8 per cent for aggravated assault. Women's involvement in property crimes such as larceny, fraud and forgery has increased relative to men's in recent years (Steffensmeier, 1993). Although the media have often drawn attention to a rise in female crime in recent decades, the increase over a 30 year period from 1960 to 1990 is mainly associated with minor property offences (Steffensmeier, 1993). Campbell et al. (2001) noted that this corresponds to a period when divorce and illegitimacy increased, resulting in large numbers of single mothers living below the poverty line (Kitson & Morgan, 1990). Campbell et al. (2001) argued that female crime may therefore be linked to resource provisioning. The implications of resource scarcity for female aggression and crime are discussed further in section 1.8.

Whilst women commit less crime than men, correlations between the rates of crime for the two sexes are high. Campbell et al. (2001) computed correlations for male-female crime rates across US states, regions of England and Wales, and across nations. For both property crime and violent crime, they reported male-female correlations well in excess of .90; where male crime rates increase, female rates

increase proportionally, though the overall rate for women consistently remains much lower. This suggests that the environmental factors which increase crime are likely to be the same in both sexes (Campbell et al., 2001). This argument is supported by research which shows that the relationship between crime and social class is the same for the two sexes, with higher levels of perpetration in the lowest socioeconomic groups (Canter, 1982).

Likewise, the age-crime curve for the two sexes shows marked similarity. Analysis of crime statistics suggests that involvement in crime peaks in the teens and early twenties for both sexes, and this is consistent cross culturally, historically, and across offences (Hirschi & Gottfredson, 1983). Campbell (1994) reported a slightly earlier peak for females (age 12 to 15) than for males (age 15 to 16). This may correspond to the earlier onset of puberty in females, and the potential significance of this is discussed in the context of sexual selection theories in Section 1.6. Official arrest statistics in the US show high male-female correlations across age for assault (but overall, a much lower rate of female perpetration), and the same pattern is observed in self-report studies (which avoid the potential problem of police bias) show the same pattern (Elliot, Huizinga & Morse, 1983).

For both sexes, excluding the special case of aggression against intimate partners (which will be addressed in the second part of this thesis), violent attacks are primarily intrasexual. Female physical attacks (when they occur) are usually directed towards other women (Campbell 1986; Campbell, Muncer & Bibel, 1998; Ness, 2004). Most female assaults involve victims and perpetrators in the 15-24 year old age group, and usually involve friends and acquaintances (Campbell, 1986). Further details regarding the nature of female to female assaults are provided in

Section 1.3.4. Likewise, male attacks are usually directed at male rivals (Daly & Wilson, 1988).

The sex difference in criminality and aggression has received a great deal of attention, but Campbell (1994) notes that sex parity in the age-crime curve has been somewhat overlooked. This is also true of the correlation between male and female rates of crime. Researchers have typically focussed on trying to explain sex differences in aggression, but a comprehensive theory of sex differences in aggression should also be able to account for similarities in aggressive behaviour between the sexes.

1.3.3: Sex differences in indirect forms of aggression

The usual pattern of greater male perpetration is not evident in research which has examined sex differences in indirect aggression. Bjorkqvist, Lagerspetz and Osterman (1992) interviewed adolescent girls about their behaviour during intrasexual conflict. The strategies described by the girls were primarily indirect and included social exclusion, gossiping and rumour spreading. In a meta-analysis, Archer (2004) found a mixed pattern of sex differences across a number of methodologies. Analysis of data from observational studies revealed a large effect size in the female direction (d = -0.74), but smaller estimates were derived from analyses of peer reports (d = -0.01 to -0.19) and analysis of self-report data did not reveal a sex difference (d = 0.03). Self- and peer-report studies may underestimate women's involvement in indirect aggression. This argument is supported by the findings of a study using experimental methods; Hess and Hagan (2006) examined the likely response of participants of both sexes to an aggression-provoking scenario. When presented with a forced choice, 90 per cent of women (but only 55

per cent of men) reported a preference for aggression directed at reputational damage (rather than physical aggression). Although evidence in support of a female advantage is mixed, it is clear that women's involvement in indirect aggression increases relative to direct forms. Perpetration of indirect aggression also appears to be age-related. Bjorkqvist, Lagerspetz and Kaukianen (1992) found that indirect aggression increases significantly around the age of 11, and this effect is especially pronounced for girls. It also corresponds with the female peak in the age-crime curve, discussed in section 1.3.2.

1.3.4: Sex differences in proximate influences on aggression

Some research has examined the proximate circumstances associated with women's use of direct aggression; this provides insights into women's motives, and perceived costs and gains. This research has mainly focussed on adolescent girls. Self-report data from British schoolgirls (Campbell, 1986) indicated substantial involvement in physical fights; 89 per cent reported involvement in a fight, and 25 per cent reported involvement in more than six fights. Fighting took the form of hand-to-hand combat, mainly punching, kicking and slapping. When asked about the reasons for a fight, the primary trigger (46 per cent) was an attack on personal integrity (usually in the form of a challenge to sexual reputation). The final remark made prior to a fight was most often an accusation of promiscuity (often the terms "slut" or "slag"). Other key triggers were defence of a friend from a personal integrity attack, and jealousy in relation to a romantic partner. Marsh and Paton (1986) reported similar findings in extensive interviews with British schoolgirls. In their study, girls reported feeling totally justified in using physical aggression to defend sexual reputation, indicating that it was necessary to be seen to redress such a challenge.

Campbell (1984) interviewed girls in New York gangs, most of whom had dropped out of school and were cohabiting with a male partner. In this sample, the triggers to aggression were similar, but aggression was more often associated with threats to an established romantic relationship, and responses to challenges to sexual reputation were secondary to this. The slightly different pattern in this sample probably reflects the fact that these girls were in established cohabiting relationships, and maintaining a mate (rather than acquiring one) would be a key concern. In an ethnographic study of girls in a deprived area of Philadelphia, Ness (2004) found that use of violent aggression was common. For these girls, violence served as a means of self-defence and of securing peer ties. Violence could also enhance identity in an environment where few alternative avenues for identity and esteem were available. Once again, threats to reputation and challenges to relationships were potent triggers to the most violent encounters. Ness (2004) noted that the economic implications of mate competition intensified female competition for mates in these deprived areas. Taken together, this research suggests that direct aggression amongst adolescent girls is particularly related to the acquisition and retention of mates.

Research which has examined triggers to direct aggression in men suggests that altercations often begin with a seemingly trivial dispute (Wilson & Daly, 1985). Similar findings were previously reported by Wolfgang (1958) whose analysis of almost 600 homicides in the USA likewise suggested that the leading motive was "an altercation of relatively trivial origin". Something as apparently insignificant as a spilled drink can trigger violence. Wilson and Daly (1985) studied homicide data from Detroit and reported that most homicidal conflicts involved men who already knew each other. For the most part, homicidal conflict was unrelated to other criminal

offences, and the altercation often began with an interpersonal dispute. Additionally, unmarried men from the poorest socioeconomic classes formed a disproportionate percentage of both victims and offenders. The authors argue that such violent male encounters reflect something of particular significance to men; face and status. This forms the basis of their theory of sex differences in aggression (discussed in Section 1.6.4). These findings are not limited to the western world; Hill and Hurtado (1996) studied the Ache of Paraguay and reported that the mortality rate for men was approximately one and a half times that for women, and this higher rate was largely due to the fact that almost half of all adult male deaths were the result of warfare and violence associated with status struggles. Research on the triggers to direct aggression therefore suggests that women are motivated by defence of sexual reputation and mate acquisition and retention, whereas men are motivated by defence of 'face' and status disputes (which are also inextricably linked with mate acquisition). For both sexes therefore, the proximate causes of direct aggression appear to be related to the acquisition and retention of mates.

1.3.5: Sex differences in the experience of aggression

In addition to behavioural sex differences in aggression and its antecedents, there is also evidence that men and women experience aggression in different ways. In an initial qualitative study, Campbell and Muncer (1987) found that women are more likely to experience their own aggression as expressive (a loss of self-control subsequently associated with guilt), whereas men are more likely to experience aggression instrumentally (as a means of control over others). These two sets of beliefs about aggression have been termed social representations (Moscovici, 1981). Campbell, Muncer and Coyle (1992) developed Expagg, a psychometric scale to measure preference for these two forms of social representation. Consistent sex

differences on Expagg have now been documented cross culturally (e.g. Campbell, Muncer & Gorman, 1993; Archer & Latham, 2003; Baumgartner, 1995; Puyat, 2001; Ramirez, Andreu & Fujihara, 2001). These findings are consistent with earlier research which suggested that women experience more guilt and anxiety in relation to aggression than men and also view their own aggression as more harmful than do men (Eagly & Steffen, 1986). This sex difference in the reported experience of aggression is also something that an adequate theory must account for.

1.4: Interim summary

When aggression was defined only as direct and physical acts, men were considered to be the more aggressive sex. It is clearly the case that men greatly exceed women in use of direct physical aggression, and to a slightly lesser extent, verbal aggression. Sex differences in indirect aggression are inconsistent, but on balance, favour women. Crime statistics reveal a similar pattern of greater male perpetration of more serious offences and face-to-face assault, with women's involvement largely restricted to property crime. Although women's involvement in direct aggression is relatively low, it is not uncommon, and patterns of involvement mirror those of men; there is a correlation between the sexes in rates of involvement, and the age-crime curve is similar for men and women.

There are distinct sex differences in proximate triggers to aggression and crime. Women's intrasexual aggression is chiefly triggered by romantic jealousy and challenges to sexual reputation, whereas men's intrasexual aggression often occurs in response to seemingly trivial events, which appear to represent status struggles. Despite these apparent differences, however, the triggers to aggression for both sexes are related to factors affecting reproductive success. As well as differing on

frequency and form of aggression, men and women differ in terms of whether they experience aggression as instrumental (men) or expressive (women).

Psychological theories of sex differences in aggression must be able to account for 1) the sex difference in favour of men in overall rates of involvement in direct aggression and violence, 2) the negative relationship between perpetration and the danger of the aggressive act in women, 3) the positive relationship between male and female rates of crime, 4) sex parity in the age crime curve, 5) the predominantly intrasexual nature of aggression, 6) sex differences in the proximate triggers to aggression and crime and 7) sex differences in social representations of aggression.

The next section reviews approaches to sex differences in aggression based on social role theory. The subsequent section will consider evolutionary based sexual selection approaches, which underpin the theoretical basis for this thesis.

1.5: Social structural approaches to sex differences in aggression

1.5.1: The social role theory approach

Within social psychology, explanations of sex differences in aggression have been incorporated into the dominant social science model of sex differences in social behaviour; social role theory (SRT: Eagly, 1987). This section reviews Eagly's original theory, and also Wood and Eagly's (2002) subsequent biosocial revision. These theories constitute the most substantial alternative to the sexual selection approach to sex differences in adult social behaviour, on which this thesis is based. Therefore, they are considered in some detail. It should firstly be noted that SRT accounts are not specific theories of sex differences in aggression; explanations of

sex differences in aggressive behaviour are derived from a theoretical framework of sex differences in social behaviour more generally (e.g. Eagly & Steffen, 1986). SRT is a meta-theory and has been applied to many aspects of sex differences in social behaviour.

1.5.2: The original social role theory account

Eagly's original social role theory (Eagly, 1987) proposed that the origin of sex differences in behaviour is located in social structure. There is a sexual division of labour in the western world whereby women are more frequently distributed into domestic roles, and men are more frequently distributed into breadwinner roles. Historically, the two sexes have occupied these different roles in society, whereby women have typically been homemakers and mothers and men have been employed full time in the workplace, providing for their families. SRT theorists argue that these roles require different attributes, which have been described as 'communal' for the homemaker (nurturance, passivity) and 'agentic' for the breadwinner (instrumentality, dominance) (Eagly, 1987).

The unequal distribution of men and women into these different roles is argued to result in sex differences in behaviour because members of each sex are expected to possess psychological attributes congruent with the role most frequently occupied by their sex. The attributes consistent with fulfilling these roles become stereotypic for the two sexes, forming 'gender roles'. Thus, the gender role for women includes nurturance because women have more frequently occupied the role of caregiver to children. Once formed, these gender roles then guide the behaviour of men and women.

There are a number of developmental accounts of the proximate social processes involved in shaping behaviour in line with differentiated sex roles. For example, socialisation theories (e.g. Mischel, 1967) emphasise conditioning of sex appropriate behaviour, whilst social learning theories (e.g. Bandura, 1973) focus on imitation and modelling of behaviour observed in family, peers, community and the media. However, the way in which socialisation to sex roles occurs is beyond the scope of this discussion, other than to demonstrate that SRT purports to specify both the social structural origins of sex differences in social behaviours, as well as the processes by which these are perpetuated and maintained. Thus, it claims to be a theory of both origin and process. In terms of origins, the key point is that SRT claims the origin of sex differences in social behaviours lies in the differential distribution of the sexes into different roles; i.e., sex differences are *socially constructed*. Sex differences in aggression are argued to result from these gender roles (Eagly, 1987); because men have been distributed into higher status roles with more power and resources, more dominant and aggressive behaviour is required. The theory has been used to explain sex differences in a number of social behaviours in similar terms, for example, helping behaviour (Eagly, 1987; Eagly & Crowley, 1986) and leadership style (Eagly & Johnson, 1990; Eagly & Karau, 2002).

It is undoubtedly the case that historical social roles associated with the two sexes foster in boys and girls certain beliefs about the kinds of attributes and behaviours commonly associated with their own sex, and also a degree of pressure to conform to these. SRT is to some extent able to account for greater male involvement in direct aggression and violence, in terms of the expectancies associated with the agentic and communal roles. This could be extended to explaining women's particularly low involvement in more dangerous forms of

aggression, since such behaviour is presumably even less congruent with the communal role than less serious acts of aggression. However, there are a number of problems with the theory. One of the principles of SRT sates that men and women seek to acquire the skills associated with their respective sex roles, so that women seek to be nurturing and caring and men to be dominant. This claim is challenged by evidence which suggests that sex differences in social behaviours, including aggression, emerge before children can understand gender roles (Ruble & Martin, 1998; Howes, 1988; Baillargeon et al., 2007). If sex differences emerge prior to an age at which socialisation processes can influence behaviour, it suggests a biological rather than a social origin. Additionally, there is some evidence to suggest that male aggression does not increase with increasing socialisation to the male sex role (Baillargeon et al., 2007).

Comparative evidence also strongly challenges the claim that the origin of sex differences in aggression lies in social structure. Sex differences in aggression follow a common pattern of greater male involvement in most species (Trivers, 1972), with aggressive competition in males being linked to the degree of polygamy in the breeding system (indicative of the strength of mate competition) (Wilson & Daly, 1995). Primate species in particular show patterns of sex differentiated aggression similar to those found in humans (Wrangham & Peterson, 1997). This is difficult to explain in the context of SRT; Archer (1996) points out that other primates have not been subject to the historical forces which SRT theorists claim have shaped sex differences in human social behaviour.

The original formulation of SRT was unable, despite its claim, to adequately explain the origin of differentiated sex roles and why, despite different historical circumstances across cultures, men universally occupy the agentic role. Indeed,

Eagly and Wood (1999) suggested that social circumstances for men and women do vary across cultures and historical periods, yet did not explain why this does not result in a variable pattern of sex distribution to the agentic and communal roles. Some authors have suggested that, according to Eagly's (1987) original formulation, the assignation of the sexes to social roles seems "essentially arbitrary" (Buss, 1996, p. 19)

1.5.3: The biosocial approach

Following some heated debate regarding the relative status of SRT and evolutionary approaches to sex differences as 'origin' theories' (see, for example, Archer, 1996; Eagly, 1997; Eagly & Wood, 1999), a subsequent biosocial revision to SRT (Wood & Eagly, 2002) was proposed. This was an attempt to provide a more credible account of the origins of sex differences by allowing for limited evolutionary influences which, the authors acknowledge, social structuralists had been "silent" about. Wood and Eagly's approach claims to be biosocial in that it attempts to specify how evolved physiological characteristics of biological sex (for example, sexual dimorphism in size and strength) interact with social structural variables and developmental factors to determine assignment to sex roles, and consequently behaviour. They acknowledge that distal causes of sex differences to some extent constrain proximate causes, and they therefore attempt to integrate ultimate and proximate explanations of social behaviours.

The revised theory focuses on the interaction of evolved physical characteristics of men and women and the social context in which the two sexes live. Physical characteristics of the sexes are used to explain why it is the case that men are more often distributed into provider roles, and women into domestic roles

(something which was always unclear in the original formulation of the theory). Wood and Eagly (2002) propose that the physical sex differences which are important are men's greater size and strength, and the burden of childbearing and lactation for women. These differences mean that particular roles are better suited to (and more easily accomplished by) one biological sex than the other. For example, men's greater strength makes them more suited to hunting, whereas the physical constraints of childbearing and nursing mean that women are better suited to childrearing. .

The biosocial theory therefore offers a credible explanation as to why, cross-culturally, women more often occupy domestic roles, and it represents a positive step in attempting to integrate social structural and evolutionary explanations. Nevertheless, the theory remains inadequate as an origin theory. Whilst the authors acknowledge the role of biological sex in the initial formation of sexual division of labour, the influence of biology largely stops there (though Wood and Eagly (2002) refer briefly to the role of hormones). The theory continues to argue that sex differences in behaviour result from the expectancies associated with the social roles that arise as a result of the sexual division of labour. The authors argue that whilst sexual selection is responsible for the sexually dimorphic physical differences which result in a sexual division of labour, its influence ends there; sexual selection is not responsible for psychological and behavioural differences between the sexes. Thus, according to this model, the influence of sexual selection stops 'at the neck'. Wood and Eagly acknowledge the effect of testosterone on muscle development, yet not its effect on the brain. It is not clear why sexual selection processes would adaptively select sex differentiated physical characteristics, yet have no influence on psychological attributes (which represent the phenotypic expression of the genes

selected for building a physical organ; the brain). Evolutionary psychology has provided extensive evidence for the role of sexual selection on psychological functions, and this is discussed further in Section 1.6, where the sexual selection approach is introduced.

A further problem with Wood and Eagly's (2002) biosocial theory concerns the predictions arising from it. The authors use ethnographic data from non-industrial societies to test hypotheses regarding the extent of variability in sex differences across cultures. They make a number of predictions regarding the extent of variability we might expect from the perspective of traditional social constructivism, their biosocial theory, and evolutionary psychology. However, it is almost impossible to differentiate the theories based on patterns of cultural variability in sex differences. For example, from the perspective of their biosocial theory, Wood and Eagly predict similarities across different societies in the distribution of men and women to activities congruent with the reproductive constraints of women and physical dimorphism. They also predict that variability across cultures will occur when societies allow, for example, women to pursue activities that confer status in their society despite the constraints of childbearing. The problem with this analysis is that such a pattern would also be consistent with (and indeed predicted by) an evolutionary approach. Sexual selection accounts would also expect, for example, that women's greater parental investment would result in their more often occupying domestic roles. Additionally, evolutionary theorists would not disagree with the proposition that women would pursue activities which confer fitness benefits where a society does not make childrearing prohibitive of these pursuits. The authors themselves acknowledge that despite the different explanations offered by these approaches, cross-cultural data may sometimes be "congruent with both

approaches" (2002, p.705). The biosocial account finds further difficulties in making a priori predictions regarding the circumstances in which sex differences are expected due to the fact that it refers to so many interacting and sometimes unspecified variables (for example, biological sex differences, hormones, unspecified aspects of social structure).

In assessing the validity of the SRT approach to explaining sex differences in aggression, it is worth referring back to Section 1.3, which describes the patterns of sex differentiated aggression that an adequate theory must be able to explain. It must account not only for sex differences, but sex similarities. SRT accounts face difficulties in explaining why male and female rates of crime rise and fall in unison and why the age crime curve is so similar for men and women. If women occupy a communal role, then it is not clear why the ecological conditions that result in an increase in male crime should also affect women. The finding that the age-crime curve is similar for women suggests that aggression has a specific function in early adulthood for both sexes. It is difficult to make sense of an increase in female crime at this age in the context of the developing communal role postulated by social role theorists. SRT theories also have little to say regarding the proximate circumstances that are likely to trigger aggression in the two sexes, and it is not clear whether SRT is able to account for the circumstances in which female direct aggression and crime occur.

An adequate theory of sex differences in aggression should also be able to account for sex differences in the experience of aggression ('social representations'). As discussed in Section 1.3.5., women typically report their experience of aggression as expressive, whereas men report their experience as instrumental. Moscovici defined a social representation as "a set of concepts, statements and explanations

originating in the course of inter-individual communications" (Moscovici, 1981, p.181). He argued that whilst representations exist as cognitive structures in the minds of individuals, their origin and content is very much social and they serve to organise social information.

Sex differences in social representations of aggression are not inconsistent with an SRT perspective (Archer, 1996) and can be explained in terms of socially derived sex roles. According to SRT accounts, communal and agentic traits associated with female and male sex roles are learned through socialisation. Women's expressive view of aggression presumably derives from the incongruence of aggressive behaviour with the communal role, whereas men's instrumental orientation is entirely compatible with the requirements of the agentic role. The terms expressive and instrumental have been used by social role theorists to refer respectively to traits associated with the communal and agentic roles (e.g. Feather, 1984).

A number of studies have examined potential correlates of sex which might explain sex differences in social representations, for example, occupational role (Campbell & Muncer, 1994), gender role attitudes (Muncer, Campbell, Jervis & Lewis, 2001) and gender-related acceptability of aggressive behaviour (Astin, Redston & Campbell, 2003). Campbell, Muncer and Gorman (1993) found that a communal interpersonal orientation and a more feminine gender identity were associated with an expressive social representation, whereas an agentic orientation and a more masculine gender identity were associated with an instrumental social representation. The results of most of these studies are broadly consistent with an SRT perspective in that they identify aspects of the agentic and communal roles which correlate with instrumental and expressive representations. However, although

Campbell et al., (1993) found that a feminine gender identity and communal interpersonal style were positively associated with an expressive social representation of aggression, when gender identity and interpersonal style were partialled out statistically, a significant correlation between sex and social representations remained. This suggests that there is something else about sex which determines social representations. Furthermore, biological sex (not gender identity) was more strongly correlated with social representations. Therefore, biological sex differences may be important in explaining the genesis of sex differences in social representations of aggression. This proposal and related evidence is addressed in section 1.8 in relation to Campbell's (1999, 2002, 2006) inhibition model.

In summary, SRT offers a useful account of the development of sex roles and the behaviours associated with these, as well as an account of the kinds of socialisation processes which may be partly responsible for conformity to sex roles. These social processes may be responsible to some extent for the overall sex difference in aggression. However, SRT accounts fall short in explaining the patterns of sex differences and similarities in aggression discussed in Section 1.3. They are unable to explain why patterns of sex differences are so consistent cross-culturally and historically, and occur in other primate species. They cannot explain the early developmental onset of sex differences in aggression. A useful psychological theory should also be able to make testable predictions regarding the circumstances in which the behaviour it is concerned with will occur. Recently, research has focussed not only on the differences in frequency and severity of male and female aggression, but also on the similarities in patterns of aggressive behaviour between the two sexes. SRT accounts which are based on mutually exclusive sex roles would seem

unable to account for such similarities. Although research on the social correlates of sex associated with social representations seems broadly consistent with the SRT view, some of this research indicates that biological correlates of sex may be worthy of further investigation.

Whilst SRT and its biosocial revision both claim to be origin theories, neither is satisfactory; the former because it cannot discount the influence of biology as a causal factor, and the latter because it irrationally assumes that selection pressures have acted on the human body, but not the human mind, despite its physical location in the brain. Whilst SRT rejects any direct influence of sexual selection on psychological attributes, it is unable to exclude the role of biological sex differences as the ultimate causal factor, acknowledging that evolved physical attributes determine distribution to sex typical roles. Despite allowing a minor role for biological influences, however, psychological sex differences are still considered to result from social structure. Evidence is discussed below which strongly suggests that sexual selection processes have had a powerful influence on masculine and feminine psychology. If sex differences in aggressive behaviour are ultimately the result of biological sex differences, it may also be the case that sex differences in social representations of aggression primarily represent biological reality rather than socialisation to sex roles.

The next section focuses on theories derived from an alternative approach to studying the sex differences, based on Darwinian principles of evolutionary psychology and the action of sexual selection. Sexual selection approaches to sex differences in aggression are not only able to account for the pattern of sex differences more fully than SRT accounts, but that they may subsume them and explain the origins of sex roles themselves (in terms of the differing selection

pressures acting on men and women throughout their evolutionary history). Campbell's inhibition theory (Section 1.6.6), which forms the theoretical basis for this thesis, incorporates recent research on biological correlates of sex (such as fear and inhibitory control) which are potential candidates for psychological mediators of sex differences in aggression. Social role theorists do not incorporate these variables into their framework (Campbell, 2006).

The next section introduces the sexual selection approach to studying social behaviour, and outlines the key principles of parental investment and fitness variance which underlie all sexual selection accounts of sex differences in aggression.

1.6: Sexual selection approaches to sex differences in aggression

1.6.1: Evolutionary psychology

In the past few decades, sex differences in social behaviour have been studied from a very different perspective to that of social role theory. In the 1980s, the new discipline of evolutionary psychology began to explain many aspects of human behaviour in terms of their ultimate function (see Cosmides & Tooby, 1987). Evolutionary psychologists have argued that our understanding of human nature and behaviour has been limited because the primary focus in psychology has been on providing proximate explanations for behaviours. Psychologists were able to explain, for example, factors in an individual's developmental history that might predispose them towards particular behaviours, or situational triggers to particular behaviours. However, without an understanding of the ultimate function of a behaviour in terms of an adaptive problem that it was 'designed' to solve, psychological explanations were rather limited.

Evolutionary psychologists have been particularly concerned with social behaviour. Evolutionary approaches examine how social behaviours have evolved to provide inclusive fitness advantages, increasing the number of genes passed on to future generations. The set of psychological adaptations which make up the human mind were shaped in the Environment of Evolutionary Adaptedness (EEA). The EEA is not a particular time or place, but the composite of selection pressures that resulted in an adaptation (Cosmides & Tooby, 1997). Adaptations shaped in the EEA are argued to be largely preserved in modern humans. Evolutionary psychology aims to provide a set of meta-theoretical principles by which to study human behaviour, and like SRT, it claims to provide a theory of both origin and process for sex differences in social behaviour (Archer, 1996).

1.6.2: Evolutionary psychology and sex differences in social behaviour

Whereas SRT locates the origins of sex differences in social behaviour in terms of social roles derived from historical social structures, evolutionary psychology focuses on sexual selection pressures in the ancestral environment as the ultimate explanation of sex differences in social behaviours. Evolutionary psychology has contributed greatly to our understanding of sex differences in a number of social behaviours, such as cooperation and reciprocal altruism (Trivers, 1971; Axelrod & Hamilton, 1981) and mate choice (Buss, 1989). Sexual selection is the process which drives the evolution of traits that are advantageous in the competition for mates and successful reproduction. Evolutionary psychologists argue that sexual selection is the driving force behind many sex differences in social behaviour. In the ancestral environment, men and women were subject to different selection pressures and subsequently developed different reproductive strategies designed to solve the adaptive problems they faced. Sex differences in aggression

can be understood in the context of these sex-specific reproductive strategies. Archer (2001) advocated such a strategic approach to studying aggression. He argued that both direct and indirect forms of aggression could be understood as part of a strategy for extracting rewards from social situations, the choice of strategy depending on social circumstances, individual differences, and crucially, sex.

There is substantial archaeological evidence suggesting that aggression and violence were common features of life in the ancestral environment (see McCall & Shields, 2008, for a fuller discussion). In terms of sex differences in aggression, their universal nature and comparable pattern to other species of primates suggests an evolutionary basis. Although evolutionary psychologists agree that sex differences in aggression are ultimately the result of sexual selection processes that operated in the ancestral environment, they differ in terms of whether they locate the primary selection pressure in the evolutionary history of male or female psychology. Before reviewing specific evolutionary theories of sex differences in aggression, the basic principles of a sexual selection approach to sex differences in aggression are discussed below.

1.6.3: Sex differences in parental investment and fitness variance

Evolutionary accounts of sex differences are based on Trivers' (1972) parental investment theory (PIT). Ultimately due to anisogamy, maternal investment in offspring is greater than paternal investment in the majority of species, and in most mammals, males provide little investment in offspring (Geary, 2000; Kleiman & Malcolm, 1981). Sex differences in parental investment have been a powerful driving force in human evolution, with particular consequences for sex differences in behaviour. Encephalisation has resulted in humans giving birth to babies at a

relatively premature stage and human babies require a high degree of parental investment for a prolonged period of time (Trivers, 1972). Whilst paternal care is common in humans (Geary, 2000), evidence suggests that maternal investment in offspring is greater. In the ancestral environment, a mother's minimum investment in any one offspring was significantly greater a father's. Men required simply the time and energy to copulate, whereas women contributed a nine month gestation period followed by prolonged lactation; evidence from modern hunter gatherer societies shows a lactation period of around four years during which time the mother probably carried the child at substantial resource cost (Campbell, 1999) The importance of maternal investment is discussed further in the context of a specific sexual selection theory of aggression (Campbell's inhibition theory) in section 1.6.6.

One of the most important consequences of this high maternal investment is that human females are limited in the number of offspring they can bear in a lifetime. In natural fertility populations, the demands of pregnancy and lactation constrain inter-birth intervals to around three years (Sear & Mace, 2008). In the ancestral environment, the fitness variance of women was therefore relatively low; they could bear a finite number of offspring, and so their reproductive interests were best served by investing highly in each to maximise their quality. As the higher investing and rate-limiting sex, women have been a valuable reproductive resource for which men must compete. In addition, the comparatively low minimum investment for men meant that their fitness variance was extremely high, and they could potentially leave behind very large numbers of offspring. These two biological principles (parental investment and fitness variance) constitute a powerful selection pressure on men to compete for copulations with fertile females, favouring a male psychology designed for aggressive competition (and this is the basis of the first sexual selection account,

discussed in section 1.6.4). The mildly polygynous nature of the human mating system serves to further increase the fitness variance of men, intensifying aggressive competition (Wilson & Daly, 2005). Across animal species, the degree of effective polygyny in the mating system is reflected in sexual dimorphism in term of size and physical armaments. It is also evident in the male/female mortality ratio, swith a higher proportion of male deaths in more polygynous mating systems (Clutton-Brock, Albon & Harvey, 1980). These are a consequence of men's history of intrasexual competition for matings with fertile females. This argument has been criticised by social structuralists; Wood and Eagly (2002) have used evidence of low body weight dimorphism in humans relative to other primates (Plavcan & van Schaik, 1997) to argue that male-male competition in humans has been minimal, and the mating system is predominantly monogamous. However, greater male fitness variance does not *depend* on a polygynous mating system; evidence suggests that male fitness variance continues to be higher when serial monogamy is employed as a mating strategy (Jokela, Rotkirch, Rickard, Pettay & Lummaa, 2010).

For men, the cost of failure to compete for mates is likely to be 'reproductive death', whereas the rewards for success in fitness terms are potentially extremely great. In general therefore, men have evolved a tendency to compete for a higher quantity of mates. In contrast, as the rate-limiting sex, women do not usually face the risk of reproductive death. As such, it is unlikely that there was a significant selection pressure acting on women to increase quantity of matings.

In the subsequent sections, sexual selection theories of sex differences in aggression are reviewed. All of these theories are based on the principles of sex differences in parental investment and fitness variance, and they all view aggression as an evolved strategy for extracting rewards from social situations or avoiding costs.

The following accounts are to a large extent complementary, but they differ in terms of whether they locate the selection pressures driving sex differences in the evolutionary history of men (Wilson & Daly, 1985; Daly & Wilson, 1988) or women (Campbell, 1999, 2002, 2006; Taylor et al, 2000). Of those accounts that focus on selection pressures acting on women, they emphasise similar selection pressures (primarily maternal investment and survival) but differ in terms of the resulting psychological mechanisms they propose. The next section begins by considering Wilson and Daly's theory.

1.6.4: Increased male appetite for aggression ('taste for risk')

The first sexual selection account of sex differences in aggression focussed almost solely on the adaptive value of aggression for men and was based on the Darwinian principle that men compete and women choose. Daly and Wilson (1983; 1988) argued that men have evolved an increased appetite for aggression due to sexual selection for mating competition. Men possess a number of physiological adaptations resulting from a history of intrasexual competition, many of which are more pronounced in young men. Men are, on average, taller, stronger, faster, and more muscular than women (Frayer & Wolpoff, 1985). Alongside these physiological adaptations are psychological adaptations such as competitiveness, and increased appetite for risk and aggression (Wilson & Daly, 1985). Wilson and Daly (1985) argued that men (and particularly young men) have evolved a "taste for risk" and are often eager to take part in dangerous and risky behaviours, including aggression, since this demonstrates fearlessness and courage. In their account, taste for risk is the psychological mediator of sex differences in aggression.

Wilson and Daly (1985) are able to draw on much evidence in support of their argument that young men have evolved a taste for risk. Young men aged 16-24 pose significant problems to society. They show the highest involvement in violent crime, and mortality in young men is largely a result of dangerous and risky behaviours such as drug taking (Kraemer, 2000), reckless driving (Kruger & Nesse, 2004) and accidental death as a result of risk-taking (Anderson, 2001; Kraemer, 2000). Males at every age have higher rates of mortality than females, but the sex difference is most pronounced in early adulthood. Kruger and Nesse (2004) reported that in their 20 nation sample, three young men died for every woman, and they concluded that, "being male is now the single largest demographic risk factor for early mortality in developed countries" (p. 66). Mortality in young men is disproportionately the result of behaviour (Kruger and Nesse, 2004). Most of these consequences result from risk taking behaviour, and Wilson and Daly (1985) termed this set of behaviours "the young male syndrome". It is probably no coincidence that this is also the age where the acquisition of reputation, status and competition for mates is most important.

Furthermore, young men in the poorest socioeconomic groups are more likely to suffer (and inflict on others) the most negative consequences of the young male syndrome. In the modern world, men often compete for status in terms of educational qualifications, high status jobs or sporting success. Such status-acquiring strategies entail less risk of physical harm than intrasexual aggression. Male mortality risk decreases and longevity increases when mate acquisition is more dependent on education than on aggression and violence (Perusse, 1993). However, for young men in the poorest socioecominc groups, such strategies may not be available. Therefore, a willingness to engage in aggression and other risky behaviours may be beneficial in terms of the acquisition of dominance and status in

their community (Campbell, 2007). It may also be the case that a refusal to engage in risk-taking behaviours signals vulnerability, which may increase vulnerability to attack.

Wilson and Daly (1985) used homicide data to support their argument that young men in particular have evolved a taste for risk, that it is directed towards the acquisition of status, and that it is particularly expressed in unmarried young men in the poorest socioeconomic groups. They referred to the seemingly "trivial" causes of disputes underlying many homicides, which make little sense unless something much more important is at stake. Wilson and Daly (1985) believe that violent male intrasexual encounters are really disputes about "face" and status. Young men appear to be so motivated to avoid loss of face that they will risk death, or the consequences of murder. Wilson and Daly argued that a "taste for risky competition" (1985, p.60) geared towards the acquisition of status (or prevention of its loss) can explain such seemingly irrational behaviour. This might also explain the finding that a disproportionate percentage of victims and offenders are from the poorest socioeconomic groups, in which the means to achieve status are more limited.

Wilson and Daly's (1985) account was the first attempt at a comprehensive theory of sex differences in aggression utilising the principles of sexual selection. It successfully explains how the selection pressures acting on men throughout evolutionary history have led to the evolution of a suite of adaptive physiological and psychological traits designed for male mating competition through the acquisition of status. Many aspects of male psychology that seemed hitherto inexplicable (homicide over a seemingly trivial dispute, extreme risk taking behaviour) make sense in light of their analysis.

Wilson and Daly's approach, however, is very male focussed; sex differences in aggression are explained in terms of selection pressures acting exclusively on male psychology. Whilst there is no doubt that the greater fitness variance of men favours selection for risky and aggressive competition, Wilson and Daly's account seems to assume that women have less to compete for because the sex difference in fitness variance is the only factor affecting intensity of intrasexual competition: "Of course females compete, but there is a straightforward logic according to which males compete *more intensely*" (Daly & Wilson, 1985, p.60).

Women are unlikely to make substantial inclusive fitness gains by competing for a high number of mates. Indeed, the ensuing damage to sexual reputation is likely to incur inclusive fitness losses; due to internal fertilisation and concealed ovulation, men seek indicators of future fidelity in a potential long-term partner to minimise the risk of cuckoldry (Buss & Schmitt, 1993). However, the evolution of biparental care in humans, whereby a woman does not bear the total burden of parental investment, fosters two-way sexual selection to a greater extent than would be the case in species where females alone provide investment in offspring. Women could make inclusive fitness gains by acquiring men of high status as mates. Men compete vehemently for status because it is attractive to women, but competition for status is a zero-sum game (status can only be gained by one man at the expense of others). Because only a small proportion of men are able to acquire high status and resources, there are only 'a few good men' (Campbell, 1995). If women are able to make inclusive fitness gains by competing to secure a high quality partner, their relative desistance from *aggressive* competition requires explanation. Wilson and Daly's (1985) focus on fitness variance as the principal determinant of inclusive

fitness limits the ability of their theory to account for women's desistance in light of the potential fitness gains.

Wilson and Daly's (1985) theory is also unable to account for the parallel age-crime curves, which are indicative of a functional explanation of aggression for both sexes in the early reproductive years, particularly in light of the findings that young women's use of aggression is related to sexual reputation and mate acquisition. Wilson and Daly's theory does not address sex differences in social representations of aggression, though the finding that men experience aggression as instrumental does not seem incompatible with their focus on the adaptive benefits of aggression for men. However, it is not clear which psychological mediators might be involved in translating a greater male appetite for aggression into the instrumental experience of aggression, nor how women's experience of aggression is realised as expressivity.

Subsequent to Wilson and Daly's (1985) theory, two recent evolutionary accounts have attempted to explain the sex difference in aggression in terms of selection pressures in the evolutionary history of women; they have focussed on the fitness costs associated with aggression. These theories are considered in sections 1.6.5 and 1.6.6, below.

1.6.5: Tend and Befriend

Taylor, Klein, Lewis, Gruenewald, Gurung and Updegraff (2000) offer a biochemical account of sex differences in direct aggression which is based on selection pressures that have acted on women to inhibit aggression. They argue that when faced with threat, neither fight nor flight responses (which have long been thought to provide an innate response to threat) are adaptive for women. Similarly to Campbell (section 1.6.6), they emphasise the necessity of maternal survival for the

wellbeing of offspring, and argue that fighting endangers this, since it incurs the risk of injury or death. However, flight is no more appropriate since in the ancestral environment, it may well have involved abandoning offspring. Taylor et al. (2000) argue that the stress response which triggers a fight or flight reaction in men leads to what they term a 'tend and befriend' response in women, whereby they tend and calm their young, and befriend other women, providing benefits of group cohesion and enhanced protection from threat.

Taylor et al. (2000) propose that this tend and befriend response is controlled by the peptide hormone oxytocin. Oxytocin has been discussed in the regulation of a number of social behaviours, and is particularly implicated in female behaviour because its effects are enhanced by oestrogen, but inhibited by androgens. It appears to promote female attachment to partners and offspring (see Campbell, 2008, for a review). Taylor et al. argue that higher levels of oxytocin are released in females in response to threat, resulting in the tend and befriend response.

This model offers a potentially useful biochemical explanation for sex differences in aggression in response to threat. It may also explain women's greater propensity for social bonding, especially when stressed. However, it falls short as a comprehensive theory of sex differences in aggression. Whilst it goes some way towards explaining women's relatively lower involvement in direct aggression, the account seems specific to explaining sex differences in aggression in response to threat, and in the presence of a community of known females. It also seems specific to women with offspring, since the costs of flight are presumably avoided in women who do not have children. Furthermore, as Campbell (2007) points out, the importance of intrasexual competition is de-emphasised in this model, yet (in non-intimate contexts) women's aggression is primarily directed at other women (Section

1.3). Whilst Taylor et al.'s (2000) account might explain a sex differentiated response to threats posed by predators or men (a tend-and-befriend strategy would appear to be adaptive when faced with such threats), the theory does not appear applicable to explaining the patterns of sex differences described in section 1.3.

1.6.6: Fear-based inhibition of direct aggression in women

Campbell (1999, 2002, 2006) has offered an evolutionary account of sex differences in aggression which also emphasises selection pressures operating on women throughout human evolutionary history. It is to some extent complementary to Wilson and Daly's (1985) account; it considers the selection pressures which have acted on women to inhibit aggression, whilst Wilson and Daly were concerned with selection pressures favouring aggressive competition in men. Campbell's theory proposes that sex differences in aggression result primarily from the differential *costs* of aggression for the two sexes; she argues that women's much lower involvement in direct aggression and crime is indicative of a consistent selection pressure favouring inhibition of aggression. This selection pressure, she argues, is the substantial fitness cost to offspring resulting from maternal death or injury in the ancestral environment. There is considerable evidence indicating the importance of maternal investment and survival for offspring, which is a direct result of the sex differences in parental investment described by PIT. In hunter-gatherer societies infant mortality is high. Because women have relatively few offspring but invest a great deal in each, they have evolved a powerful motivation to ensure the survival and wellbeing of these offspring. Precisely because young children depend so greatly on the care of their mother, her own survival and wellbeing would have been of paramount importance in the ancestral environment. Evidence relating to the crucial role of maternal investment and maternal survival for offspring is discussed below. This

evidence is central to the argument that women should place higher value on their lives than men, and therefore avoid high risk behaviour wherever possible (particularly where the risk is physical injury).

Maternal investment and maternal survival

Recent accounts of childrearing have moved beyond traditional views of mothers as exclusive caregivers (e.g. Bowlby, 1969) towards 'cooperative breeding' models (Hrdy, 2008; 2009), which emphasise the role of allomothers in raising expensive human offspring in the ancestral environment. Whilst not the exclusive caregivers to offspring, evidence suggests that maternal investment was essential for the survival of offspring in the ancestral environment. Women take more responsibility for care of offspring in all societies (Brown, 1991; Ember, 1981). The behaviour of infants also appears to acknowledge the role of the mother as the primary caregiver and source of protection. From a few months of age, babies show attachment behaviour and this is primarily directed toward the mother, particularly in the earliest years when the child is most vulnerable. Maternal abandonment of children is rare in all cultures (Browne, 1995).

Studies of orphans in contemporary hunter-gatherer societies also indicate an essential role for the mother. Hill and Hurtado (1996) reported survival rates for orphans in the Ache of Paraguay which showed that the death of a mother resulted in a fivefold increase in child mortality, whereas the death of a father resulted in a threefold increase. The mortality rate was 100 per cent when the mother died in the first year of a child's life. Sear and Mace (2008) reviewed studies of the relationship between mother and child morality drawn from 28 natural fertility populations with little or no access to healthcare; in all of these, the death of a mother was related to

higher child mortality. The strength of the effect was dependent on the age of the child. Where the mother died in childbirth, almost no children survived. However, the survival rate increased for older children, and improved most notably for children who lost their mother subsequent to weaning. The loss of a father had less impact on child mortality in all studies where this comparison was made.

Disparities in fitness variance between the sexes, the reproductive tactics used by men as a consequence of this, and infant dependence due to encephalisation all ensure that whilst the survival of the father was probably beneficial to offspring, the survival (and wellbeing) of the mother was crucial in the ancestral environment. Therefore, women would be expected to show high concern for their own lives. This has clear consequences for sex differences in aggression. Although it is clear that women could make substantial fitness gains by engaging in aggressive intrasexual competition for high quality mates, the associated fitness costs are likely to have resulted in a selection pressure to inhibit face-to-face aggression and violence, which carries the risk of retaliation, injury and even death. It is important to emphasise that Campbell's (1999, 2002, 2006) theory does not propose that women never use direct aggression and violence. All decisions about social behaviour result from a cost/benefit analysis, and in the case of direct aggression, the inclusive fitness costs appear to be higher for women than for men.

Evaluation in relation to patterns of sex differences

Whilst Campbell's (1999, 2002, 2006) account is primarily concerned with women's relative desistance from aggression, it is also consistent with patterns of female involvement in aggression and crime. Evidence suggests that when women do engage in aggression, the key triggers are challenges to sexual reputation and

romantic relationships (Section 1.3.4), indicating that aggression is a means of competing for mates. Female reproductive success is limited by access to resources to invest in offspring. There are two ways in which women can acquire resources; i) self-provisioning or ii) the acquisition of a male partner who is willing and able to invest in offspring (Campbell, 1999). Self-provisioning in the ancestral environment is likely to have been very difficult. particularly when combined with providing maternal care to offspring who were, as a result of encephalisation, highly dependent for a number of years (Bogin, 1997; Hill, 1993). This difficulty would be compounded by the need to care for more than one dependent child at the same time (Hrdy, 1999). Such circumstances have favoured biparental care in humans. Campbell (1995) argues that women do not lack competitiveness in seeking to acquire the best mates. Whilst low-risk intersexual competition is preferable (Buss & Schmitt, 1993), unfavourable circumstances (such as a paucity of resource-rich males) can tip the balance in favour of more aggressive competition (Campbell, 1995). The female peak in the age-crime curve at puberty is also consistent with this approach; women engage in more aggression and crime at a time of life when mate selection is salient (Campbell, 1995).

.   The central importance placed on resource acquisition is consistent with what is known about the nature of female crime; higher involvement in property crimes (Section 1.3.2) indicates that women's crime is driven by resource scarcity (Campbell et al., 2001). Female property crime occurs most often in the poorest socioeconomic groups and when the proportion of single mothers is high; Wilson and Herrnstein (1985) reported that the typical female offender (perhaps much like the typical male offender) is "poor, undereducated, disproportionately a member of a minority group, and dependent on her limited resources for her own support and

often the support of her children" (p. 124). Female property crime may typically reflect women's attempts at self-provisioning in the absence of investing males, a competitive response to lack of resources.

1.7: Potential mediators of sex differences in aggression

The discussion so far has considered the selection pressures which may have acted on men and women to favour involvement in or desistance from aggression. The psychological mediators of sex differences in aggression arising from Wilson and Daly's (appetitive) and Campbell's (avoidant) accounts therefore differ. Wilson and Daly (1985) argue that sex differences in aggression are mediated by men's taste for risk. The proposed mediators in Campbell's model are women's greater fear of physical harm and inhibitory control (Campbell, 2006). This section reviews evidence relating to potential mediators of sex difference in aggression. This discussion considers the proposed mediators in Campbell's model (fear and inhibition), as well as taste for risk. Additionally, the potential role of anger is considered since a sex difference in anger is a potentially powerful mediator of sex differences in aggression.

1.7.1: Taste for risk

The role of taste for risk has been assessed by examining sex differences on measures of sensation seeking, primarily using the Zuckerman Sensation Seeking Scale. This scale is comprised of four subscales, three of which assess attraction to dangerous and risky activities, and one (Experience Seeking) which focuses on attraction to novel experiences which do not include physical risk. Sex differences in the male direction have been widely reported on the subscales which relate to physical risk, and this was confirmed by Cross, Copping and Campbell (2011) in a

recent meta-analysis. However, cross-culturally sex differences are very rarely reported on the Experience Seeking scale (Zuckerman, 1994). A meta-analysis of sex differences in risk-taking (Byrnes, Miller & Schafer, 1999) reported significant effect sizes in the male direction for 14 out of the 16 types of risk they examined, with a weighted mean effect size of d = 0.13, though this did vary somewhat with context and age. Taken together, these findings suggest that men and women do not differ in their appetite for new experiences, but that there are sex differences in willingness to take risks. Wilson and Daly (1985) offer a wide body of evidence to support their argument for greater risk-taking in men, using examples of male behaviour such as higher mortality, dangerous driving and so on (discussed in Section 1.6.4). Whilst sex differences are clear, they do not provide unequivocal evidence of male *appetite* for risk; they could be indicative of women's greater fear. This issue is discussed at various points later in this thesis.

1.7.2: Anger

Anger must be considered as a potential mediator of the sex difference in direct aggression. Whilst fear serves to inhibit aggressive behaviour, anger promotes attack. Increasing provocation increases aggression, but also reduces the size of the sex difference (Bettencourt & Miller, 1996). The reduction in the sex difference following increased provocation could be explained by higher levels of anger in men (Campbell, 2006).

Research on sex differences in the frequency and intensity of anger has generally not found a sex difference. Meta-analyses have reported effect sizes of d = .006 (Archer & Mehdikhani, 2003) and d = - 0.003 (Archer, 2004). Brebner (2003) reported a small effect size in the female direction in an international sample (d = -

0.05). Likewise, self-report studies generally suggest that the sexes do not differ in their expression of anger (Kring, 2000). Therefore, a sex difference in anger is unlikely to underlie the sex difference in aggression. However, some studies have found sex differences in the way in which men and women react to anger, with men reporting a greater likelihood of engaging in confrontation and direct aggression (Deffenbacher, Oetting, Lynch & Morris, 1996). Women's greater reluctance to react to anger provoking situations with confrontation and aggression lends support to the argument that the sex difference in aggression is underpinned by a sex difference in inhibitory control or fear, rather than a sex difference in anger.

1.7.3: Fear

Fear is an adaptive response to a potentially harmful situation, which has the effect of inhibiting behaviour. Campbell (1999) argued that the psychological means by which humans assess the costs of an aggressive encounter is fear, and that women will experience more fear than men when faced with the same objective situation.

Girls show fear responses earlier in infancy than boys (Nagy, Loveland, Kopp, Orvos, Pal & Moinar, 2001; Garsetein & Rothbart, 2003). In adulthood, women report greater anxiety on personality measures (Feingold, 1994). Women experience fear more frequently than men (Fischer & Manstead, 2000; Brebner, 2003), and the experience is more intense (Fischer, 1993). Women also show heightened physiological responses to fear compared to men (Bradley, Cuthbert & Lang, 1999). Sex differences in fear are most consistent when there is risk of physical harm. Those subscales of the Fear Survey Schedule associated with physical harm (such as animals, death and disease) yield the largest sex differences (Arrindell, Kolk,

Pickersgill & Hagerman, 1993). These fears and phobias are all adaptive responses to real threats to survival which existed in the ancestral environment, and humans who possessed such fears were more likely to survive. Women also show more concern for their own health, engaging in more preventative health care than men (Harris & Guten, 1979). In contrast, sex differences on social fears (which are not clearly linked to survival) are less consistent. Some studies find greater female fear (Turk et al., 1998), but in meta-analyses, Feingold (1994) reported no sex differences for social anxiety.

Recent testosterone studies provide support for a biological basis for sex differences in fear. When testosterone is administered in a double-blind placebo controlled trial, women showed reduced attention to threat on the emotional Stroop test (van Honk, Peper & Schutter, 2005) and the potentiated startle paradigm (Hermans, Putman, Baas, Koppeschaar & van Honk, 2006).

Two studies (Eagly & Steffen, 1986 and Bettencourt & Miller, 1996) provide more direct evidence for the role of fear in mediating sex differences in aggression. They examined sex differences in subjective appraisals of danger in the face of aggressive encounters, and concluded that when faced with the same aggressive encounter, women rated the danger higher than men did, and the magnitude of this sex difference was related to sex differences in aggression. This provides evidence that the sex difference in fear may well be important in mediating the sex difference in aggression (Campbell, 2007).

Selection pressures acting on women to ensure survival for the protection of offspring may have harnessed fear as an emotional brake to potentially fitness-damaging behaviour. Campbell (2006) proposed that girl's greater fear forms the

basis for the development of superior inhibitory control, one consequence of which is greater restraint of aggressive behaviour. A wide range of evidence from the psychological and criminological literature indicates a central role for poor inhibitory control (or high impulsivity) in explaining aggression, violence and criminality. Additionally, sex differences are reported on measures of inhibition, and these are most pronounced on fear-based forms. This evidence suggests that sex differences in fear-based forms of inhibition may explain sex differences in aggression. This evidence is reviewed in the next section

1.7.4: Inhibition

Neurochemical and neurological evidence for the role of inhibition

Serotonin (5-HT) generally has inhibitory effects on the brain (Daw, Kakade & Dayan, 2002) and it has been identified as one of the neurotransmitters responsible for inhibitory control of aggression (Volavka, 1999). A history of aggression is associated with lower levels of serotonin in cerebrospinal fluid and whole blood, experimental depletion of dietary tryptophan (needed for 5-HT synthesis) and differences in the DNA sequence of the serotonin transporter gene (Miczak, Weerts, Haney & Tidey, 1994; Niehoff, 1999).

Additionally, sex differences have been found in serotonin uptake, binding potential, and volume in areas of the brain associated with inhibitory control. Distinct areas of the prefrontal cortex (PFC) are associated with inhibitory control of social behaviours. MacDonald (2008) reviewed evidence indicating a primary role of the ventromedial PFC, especially the orbitofrontal cortex (OFC) and Ventral anterior cingulate cortex (ACC). The ventromedial PFC has strong bidirectional links with

subcortical brain areas involved in the processing of emotion (Banfield, Wyland, Macrae, Munte & Heatherton, 2004).

Women have greater volume in the orbitofrontal areas of the prefrontal cortex. Using MRI, Goldstein et al (2001) found that women had significantly greater cortical volume (relative to the size of the cerebellum) than men. There is also evidence that women have greater binding potential for serotonin than men. Using PET and 5-HT_{IA} antagonists, Parsey et al. (2002) reported greater binding potential of $5HT_{1A}$ receptors in women in a number of brain areas, including the medial and orbital prefrontal cortex. Additionally, binding potential of $5HT_{1A}$ receptors was significantly negatively associated with lifetime aggression, on which women scored lower. Furthermore, sex differences in serotonin uptake have been reported in the frontal cortex (Biver et al., 1996).

In contrast to 5-HT, dopamine (DA) is associated with behavioural activation and sensitivity to reward (Ikemoto & Panskepp, 1999), and also with aggressive behaviour (Miczek & Yoshimura, 1982). Additionally, a sex difference in DA receptor density (in favour of men) has been reported (Anderson & Teicher, 2000). Seo, Patrick and Kennealy (2008) argued that impulsive aggression may result from the interaction of 5-HT hypofunction with DA hyperfunction. Available evidence regarding sex differences in these neurotransmitters suggests that such a profile may be more commonly found on men, and may provide the neurochemical basis for the sex difference in aggression.

Developmental evidence for the role of inhibition

Campbell (2006) reviewed the literature on sex differences in the development of four forms of inhibition and their relationship to aggression. She

draws on Rothbart and Bates' (1998) developmental model of temperament, which describes the development of self-control via the development of two intermediary forms of inhibitory control (reactive inhibition and effortful control). The acquisition of these childhood forms of effortful control is proposed to build developmentally on fear; fear influences attentional mechanisms such that individuals who are more fearful are more sensitive to threat. Individuals with higher levels of fear (i.e. girls) should therefore more readily acquire effortful control. Campbell (2006) concluded that those forms of inhibition which are most strongly fear-based show the greatest sex difference in favour of women, and are also negatively related to aggression. Reactive inhibition develops early in childhood, followed by effortful control and finally self-control. However, fear is less directly implicated in the later developing effortful control and self-control than it is in reactive inhibition. Patterns of sex differences in these forms of inhibition covary with the extent to which fear is implicated.

Reactive control is an early developing form of behavioural regulation, which is involuntary and develops early in childhood. Lower levels of reactive inhibition are related to low resting heart rate (Lorber, 2004), which shows a positive relationship with antisocial behaviour. Resting hear rate is also higher in girls from around three years of age (Raine, 2002). Studies of the development of reactive control have demonstrated a sex difference in favour of girls (Eisenberg et al., 2005; Valiente et al., 2003).

The development of effortful control in the toddler years builds on reactive control (Derryberry & Rothbart, 1997). Effortful control is a less automatic process and involves effort rather than simply reacting to fear. It allows for conscious control of behaviour associated with emotion (Eisenberg & Reiser, 2004). Effortful control

shows a positive relationship with fear; children higher in fear show greater effortful control (Kochanska, Coy & Murray, 2001). It is negatively associated with aggression (Kochanska & Knaack, 2003), whilst showing positive relationships with moral behaviours such as resistance to cheating (Kochanska, Murray & Coy, 1997). In their meta-analysis, Else-Quest, Hyde, Goldsmith and van Hulle (2006) reported a large female advantage for effortful control in children aged three months to 13 years (d =-1.01).

Self-control develops later in childhood as externally imposed social control is internalised. Impulsivity, the tendency to act quickly without thought for long-term consequences, is considered to be the opposite of self-control. Low levels of self-control (or high impulsivity) have been identified in the clinical domain (as a key variable in the etiology of conduct related disorders) and in criminological domains (as one of the strongest correlates of crime). Evidence from both of these domains is discussed below.

Disinhibitory pathologies are known to be associated with low self-control; sufferers of attention deficit hyperactivity disorder (ADHD), conduct disorder and psychopathy have low levels of self-control (Morgan & Lillenfeld, 2000; Barkley, 1997; Pennington & Ozonoff, 1996) and perform poorly on measures of behavioural inhibition, such as the Iowa Gambling Task (Blair, Colledge & Mitchell, 2001). Of most importance in establishing a potential role for inhibition in mediating sex differences in aggression, disinhibitory pathologies have been found to be far more common in males; estimates of the male:female ratio for ADHD are between 3:1 and 9:1 for ADHD (Pennington & Ozonoff, 1996) and between 3:1 and 10:1 for conduct disorder (Moffitt, Caspi, Rutter & Silva, 2001). Such disinhibitory pathologies may

result from underlying differences in the neurotransmitters associated with impulsive aggression (discussed above).

The role of inhibition in theories of crime

Theories of criminal and antisocial behaviour have also implicated low self-control as a key explanatory variable. Self-control has been defined as a combination of impulsivity, risk-seeking, present orientation, temper and carelessness. In their general theory of crime, Gottfredson and Hirschi (1990) proposed that low levels of self-control (in interaction with criminal opportunity) result in criminal and antisocial behaviour. They emphasised the rewards and attractions associated with criminal behaviour, and argued therefore that crime requires active desistance. Individuals with low levels of self-control are therefore more likely to commit crimes. In Gottfredson and Hirschi's theory, low self-control is the sole psychological variable responsible for crime. Likewise, Pratt and Cullen (2000) argued that low self-control has a powerful role; they described the effect size for low self-control across 21 studies (d = 0.41) as "one of the strongest known correlates of crime" (p. 952). These findings were supported by a study which reported that the sex difference in violent offending is almost eliminated when the effect of self-control is removed (Burton et al., 1998). Although all components of low self-control are related to crime, it is the risk seeing and impulsivity subscales which have the greatest predictive power (Gramick, Tittle, Bursik & Arneklev, 1993; LaGrange & Silverman, 1999). These subscales also show the most pronounced sex differences (LaGrange & Silverman, 1999; Nakhaie, Silverman & LaGrange, 2000).

Impulsivity is the basis of another influential theory of the development of delinquency. Moffitt (1993) argued that impulsivity results from neuropsychological

impairments and poor parenting, and is later associated with delinquency and antisocial behaviour. This was supported by a longitudinal study which found that behavioural (rather than cognitive) impulsivity was most strongly related to delinquency (White et al., 1994). Impulsivity has also been shown to predict violent offending (Henry, Caspi, Moffitt & Silva, 1996). In a New Zealand longitudinal study, constraint (defined as an inability to modulate impulsive aggression) was a significant predictor of the sex difference in antisocial behaviour.

Although these theories are not particularly concerned with sex differences, they all suggest that inhibitory processes are central to explaining criminality. However, their focus on impulsivity and low self-control emphasises the impelling motivations to aggression (associated with Daly & Wilson's (1985) theory of male taste for risk) rather than the inhibitory motivations (associated with Campbell's (2006) theory of fear-based inhibition). This distinction is discussed more fully in Section 3.1.2 in relation to measurement instruments.

Inhibition in interpersonal domains

In the interpersonal domain, women show superior inhibitory control abilities. Bjorklund and Kipp (1996) reviewed studies of sex differences in inhibitory control of social behaviour, and reported a strong female advantage. In the studies they reviewed, women demonstrated superior ability to control the expression and arousal of emotion. They argued that sexual selection has favoured better inhibitory control in women in the interpersonal domain due to the constraints imposed by mate acquisition and childrearing. The acquisition of a high quality long term mate who will invest in offspring has required a woman's sexual reputation to be intact (Buss & Schmitt, 1993), and this has exerted a strong selection pressure favouring inhibitory

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control of sexual and social behaviour in women. Additionally, Bjorklund and Kipp (1996) argued that the demands of maternal care require a high level of inhibitory control. Bjorklund and Harnishfeger (1995) suggested that brain circuits already selected to inhibit aggressive and sexual behaviour were harnessed by selection pressures for self-control in social contexts. Thus, they directly link inhibitory abilities in interpersonal domains to inhibitory control of aggression.

Although they found only weak and inconsistent sex differences on general measures of impulsivity, Cross et al. (2011) reported a clear sex difference favouring women in the interpersonal domain in their meta-analysis, consistent with Bjorklund and Kipp's (1996) findings. This suggests that women's better inhibitory control may be especially evident when the context is clearly interpersonal.

Cognitive inhibition (Executive function inhibition)

Campbell (2006) discussed executive function (EF) as a point of comparison with the more affective forms of inhibition discussed above. Executive function inhibition is governed by the dorsolateral region of the prefrontal cortex (Aron, Robbins & Poldrack, 2004) and is not fear-based. Executive functions encompass higher-order cognitive processes which are conscious and planful, and are involved in sustaining and directing attention, and decision-making. EF has two key components: 1) the ability to consciously inhibit a dominant or prepotent response and replace it with a non-dominant response, and 2) the ability to consider a longer time frame when making decisions (Cross, Copping & Campbell, 2011). A range of cognitive and behavioural measures have been used to measure the two components separately. For example, the go/no go task and the Stroop test have been used to measure the ability to inhibit a dominant response, and the delay

discounting task has been used to measure the ability to consider longer time frames.

Measures of EF inhibition have been employed in clinical populations to assess their relationship to disinhibitory pathologies. In a meta-analysis, Morgan and Lillenfeld (2000) reported a strong relationship between performance on six commonly used EF tests and both criminality and delinquency. However, sex differences on EF tests are generally weak or non-existent. In their review of sex differences in the evolution of inhibitory mechanisms, Bjorklund and Kipp (1996) reported only weak and inconsistent sex differences on tasks related to cognitive inhibition. In a meta-analysis published subsequent to this study, Cross et al. (2011) examined sex differences on the most commonly used measures of EF inhibition. Tests which measured the suppression of a prepotent response (such as the go/no go task, stop signal task, continuous performance test and the stroop test) yielded an overall non-significant effect size of $d = 0.13$, in the direction of greater male impulsivity. Cross et al. argue that these tests largely measure attention and inhibitory motor control. Sex differences on measures of the ability to consider a longer time frame (such as the delay discounting task, Iowa gambling task and balloon analogue risk test) were inconsistent, with effect sizes ranging from -0.08 to 0.30.

An important issue regarding the relationship of EF tasks to aggression is their relationship with IQ; a number of tasks are correlated with general intelligence (Kane, Hambrick & Conway, 2005), which is itself associated with antisocial behaviour. When IQ is controlled, the relationship between executive function and aggression is weak (Seguin, Nagin, Assaad & Tremblay, 2004) and is weaker than relationships with fear-based forms of behavioural inhibition (White et al., 1994).

Therefore, fear-based forms of behavioural inhibition appear to show the strongest relationship with aggression, and also the clearest sex differences. This provides support for Campbell's argument that fear-based forms of inhibition mediate the sex difference in aggression.

1.7.5: Summary of research reviewed in relation to potential mediators of aggression

In summary, consideration of sex differences in a number of facets of inhibition and impulsivity alongside sex differences in aggression suggests that inhibition is a potentially powerful mediator of sex differences in aggression. The sex difference in fear, particularly of threats to physical harm, suggests that fear may underlie sex differences in inhibitory control. This is supported by evidence that fear-based forms of inhibition show the strongest relationship with aggression, and the most established sex differences. Campbell's model therefore appears to propose potentially important mediators of the sex difference in aggression which are worthy of further study.

1.8: Fear, inhibition and sex differences in social representations of aggression

It was noted earlier (Section 1.3.5) that an adequate theory should be able to account for sex differences in the experience of aggression. Campbell's (1999, 2002, 2006) model has been extended to provide a new and non-social account of the origin of sex differences in social representations of aggression in terms of the relationships between inhibition, aggression and sex. It is proposed that sex differences in inhibitory control might give rise to distinctive phenomenological experiences of aggression, resulting in sex differences in reported social representations, and that this phenomenological experience might reflect an accurate 'read out' of internal state (Alexander, Allen, Brooks, Cole & Campbell,

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2004; Driscoll, Zinkivskay, Evans & Campbell, 2006). Alexander et al. argued that aggressive behaviour occurs when anger exceeds inhibition. Therefore, individuals with poorer inhibitory control express their anger behaviourally when it is at a lower level, and hence they express it more frequently. Consequently, when aggression occurs, it is experienced at a much lower level of arousal, allowing a greater degree of behavioural and tactical control. Phenomenologically, they argue, this is experienced as instrumentality. In contrast, individuals with better inhibitory control inhibit their anger for longer, and therefore when it is expressed the level of emotional arousal is much greater and less control is experienced. Phenomenologically this is experienced as expressivity, a loss of control. Driscoll et al. (2006) proposed that sex differences in social representations would be explicable in terms of sex differences in inhibitory control. Alexander et al. (2004) provided preliminary evidence for this proposal; in a student sample, they found that men scored higher on instrumentality, impulsivity and risk-seeking, and impulsivity and risk-seeking predicted instrumentality. A more direct test of the relationships between sex, inhibitory control and social representations of aggression is provided in the study described in Chapter 3, and was reported by Driscoll et al. (2006).

1.9: Aims

The evidence reviewed above indicates that Campbell's theory appears to be able to explain both sex differences and sex similarities in aggressive behaviour and in the experience of aggression in terms of the selection pressures acting on women in the ancestral environment. A valid evolutionary theory must go beyond plausible explanations based on likely selection pressures, and provide an account of the psychological mechanisms which have evolved to translate selection pressures into fitness promoting behaviours. Campbell's (2006) model is very specific in identifying

fear-based inhibition as the mediator of the sex difference. As discussed above, a large body of research can be drawn upon to support this account of the relationship between fear-based inhibition, sex and aggression. This evidence is drawn from criminology and a number of branches of psychology. However, although the evidence supports the proposed pattern of relationships, it is largely indirect. For example, some studies show a relationship between poor inhibitory control and aggression, others show a sex difference in inhibitory control, and taken together, we can argue that sex differences in aggression might be explicable in terms of this sex difference in inhibitory control. Furthermore, sex differences in social representations of aggression may be explicable in terms of the same variables.

The aim of the research reported in the first half of this thesis was to provide a direct test of the relationships between sex, inhibition, aggression and social representations. The relationships between these variables are investigated in the study reported in Chapter 3. However, prior to that, a confirmatory factor analysis of the scale used to measure social representations of aggression (Expagg) is reported. Previous research has used a 16-item version of this questionnaire (Campbell, Muncer, McManus & Woodhouse, 1999). However, Muncer and Campbell (2004) developed a shorter form, which appeared to be more convenient to use and potentially provided a better fit to the underlying two dimensional (instrumental/expressive) factor structure than the longer version. The confirmatory factor analysis (Driscoll, Campbell & Muncer, 2005) is documented in the next chapter.

Chapter 2: Confirmatory factor analysis of a ten-item Expagg scale[1]

2.1: Introduction

Sex differences in social representations of aggression were first reported in a qualitative study; Campbell and Muncer (1987) performed a qualitative analysis of same-sex discourse regarding experiences of aggression, and found that women appeared to experience aggression as expressive (a loss of control associated with guilt), whereas men experienced aggression as instrumental (a justifiable means of control over others) (see Section 1.3.5). These sex differentiated experiences of aggression correspond to two types of theory regarding the nature of aggression (Muncer & Campbell, 2004). Theories of expressive aggression (for example, frustration-aggression) emphasise the cathartic nature of aggression and the expression of anger, whereas theories of instrumental aggression (for example, social constructionist) imply that aggression can be used as a controlled means of extracting rewards.

In order to examine preliminary findings of sex differences in a larger sample, Campbell, Muncer and Coyle (1992) developed the Expagg scale. It consisted of twenty statements each followed by two possible endings (one instrumental and one expressive) from which the respondent chose the one which best described their experience of aggression. For example, following the introductory statement, "I believe that my aggression comes from…", respondents chose between "losing my self-control" (expressive response) and "being pushed too far by obnoxious people"(instrumental response). Each item related to one of eight domains, relevant

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[1] The material in this chapter is a modified version of the following publication: Driscoll, H., Campbell, A., & Muncer, S. (2005). Confirming the structure of a ten-item Expagg scale using confirmatory factor analysis. *Current Research in Social Psychology, 10(15),* 222-234.

to the experience of aggression: aim of aggression, proximate cause, reputation, emotion, cognition, form, social value and situational factors (for example. public versus private aggression) (Campbell, Muncer & Gorman, 1993). Endorsement of an expressive response was scored as 1, and endorsement of an instrumental response was scored as 0, so that the individual's overall score (between 0 and 20) reflected their relative preference for an expressive representation of aggression. Effectively, an individual's social representation of aggression was conceptualised as being located on a one-dimensional continuum from instrumental to expressive. The original Expagg was used in a number of studies. Campbell, Muncer, McManus and Woodhouse (1999) reported a large effect size (d =.84) in favour of women reporting a relatively more expressive experience of aggression (based on 1,674 participants across 12 samples). Exploratory factor analyses (e.g. Campbell et al., 1992) revealed a single underlying factor (expressive-instrumental aggression) onto which all items loaded positively. However, the amount of variance explained by this factor was rather small (Campbell et al., 1999).

Subsequently, Archer and Haigh (1997) suggested that instrumentality and expressivity might be two independent dimensions rather than opposite ends of a single continuum (i.e. a two factor structure), and that it might be possible for an individual to endorse both representations to varying degrees. Based on this conceptualisation, Archer and Haigh (1997) developed the Revised Expagg scale, whereby the original twenty items were expanded into forty items on five-point Likert scales. Twenty items measured expressive beliefs and a further twenty items measured instrumental beliefs. Factor analysis of data from a small sample (n = 130) suggested a three-factor solution, the first and third factors being uninterpetable, and the second factor showing positive loadings from expressive items and negative

loadings form instrumental items. With a large sample (n = 200), however, they found a clear two-factor (instrumental and expressive) structure. This suggests that Expagg is not unidimensional. Campbell et al.'s (1999) factor analysis of this scale also revealed a two-factor structure. However, whilst the second factor appeared to measure expressivity, the first factor was interpreted as a bipolar instrumental-expressive dimension, rather than a pure measure of instrumentality. Additionally, Archer and Haigh's (1997) forty item scale was rather long. If there is no substantial loss of psychometric quality, shorter inventories are preferable to longer ones in terms of administration time and demands on research participants.

Archer and Haigh's (1997) revised two-dimensional version of Expagg was further modified by Campbell et al. (1999). Their aims were to reduce the scale to a more manageable length and, in light of the concerns regarding the factor structure of Archer and Haigh's measure, to construct two subscales which independently measured expressivity and instrumentality. They reduced Archer and Haigh's Expagg measure to a sixteen item scale (Revised Short Expagg: Campbell et al., 1999) consisting of eight instrumental items and eight expressive items. In constructing the two subscales, Campbell et al. selected the eight instrumental items which loaded most highly on the instrumental factor, and likewise for the expressive subscale. Exploratory factor analysis yielded two factors, with all instrumental items loading onto one, and all expressive items loading onto the other. The Revised Short Expagg therefore allowed independent measurement of expressive and instrumental representations, and allowed participants to endorse neither or both representations, or a combination of the two (Campbell et al., 1999). However, the original Expagg score (relative preference for an expressive representation) could still be obtained by subtracting the instrumental score from the expressive score.

The original (Campbell et al., 1992), Revised (Archer & Haigh, 1997) and Revised Short (Campbell et al., 1999) versions of Expagg have all been widely used and have revealed sex differences confirming Campbell and Muncer's (1987) original findings (e.g. Campbell et al., 1992; Campbell, Muncer & Gorman, 1993; Campbell & Muncer, 1994; Archer & Haigh, 1997). A relatively more instrumental view of aggression has also been found to be associated with more self-reported aggression (Archer, 2004; Campbell, Muncer & Odber, 1997; Campbell, Sapochnik & Muncer, 1997). Expressive views of aggression have been found to be unrelated to physical aggression, or weakly negatively correlated (Archer & Haigh, 1997).

Expagg was intended to measure social representations of aggression in the study to be reported in Chapter 3. Given this, and indeed the wide use of Expagg in aggression research, measurement issues are clearly important. Exploratory analyses have used principal component analysis, factor analysis and Microfact (a program explicitly designed for dichotomous data, such as that provided by the original Expagg measure) to examine the underlying structure of the questionnaire. The original 20-item Expagg was found to be unidimensional (Campbell, Muncer, McManus & Woodhouse, 1999). It is unclear whether the Revised Expagg is unidimensional or two-dimensional (Archer & Haigh, 1997; Campbell et al., 1999). The Revised Short (16 item) Expagg was constructed on the basis of principal components analysis and showed good internal consistency and the expected sex differences (Campbell et al., 1999).

While exploratory factor analysis is useful in revealing the empirical structure of questionnaire items, confirmatory factor analysis (CFA) is a statistical technique which provides a means of assessing how well a proposed theoretical model of empirical structure explains or "fits" a set of data by examining patterns of covariance

in the data. The proposed model specifies the way in which individual items load onto underlying factors, and the relationship between these factors. CFA tests the appropriateness of that model in terms of its fit to the actual data. CFA is appropriate in situations where the researcher has some a priori theory about the latent factors that might underlie a set of data, and the relationships between them.

CFA programs can provide up to thirty-one measures that indicate how well the data fit the proposed model. The most widely accepted indices are summarised as follows:

- The *GFI (Goodness of Fit)* and *CFI (Comparative Fit Index)* both indicate how much better the model fits the data than a null model which specifies that there are no common factors, and that sampling error alone explains the item covariances. Their values can range between 0 and 1 with higher values indicating a better fit; Bentler and Bonnett (1980) among others have suggested that values above .90 represent a reasonable fit.

- The *RMSEA (Root Mean Square Error of Approximation)* is better conceived of as an index of badness of fit. Steiger (1989), who first proposed the RMSEA, argued that values below .10 were good, while others have been more stringent in suggesting that "a value of about .08 or less for the RMSEA would indicate a reasonable error of approximation" (Browne & Cudeck, 1993, p.144).

- The *chi square statistic* tests whether there is a significant difference between the model and the data, and hence ideally should be non-significant.

A number of comparative fit indices are also available, which allow comparison between models. The two most commonly used are:

- The *Expected Cross Validation Index (ECVI)* and the *AIC (Akaike Information Criterion)*. In each case, the model with the lower value provides the better fit to the data and would be expected to cross-validate better on a different sample.

Forrest, Shevlin, Eatough, Gregson and Davies (2002) argued that it was insufficient to accept models of empirical structure based only on exploratory factor analysis; such analyses had revealed inconsistent solutions for Expagg and additionally, they argued, CFA is more appropriate when existing theory leads to hypotheses regarding the factor structure. Forrest et al. used CFA to examine the structure of the various Expagg measures using CFA. They failed to confirm the one-factor structure of the original Expagg, and also failed to confirm the two-factor structure of Archer and Haigh's (1997) 40-item Revised Expagg. Of most concern, they were not able to confirm the two-factor structure of Muncer and Campbell's (2004) Revised Short Expagg. Their model, which specified a two-factor solution to the Revised Short (16-item) Expagg produced a GFI of .89 (where anything above .90 is considered adequate) and an RMSEA of .082 (where anything between 0.05 and 0.08 is considered adequate). Additionally, the chi-square statistic was highly significant, indicating that the data differed significantly from the model. They went on to conclude that, "the failure of this study to replicate previous findings using such methods raises serious questions about the Expagg and Revised Expagg scales" (p. 20).

Muncer and Campbell (2004) challenged this conclusion on several grounds.

They raised concerns regarding Forrest et al.'s (2002) interpretation of goodness-of-fit indices derived from CFA. Firstly they pointed out that Forrest et al. did not provide a definition of good fit. Secondly, they argued that Forrest et al.'s rejection of the two-factor Revised Short Expagg model based on a significant chi-square value is unwarranted. Ideally in CFA, the chi-square value should be non-significant, indicating that the model does not differ significantly from the data. However, problems with the chi-square statistic have been noted for some time (Rayko, 1998). The statistic appears to be very sensitive to sample size; when the sample size is large it can be over-sensitive to small discrepancies between the data and the model, and when the sample size is small, large discrepancies can be overlooked, resulting in a non-significant result. Over-reliance on the chi-square statistic, therefore, can lead to acceptance of models which do not fit the data, and rejection of models which do. Muncer and Campbell (2004) argued that Forrest et al. (2002) had inappropriately rejected the proposed two-factor model for the Revised Short Expagg. To support their argument, Muncer and Campbell conducted CFA on three widely used and well validated measures of three psychological constructs, and compared the derived goodness-of-fit indices with those reported for Expagg by Forrest et al.. They demonstrated that the goodness-of-fit indices obtained for the 16-item Expagg scale were superior to those obtained for the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1991), the Belief in a Just World Scale (Lambert, Burroughs & Nguyen, 1999) and the Right Wing Attitudes Scale (Altmeyer, 1981). Muncer and Campbell also pointed out that the more reliable goodness-of-fit indices (GFI and RMSEA) suggest that the two-factor model is extremely close to providing a good fit to the data, using standard definitions for acceptable values in

each case. Forrest et al. (2002) obtained a GFI of .89 (anything above .90 is considered adequate) and an RMSEA of .082 (where values between 0.05 and 0.08 are considered adequate). Although these values do not quite meet the definitions of good fit, they were much closer than the values obtained from the Eysenck Personality Questionnaire, the Belief in a Just World scale, and the Right Wing Attitudes scale, which were unanimously poor. As a point of comparison, the EPQ yielded a GFI of 0.70 and an RMSEA of 0.13 (based on a two-factor model specifying extraversion and neuroticism dimensions).

Muncer and Campbell (2004) suggested that a better fit to a two-factor model might be obtained with a further reduced number of items on each subscale. They were particularly concerned with the expressive scale because the instrumental scale has stronger item loadings and higher internal consistency. However, to maintain balanced scales, they reduced the number of items on each scale by the same number, and both scales were reduced to five items. The three items they removed from the expressive scale loaded strongly onto the expressive factor in exploratory factor analysis, but also showed positive loadings onto the instrumental factor, and therefore did not discriminate clearly between the two. The remaining five items loaded positively onto the expressive factor, but negatively on the instrumental factor, and so arguably had better discriminative validity. Muncer and Campbell also retained the five items from the instrumental scale which had the highest loadings on the instrumental factor. This meant that two instrumental items with positive loadings on the expressive scales were removed, again enhancing discriminative validity. Muncer and Campbell argued that the items retained in this shorter version are those which are most able to distinguish between expressive and instrumental experiences

since they focus on issues of control and moral appraisals of aggressive behaviour.

Table 2.1 shows the items retained in the ten-item version (in bold).

Table 2.1: Instrumental and Expressive items and their loadings on factors corresponding to Instrumental (I) and Expressive (E) (From Campbell et al., 1999)

	Factor	
Expressive items	I	E
1. During a physical fight I feel out of control.	**-.14**	**.45**
2. I am most likely to get physically aggressive when I've been under a lot of stress and some little thing pushes me over the edge.	.37	.53
3. After a physical fight I feel drained and guilty	**-.40**	**.45**
4. After I lash out physically at another person, I would like them to acknowledge how upset they made me feel and how unhappy I was.	.28	.54
5. I believe that my aggression comes from losing my self-control.	**-.19**	**.52**
6. I am more likely to lash out physically when I am alone with the person who is annoying me.	.21	.45
7. When I get to the point of physical aggression the thing I am most aware of is how upset and shaky I feel.	**-.15**	**.45**
8. In a heated argument I am most afraid of saying something terrible that I can never take back.	**-.35**	**.38**
Instrumental items		
1. I feel that physical aggression is necessary to get through to some people.	**.68**	**-.07**
2. If I hit someone and hurt them, I feel as if they were asking for it.	**.63**	**-.22**
3. In an argument I would feel more annoyed with myself if I cried than if I hit the other person.	**.59**	**.01**
4. The best thing about physical aggression is that it makes the other person get in line.	**.64**	**.10**
5. If someone challenged me to a fight in public I'd feel cowardly if I backed away.	**.56**	**.12**
6. After I lash out physically at another person I would like to make sure they never annoy me again.	.56	.16
7. I am more likely to lash out physically when another person shows me up in public.	.60	.28
8. I am most likely to get physically aggressive when I feel another person is trying to make me look like a jerk.	.63	.24

Note: Retained items are in bold.

The five retained expressive items were drawn from the following three domains: proximate cause ("I believe that my aggression comes from losing my self-control"), cognition ("In a heated argument I am most afraid of saying something terrible that I can never take back"; "During a physical fight I feel out of control") and emotion ("When I get to the point of physical aggression the thing I am most aware of is how upset and shaky I feel"; "After a physical fight I feel drained and guilty"). The instrumental items have a broader coverage of five domains; social value ("I feel that physical aggression is necessary to get through to some people"), form ("In an argument I would feel more annoyed with myself if I cried than if I hit the other person"), aim ("The best thing about physical aggression is that it makes the other person get in line"), reputation ("If someone challenged me to a fight in public I'd feel cowardly if I backed away"), and emotion ("If I hit someone and hurt them, I'd feel as if they were asking for it").

Based on an undergraduate sample of 379 participants, Muncer and Campbell (2004) found superior fit indices for the 10-item Revised Short Expagg (GFI = .94; CFI = .90; RMSEA = .08). Cronbach's alphas for the 10-item version were suitably high: α = .75 (instrumental scale) and α = .73 (expressive scale). Both scales showed significant sex differences in the expected direction. Correlations between the 10-item and 16-item versions were high (instrumental scale, r = .94; expressive scale r = .92) leading Muncer and Campbell to conclude that both versions would perform similarly when used in research, since they are highly correlated, have similar Cronbach's alphas and show similar patterns of sex differences.

Based on these findings, the 10-item version appeared to be most suitable for inclusion in the study reported in Chapter 3. However, the evidence for the

superiority of this shorter measure was limited to a single study which had a limited sample size (for CFA purposes). The aim of this study therefore, was to confirm the superior psychometric status of this short 10-item, two-factor version of Expagg using CFA, which could subsequently be used to measure social representations in this thesis. It was expected that the 10-item version would again show better fit as a two-factor model than the 16-item version. The data used in this analysis were obtained through a website hosted by a UK television company, which potentially offered a much larger (providing a statistical power advantage) and more representative sample. Respondents were self-selected, but more likely to be representative of the general population than the undergraduate respondents in previous studies.

2.2: Method

2.2.1: Sample

Data was collected with the assistance of Channel 4 Television (UK). The Expagg questionnaire was placed on their website (www.channel4.com) as part of another study on aggressive behaviour. In the present study, Expagg data from the first 1000 respondents was analysed. This sample was composed of 569 males (56.9 per cent) and 431 females (43.1 per cent). As noted by Muncer and Campbell (2004), an approximate sex balance is important for CFA studies of scales on which a strong sex difference is anticipated. The age range was from under 17 to over 60.

2.2.2: Procedure

All participants completed the 16-item Revised Short Expagg scale, composed of eight items measuring instrumentality and eight items measuring

expressivity (Campbell et al., 1999) along with a number of other measures not relevant to this study. The Expagg items were prefaced with the standard instructions, as follows: *"We would like you to tell us about your feelings about your own angry emotions. Below are a number of statements. For each one please think how much you agree or disagree with each statement and mark the box next to it. Please give only ONE answer for each statement. Please do not miss any out. There are no right or wrong answers."* Participants responded to items by checking one of the boxes next to each item on the Expagg questionnaire which indicated their degree of agreement (between 1 and 5) with each statement.

2.3: Results and analysis

Both the 16-item two factor model and the 10-item two factor model were tested using EQS 6, a programme designed for analysis of structures of covariance and structural equation modelling. The model for the 16-item version specified that the eight instrumental items would load onto the 'instrumental' factor and the eight expressive items would load onto the 'expressive' factor. These factors were assumed to be correlated since the underlying constructs in a single questionnaire are usually assumed to be correlated to some extent. The model for the 10-item version specified that the five instrumental items suggested by Muncer and Campbell (2004) would load onto the instrumental factor and the five expressive items would load onto the expressive factor. Again, the factors were assumed to be correlated. Both models were evaluated in terms of the measures of goodness-of-fit and comparative indices described in Section 2.1. The definitions of adequacy stated in Section 2.1 were used for evaluation.

2.3.1: 16-Item Revised Short Expagg (Campbell et al., 1999)

The 16-item model gave a chi square value of 790.68 (*p* <.001), an RMSEA of .08, a GFI of .90 and a CFI of .82. Only the RMSEA value met the definitions of good fit described in Section 2.1, though the GFI value was extremely close. Cronbach's alphas were .83 for the instrumental scale, and .70 for the expressive scale. These values are consistent with previous findings, with the reliability coefficient for the expressive scale usually being lower than that for the instrumental scale. The two scales were correlated at *r* = 0.38 (*p* <.001).

With regard to sex differences, where the possible range of scores on each subscale is 0 to 40, men scored significantly higher (*t*(998) = 7.66, *p* <.001) than women on the instrumental scale (male mean = 23.53, SD = 6.52; female mean = 20.39, SD = 6.30), consistent with previous findings. Although women scored higher on the expressive subscale (male mean = 25.56, SD = 5.16; female mean = 27.03, SD = 5.57), this difference did not reach significance. Whilst women consistently score higher on the expressive scale, it is not unusual for the difference to fall slightly short of significance on the 16-item scale. Both sexes obtained higher scores on the expressive subscale than on the instrumental subscale.

2.3.2: 10-Item Revised Short Expagg (Muncer & Campbell, 2004)

The 10-item model gave a chi-square value of 157.91 (*p* <.001). Again, this was significant, but all other indices suggest that the model provides a good fit to the data, with an RMSEA of .06, a GFI of .97, and a CFI of .93. The RMSEA has a 90% confidence interval of 0.05 to 0.07. These values all suggest a better fit to the data than the 16-item model, and meet the definitions of good fit given in Section 2.1. Cronbach's alphas were .78 for the instrumental scale, and .63 for the expressive

scale. Muncer and Campbell (2004) previously obtained a similar value of alpha for the 5-item instrumental scale (.75), but a considerably higher alpha of .73 for the 5-item expressive scale. Overall, the values suggest a small reduction in reliability from the 16-item version to the 10-item version, in line with the reduced number of items. There was a significant but small positive correlation between the five-item instrumental and expressive scales, $r = 0.07$ ($p = .05$).

The possible range of scores on each subscale is 0 to 25. Men again scored significantly higher on the instrumental subscale than women (male mean = 14.34, SD = 4.40; female mean = 12.23, SD = 4.46), $t(998) = 7.47$, $p<.001$. Although women scored slightly higher on the expressive subscale (male mean = 17.04, SD = 3.66; female mean = 17.39, SD = 3.68), this difference was not significant.

2.3.3: Comparison of 16-item and 10-item versions of Expagg

It is also useful to examine comparative goodness-of-fit indices. The model which produces the lower value provides the better fit to the data (Section 2.1). The 10-item model gave an AIC of 89.91, compared to 584.68 for the 16-item model. The ECVI value was .20 for the 10-item model, and .86 for the 16-item model. In both cases, a lower value suggests a better fit of the model to the data, and would be expected to cross-validate better on a different sample. These values again suggest that the model based on the 10-item Revised Short Expagg provides a better fit to the data than the 16-item version.

The correlations between the 5-item and 8-item scales were $r = .95$ ($p <.001$) for the instrumental scales, and $r = .89$ ($p <.001$) for the expressive scales. These values are comparable to those reported by Muncer and Campbell (2004) of .94 and .92 respectively. Analysis of the three items omitted from each scale provides further

evidence of the superiority of the 10-item scale. The remnants of the 8-item instrumental scale showed a significant positive correlation with the 5-item instrumental scale (r = .65, p <.001) and with the 8-item instrumental scale (r = .85, p <.001). The remnants from the 8-item expressive scale showed a significant positive correlation with the 5-item expressive scale (r = .40, p <.001) and with the 8-item expressive scale (r = .78, p <.001). In both cases the correlations between the remnants and the subscales are lower than those between the five-item and eight-item scales: r = .95, p < .001 for the five- and eight-item instrumental scales, and r = .89, p < .001 for the five- and eight-item expressive scales.

Table 2.2 shows model fit indices and psychometric properties for all Expagg variants obtained from studies discussed here.

Table 2.2: Summary of model fit indices and psychometric properties of Expagg variants

Instrument	Author	Model	GFI (ideally >.90)	CFI (ideally >.90)	RMSEA (ideally <.08)	ECVI (ideally small)	Cronbach's alpha (I scale)	Cronbach's alpha (E scale)
Revised Expagg (Archer & Haigh, 1997)	Forrest et al. (2002)	One factor	.83	Not given	.09	2.31	Not given	Not given
	Forrest et al. (2002)	Two-factor	.71	Not given	.09	8.68	Not given	Not given
16-item Revised Short Expagg (Campbell et al., 1999)	Forrest et al. (2002)	Two-factor	.89	Not given	.08	1.22	Not given	Not given
	Muncer & Campbell (2004)	Two factor	.96	.92	.08	.26	.81	.73
	Driscoll et al. (2005)	Two factor	.90	.82	.08	.86	.83	.70
10-item Revised Short Expagg (Muncer & Campbell, 2004)	Muncer & Campbell (2004)	Two factor	.94	.90	.08	.42	.75	.73
	Driscoll et al. (2005)	Two factor	.97	.93	.06	.20	.78	.63

2.4.1: Evaluation of the 10 item version of Expagg

The findings from this study confirm those of Muncer and Campbell (2004) in demonstrating that a two factor model with only five items on each scale provides a better fit to the data than the 16-item Revised Short Expagg. In this case, CFI, GFI and RMSEA values easily meet the criteria for good fit. The values obtained from this sample all suggest a better fit than the values obtained by Muncer and Campbell from their sample of 379 participants (GFI of .94, CFI of .90 and RMSEA of .08). This is likely to be a consequence of the larger sample size used in the present analysis. The results of this analysis suggest (in line with Muncer & Campbell) that a two factor 10-item version of Expagg is psychometrically sound. Given the high correlations between the 10-item and 16-item versions, both are useful for research purposes although the shorter version obviously offers advantages in terms of speed of administration and scoring.

It should be noted that for both the 10-item and 16-item versions of the Revised Short Expagg, the value of chi-square was significant, suggesting that the proposed model differs significantly from the data. This is consistent with the findings of Muncer and Campbell (2004) and Forrest et al. (2002), and indeed contributed to Forrest et al.'s rejection of the two-factor model based on the 16-item version. However, given the established problems with the chi-square statistic discussed in Section 2.1 and the adequacy of the other goodness-of-fit and comparative indices (particularly for the 10-item version) it seems reasonable to assume that the significant chi-square statistic represents a Type 1 error.

The instrumental and expressive scales of both versions can be used independently in situations where only expressive or instrumental scores are of interest, or where the contribution of instrumentality and expressivity are of interest independently. For example, perpetration of partner violence appears to be associated with instrumentality, which is also associated with a range of controlling behaviours such as economic and emotional coercion (Archer & Graham-Kevan, 2003). A measure of relative preference, similar to that obtained from the original Expagg, can also be computed by subtracting the instrumental score from the expressive score. This measure may be especially useful for some research purposes. For example, Archer and Haigh (1997) reported that violent offenders scored lower than non-violent offenders on the expressive scale while Smith and Waterman (2004) found significantly higher scores on the instrumental scale among violent compared to non-violent offenders. Using the combined relative measure may help to clarify and simplify patterns of findings. Additionally, the measure of relative preference is useful when a single outcome variable representing social representations is required for regression analysis. This relative score allows for the possibility that aggression may have experiential elements of both loss of self-control and assertion of other-control; respondents are able to indicate the extent of both instrumentality and expressivity on the separate scales, but the researcher is able to determine relative preference for expressivity.

In the present study, significant sex differences were found on the instrumental but not the expressive scale. The failure of the expressive subscale to yield a significant sex difference may be due to the lower internal consistency of the expressive relative to the instrumental scale. Items assessing loss of control appear to be less cohesive and unitary than those which assess the use of aggression to

control others. While greater scale reliability reduces random error and so increases the power to detect relationships with other variables, sex differences have been found even where the reliability values for expressivity have been less than .75 (e.g. Archer & Latham, 2004; Muncer & Campbell, 2004).

Nevertheless, it is not unusual for sex differences to be weaker on the expressive subscale. This indicates that it may be assessing a more general experience of 'upset' feelings that are associated with the high arousal and negativity of interpersonal conflict, and this may be characteristic of the experience of both sexes. Scores for both sexes in this study, as in others, are higher for the expressive than for the instrumental scale. The sex difference for expressivity is less variable across type of aggression and opponent than the sex difference in instrumentality (Archer & Haigh, 1999). This suggests that expressivity may generally characterise interpersonal conflict, whilst instrumentality may be an interpretation that is superimposed on this aversive arousal by those who use aggression more frequently, and as a means to control others. This reasoning is consistent with the finding that the instrumental scale is more predictive than the expressive scale of physical and verbal aggression (Archer, 2004; Archer & Graham-Kevan, 2003; Archer & Haigh, 1997).

Muncer and Campbell (2004) particularly hoped to improve the expressive subscale since it has always been less reliable than the instrumental subscale. The evidence is equivocal in terms of internal consistency of the 10 item version, but it is at least approaching an acceptable level; Muncer and Campbell reported a Cronbach's alpha of .73, but in this study, alpha was only .63. Additionally, the removal of three items with poor discriminative ability undoubtedly enhances the

psychometric properties of the expressive subscale. Although it may not be ideal, the 10-item version performs better than many widely used psychometric instruments, and based on evidence to date, appears to be psychometrically superior to the 16-item Revised Short Expagg.

One important limitation should be noted. Expagg requires participants to report on their experience of their own aggressive behaviour. However, participants were not instructed to report on their experience of aggression towards a particular target; i.e. there was no control for target sex or relationship to target. Consequently, it is not known which targets participants had in mind when completing Expagg, and it cannot be assumed that participants were reporting only on their experience of aggression towards intrasexual targets. This has implications because there may be sex differences in the likelihood of recalling aggression towards particular targets. Research reviewed subsequently (Chapter 4) indicates that women are more likely to engage in direct aggression towards intimate partners than towards other targets, whereas the targets of men's aggression are more often other men. Women, therefore, may be more likely to base their Expagg responses on their experience of aggression towards intimate partners, rather than intrasexual targets. Some reassurance that this may not be the case is provided by results reported in Chapter 6; when men and women were asked to report on their experience of aggression specifically towards intimate partners, there was no sex difference on either Expagg subscale. This contrasts with the findings of the present study, where men scored significantly higher on the instrumental subscale. Nevertheless, the magnitude of the effect may be affected by even a small number of participants reporting on an opposite-sex target. Ideally therefore, studies using Expagg should specify the sex and relationship of the target of aggression.

2.4.2: Conceptual issues

It is worth considering some conceptual issues regarding the Expagg scale. Archer and Haigh (1997, p.84) used the term 'belief' rather than 'representation' to describe the construct underlying the Expagg scale on the grounds that the term 'representation' implied an interpretation shared by individuals, but the questionnaire responses are obtained from individual respondents. Although Moscovici emphasised the social nature of representations (in that they are developed and transmitted through social interaction, broadly defined), he also drew attention to their impact on individual psychology; *"...social representations become capable of influencing the behaviour of the individual participant in a collectivity. This is how they are created inwardly, for it is in this form that the collective process itself penetrates, as the determining factor, into individual thought"* (Moscovici, 1984, p. 12). Much research from this tradition continues to collect data from individuals representing different social groups. There is no contradiction between data collection from individuals and the concept of a shared social representation.

The development of Expagg has been influenced by Moscovici's definition of representations as *"cognitive matrices co-ordinating ideas, words, images and perceptions that are all interlinked. They are common-sense "theories" about key aspects of society"* (Moscovici & Hewstone, 1983). Campbell and Muncer's (1987) initial qualitative study suggested that the discourse of men and women corresponded to what academics would refer to as instrumental and expressive theories of aggression respectively. In developing the initial 20-item Expagg, their aim was to systematically capture differences between these two theoretical schools with respect to eight domains of aggression (Campbell, Muncer & Coyle, 1992). This

ten-item version of the questionnaire continues to fulfil this aim, despite incorporating only five items per representation. The 10-item version draws on seven of the eight original domains (refer back to Section 2.2.2 for details of items drawn from each domain). The only domain which remains untapped is situational factors (the likelihood of aggression occurring in private versus public) which does not reliably differentiate the two representations. It is noteworthy that the instrumental and expressive scales are distinctive in the differing domains on which they draw. The one domain which they both incorporate is emotion. In general, expressive items indicate differences in intra-individual experiences of aggression (specifically feelings of inability to control one's own behaviour and associated guilt) while instrumental items are more clearly oriented to interpersonal functions (specifically impression management and perception of unjustified provocation). A similar distinction has been noted by Archer and Haigh (1997). Expagg assesses more than a belief; it captures personal experience in terms of attributions of aim, value, cause, emotion and personal and interpersonal effects. It addresses alternative models of aggression that reflect the formal theories developed by psychologists.

To provide further evidence that the expressive and instrumental subscales measure loss of control and control over others respectively, it would have been worthwhile including measures of variables which could be used to support the validity of this distinction. Since the Expagg data analysed here was derived from a prior study, there was no opportunity to include measures for the purpose of validity testing. However, this would be a useful avenue for future investigations of the 10 item Revised Short Expagg. For example, a measure of the extent to which participants report feeling justified versus guilty in their use of aggression would be expected to differentiate the two subscales; guilt should be positively associated with

expressivity, whereas justification should be positively associated with instrumentality. Likewise, measuring the extent to which participants perceive their aggression as controlling should differentiate the two subscales; controlling behaviour would be expected to be positively associated with instrumentality, but not expressivity.

Recent work has challenged the proposition that sex differences in social representations are, as proposed by Moscovici (1981) socially transmitted. Instead, sex differences might arise as a consequence of genuine differences in the phenomenological experience of aggression. As discussed in Section 1.8, two studies (Alexander, Allen, Brooks, Cole & Campbell, 2004; Driscoll, Zinkivskay, Evans & Campbell, 2006) have suggested that greater inhibitory control by women may cause them to express overt behavioural aggression at higher levels of provocation and anger than do men, resulting in a more expressive experience. This is addressed in the subsequent chapter.

2.4.3: Summary

The 10-item Revised Short Expagg appears to be psychometrically superior to previous versions and was therefore most suitable for use in the study reported in the subsequent chapter. The items retained in the 10-item version relate especially to issues of control and morality (Muncer & Campbell, 2004). The instrumental items assess aggression as a means of control and justify moral concerns, whereas the expressive items assess aggression as a loss of control, associated with guilt. Failure of inhibitory control (associated with an expressive representation) has been implicated in theories of female aggression, whereas the benefits of aggression (associated with an instrumental representation) have been discussed in theories of

male aggression (discussed in Chapter 1). The 10-item Revised Short Expagg was incorporated into the subsequent study, which examines sex differences on measures of aggression, social representations of aggression, inhibition and anger control, and the relationships between these variables.

Chapter 3: The role of inhibition, harm avoidance, anger-control and social representations in explaining sex differences in aggression[2]

3.1 Introduction

3.1.1: Study overview

Campbell (1999) proposed that the primary importance of maternal survival for offspring in the ancestral environment resulted in a selection pressure on women to avoid injury. The proposed mechanism by which the greater costs of female aggression reduce involvement in risky behaviour (including direct aggression) is a lower threshold for fear of physical harm. Evidence reviewed in Section 1.7.3 suggests that girls experience greater fear from an early age, and sex differences are especially pronounced when there is risk of injury. Whilst fear can directly inhibit involvement in aggression (and other activities associated with risk of physical harm), it is clear that inhibition of aggression can occur when there is no immediate danger (Campbell, 2006). Campbell (2006) proposed that women's lesser involvement in direct aggression is mediated by better inhibitory control. The development of effortful control is based on an infrastructure of fear (Section 1.7.4); therefore, whilst women's greater fear may directly inhibit aggression where physical danger is apparent, it is proposed to act indirectly to guide the development of better inhibitory control, one consequence of which is reduced involvement in direct aggression. Consistent with Campbell's argument, evidence reviewed in Section 1.7.4 suggests that poor inhibitory control plays a central role in the etiology of aggression and violence, and criminologists have identified low self-control as the

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[2] An analysis of the data reported in this chapter has been published in: Driscoll, H., Zinkivskay, A., Evans, K., & Campbell, A. (2006). Gender differences in social representations of aggression: The phenomenological experience of differences in inhibitory control? *British Journal of Psychology, 97,* 139-153.

key explanatory variable in theories of crime. Additionally, evidence of sex differences in disinhibitory pathologies and in developmental aspects of inhibitory control suggests that inhibition is potentially a key mediator of the relationship between sex and aggression.

The primary aim of this questionnaire-based study was to examine the extent to which the psychological mediators proposed by Campbell (2006) (women's great fear of harm and general inhibitory control) mediate sex differences in aggression. Two further potential mediating variables are considered in this study: negative affect and anger-specific control. Criminological researchers have identified a prominent role for negative affect in theories of antisocial behaviour, although this may result from 'tautological' research where there is overlap between predictor and criterion (see Section 3.1.4, below). Anger control is also considered as a potential mediator; sexual selection could have favoured superior ability to control anger to inhibit women's involvement in risky direct aggression (this is discussed in Section 3.1.5, below). Additionally, Campbell's model has been extended to explaining sex differences in the experience ('social representations') of aggression (Alexander, Allen, Brooks, Cole & Campbell, 2004). A further aim of this study was to investigate the relationship of fear of harm and inhibition to social representations, and to examine the extent to which sex differences in the experience of aggression are associated with sex differences in aggression.

The target sample for this study was adolescents and young adults within the 13 to 24 year age range. Evidence suggests that a significant increase in aggressive behaviours occurs around the onset of puberty. For example, Bjorkqvist, Lagerspetz and Kaukianen (1992) reported a significant increase in use of indirect aggression in girls around the age of 11. For both sexes, aggression and crime peak in the mid to

late teenage years (Hirschi & Gottfredson, 1983; Campbell, 1994). This corresponds to the life history period when competition for males is most salient. This argument is supported by a slightly earlier peak in aggression and crime for girls than boys, consistent with their earlier onset of puberty (Campbell, 1994).

The patterns of aggression discussed in Section 1.3 (which this thesis seeks to explain) are typically found in adolescents and young adults. Aggression appears to be primarily intrasexual, providing a means of inflicting harm on same sex rivals, and thereby providing a fitness benefit to the perpetrator. Female assaults are mainly directed towards other women (Campbell, Muncer & Bibel, 1998; Ness, 2004), and female aggression is characterised by disputes regarding sexual reputation (Campbell, 1986; Ness, 2004) (see Section 1.3), indicating its importance in mate competition. Likewise, male assaults within the 15 to 25 year age range are primarily directed at same sex rivals, involve victims and perpetrators who friends or acquaintances, and are associated with disputes about status (Daly & Wilson, 1988).

Likewise, the sex differences in aggression discussed in Section 1.3 are evident in adolescents and young adults in school and college samples. Using self and peer reports in a sample of 15 year old school children, Bjorkqvist, Lagerspetz and Kaukianen (1992) found clear sex differences, with boys perpetrating significantly more physical aggression, but girls reporting more indirect aggression. Gladue (1991) examined sex differences in direct (physical and verbal) aggression in a slightly older undergraduate sample (mean age = 20.5) and reported significantly higher levels of male aggression on the Olweus Multifaceted Aggression Inventory.

Given that aggression is most salient (and, from a sexual selection perspective, most important) in adolescence and young adulthood, an age range of

13-24 was deemed appropriate for the study. Thirteen was considered an appropriate lower limit; whilst girls show an increase in use of aggression as early as age 11, onset of puberty in boys (and associated increase in aggression) occurs slightly later. Additionally, it was not clear that all of the measures used in the study would be suitable for participants under 13 years of age (see Section 3.2.2). Twenty four was deemed appropriate as an upper limit, since research suggests that aggression declines from the mid-20s (Daly & Wilson, 1988; Wilson & Daly, 1985). Participants were recruited from schools and colleges of further education since this provided a means of accessing participants in the relevant age range. It was felt that recruitment from both schools and colleges would provide a larger and more representative sample. Whilst there may be some differences in sample characteristics they would not constitute confounding variables since hypotheses did not concern differences between samples, but differences between sexes. The subsections below discuss conceptualisation and measurement of the potential mediators considered in this study.

3.1.2: Inhibition

There is considerable conceptual complexity evident in the literature on inhibitory control. Confusion surrounding the construct may have hindered efforts to develop coherent theoretical models of the relationship between inhibitory control and aggression. Terms such as inhibitory control, self-control and impulsivity are often used interchangeably, perhaps reflecting an assumption that inhibition and low impulsivity are equivalent. However, a low score on a measure of impulsivity may be more indicative of an absence of impelling forces than the presence of inhibitory control. This distinction is important since theories of aggression and crime differ in their motivational underpinning (Cross, Copping & Campbell, 2011); some

emphasise the impelling motivations associated with these behaviours (i.e. strong approach motivation, or reward hypersensitivity) and others emphasise weak avoidance motivation (or punishment hyposensitivity). The distinction between approach and avoidance motivation is likewise evident in theories of sex differences in aggression. In arguing that the primary selection pressure driving sex differences in aggression is the high cost of physical injury for women, the mediators specified in Campbell's theory (fear, and fear-based inhibitory control) emphasise women's avoidance motivation, or punishment sensitivity. In contrast, Wilson and Daly (1985) are concerned with the benefits of aggression for male fitness; hence their proposed mediator ('taste for risk') emphasises the impelling attractions of aggression, and men's greater approach motivation. In testing Campbell's theory therefore, this study required specialised, discriminating and reliable measures of inhibitory control, rather than impulsivity.

This study considers inhibition as an enduring personality trait, rather than a cognitive or behavioural ability. Executive function (or cognitive inhibitory ability) was discussed in Section 1.7.4. Whilst executive function tasks are related to delinquency and criminality (Morgan & Lillenfeld, 2000), this relationship becomes weak or non-existent when IQ is controlled (Seguin, Nagin, Assaad & Tremblay, 2004). Furthermore, research has not typically revealed consistent sex differences, perhaps due to the high correlation between IQ and executive function. MacDonald (2008) made a clear distinction between 'cool' (executive function) and 'hot' ('socioaffective') forms of effortful control, providing evidence of their localisation to different brain regions. Bjorklund and Kipp (1996) argue that cognitive inhibitory abilities are unlikely to have been subject to sexual selection since they do not relate differentially to the reproductive strategies of the sexes. Because sex differences in inhibitory

control are proposed to result from differential selection pressures on men and women over long periods of evolutionary time, they are likely to be manifest as sex differences in stable, enduring personality traits, shaping the behaviour of men and women in sex-typed ways. Thus, women in general are likely to be characterised by greater behavioural restraint and greater planning than men. Evidence reviewed in Section 1.7.4 does indicate a female advantage in developmental aspects of effortful control, which itself is negatively related to aggression (Kochanska & Knaack, 2003). Effortful control involves explicit processing and has two key components: the inhibition of a prepotent response (and replacement with a sub-dominant response) and consideration of longer time frames (Kockanska & Knaack, 2003). A number of 'trait' measures are available. However, many of these measures are oriented towards impulsivity rather than inhibitory control (for example, Whiteside and Lynam's (2001) UPPS scale, and the Barratt impulsiveness scale).

A longitudinal study in New Zealand ('The Dunedin study': Moffitt, Caspi, Rutter & Silva, 2001) utilised a personality inventory that includes a factor which is oriented towards inhibitory control, rather than impulsivity. The Multidimensional Personality Questionnaire (MPQ: Tellegen, 1982) includes the superfactor Constraint, which measures generalised behavioural restraint. Constraint is comprised of three subscales: the Control (versus Impulsivity) subscale measures the tendency to be cautious, careful, reflective and planful. Harm Avoidance measures the tendency to prefer uncomfortable or tedious (but safe) activities rather than activities associated with danger. Finally, the Traditionalism subscale measures endorsement of traditional attitudes and values, and the desire for predictability. In their adolescent sample, Moffitt et al. (2001) found that low levels of Constraint were highly correlated with antisocial behaviour in both sexes. Constraint also showed a

clear sex difference in favour of girls (d = -0.59) and was a powerful mediator of sex differences in antisocial behaviour.

Conceptually, the Constraint factor of the MPQ appeared to provide an appropriate measure of trait inhibition (its psychometric properties are discussed in Section 3.2.2). However, whilst Moffitt et al. (2001) reported sex differences on the individual subscales comprising Constraint, they did not consider their individual contribution to explaining antisocial behaviour. The Control subscale appears closely allied to the conceptualisation of effortful control given above, more so than the remaining subscales (Harm Avoidance and Traditionalism). As discussed in Section 3.1.3, below, the Harm Avoidance subscale conveniently provided a suitable measure of fear of harm (and therefore measures the other potential mediator proposed by Campbell, 2006).

3.1.3: Harm avoidance

Campbell (2006) considers a potential mediating role for both general inhibitory control and fear of harm. It was anticipated that both variables might mediate sex differences in aggression, though inhibitory control was expected to be the stronger predictor, since inhibition of aggression occurs even when there is no direct threat of harm (Campbell, 2006). As noted above, the Constraint factor of the MPQ contains a subscale which measures Harm Avoidance. Harm avoidance may be considered as reversed sensation- or risk-seeking (Cross, Copping & Campbell, 2011). However, the distinction between measurement of inhibitory and impelling forces is also relevant here; a measure was needed which specifically assayed the tendency to avoid physical harm, rather than an appetite for risk. The MPQ Harm Avoidance scale provides such a measure. It is oriented towards avoidance of harm

rather than risk-seeking, and the majority of items offer respondents a non-appetitive choice between two alternative activities, one which poses a threat of physical harm, and one which is painful or tedious, but safe (for example, walking around all day on a blistered foot versus a camping trip in an area where there are rattlesnakes). Although Moffitt et al. did not consider the individual contribution of the Harm Avoidance subscale to explaining antisocial behaviour, this subscale yielded the largest sex difference in their study (d = -0.72), roughly twice the size of the effect size for the sex difference on Control (d = -0.34). Whilst the sex differences on both of these subscales suggests that they measure sex discriminating aspects of personality traits related to aggressive behaviour, they may be more usefully considered separately.

3.1.4: Negative affect

Constraint was not the only personality dimension considered by Moffitt et al. (2001). They also identified a key role for another MPQ personality dimension: Negative Emotionality. Negative Emotionality represents a reduced ability to cope with the experience of negative emotions such as anger, anxiety and stress. It comprises three subscales: Alienation (the tendency to feel mistreated, persecuted and threatened), Stress Reaction (the tendency to nervousness, worry and sensitivity), and Aggression (the tendency to be violent, vengeful and vindictive). Moffitt et al. found that higher levels of Negative Emotionality are highly correlated with antisocial behaviour in both sexes, but boys scored significantly higher than girls (d = 0.28). The relationship between the personality profile identified by Moffitt et al. (low Constraint and high Negative Emotionality) and antisocial behaviour and crime (measured both via self-report and official statistics) has been replicated across age, sex and culture (Caspi et al., 1994; Elkins, Iacono, Doyle & McGue, 1997). Sex

differences on these factors explained 96 per cent of the variance in antisocial behaviour, and 78 per cent of the variance in conduct disorder. The same personality profile (low restraint and high negative affect) therefore appears to underlie antisocial behaviour in both sexes, but is more commonly found in boys.

Although negative affect has not been considered as a mediator of sex differences in aggression in psychological research, Moffitt et al.'s (2001) findings warrant further consideration. The authors suggest that individuals with very high levels of Negative Emotionality have a lower threshold for negative affect and may process information in a biased way, perhaps more readily perceiving challenge, and therefore showing increased propensity for antisocial behaviour. Indeed, one of the subscales comprising Negative Emotionality (Alienation) measures feelings of suspicion, persecution and threat. However, there are two reasons to suspect that the role of Negative Emotionality is less important than that of Constraint. Firstly, the magnitude of the sex difference on Constraint was more than double that on Negative Emotionality. Secondly, Negative Emotionality includes a subscale which measures trait aggression, and the effect size in favour of men was much greater for Aggression (d = 0.87) than for Alienation (d = 0.32) or Stress Reaction, which showed a moderate effect size favouring girls (d = -0.41). Negative Emotionality may show a strong relationship with antisocial behaviour since it essentially measures what it predicts. It is proposed that the role of negative affect in explaining antisocial behaviour has been overstated. A secondary aim of this study therefore, was to evaluate the contribution of negative affect to explaining sex differences in aggression. It was anticipated that its explanatory power would be eliminated if the Aggression subscale were excluded (i.e. it was anticipated that neither of the remaining subscales would predict aggression, nor mediate the sex difference).

3.1.5: *Anger-specific control*

There is no sex difference in anger (Archer & Mehdikhani, 2003); therefore, anger is not a potential mediator of sex differences in aggression. However, anger has an important role in Campbell's model; whilst fear serves to inhibit behaviour and promote withdrawal, anger is an impelling force (Campbell, 2006). Whilst Campbell (2006) proposes that more general behavioural restraint is the key mediator of the relationship between sex and aggression, there remains a possibility that the more specific control or inhibition of anger may be important; sexual selection may have favoured inhibitory processes specific to the control of anger to reduce female involvement in direct aggression. Additionally, Alexander, Allen, Brooks, Cole and Campbell (2004) suggested that an expressive representation of aggression (which is characteristic of women and, it is proposed, a consequence of better inhibitory control, and hence lower frequency of aggression) may be related to high levels of anger-control; in their study, the impulsivity and risk-seeking subscales of LaGrange and Silverman's (1999) low self-control scale did not predict expressivity, but temper did. Respondents with a more expressive experience of aggression therefore had chronically high levels of hostility, perhaps indicative of high anger control.

Therefore, a measure of the ability to control or inhibit the expression of anger was needed. The State-Trait Anger Expression Inventory-2 (STAXI-2: Spielberger, 1999) provides three subscales which assess the control of anger, and the extent to which anger is experienced but not expressed. Further details regarding the psychometric properties of this measure are provided in Section 3.2.2.

3.1.6: *Social representations*

Campbell's model has been extended to explaining sex differences in the experience of aggression (as instrumental or expressive) in terms of sex differences in fear-based inhibitory control. The phenomenological experience of aggression (as a loss of self-control, or as a means of control over others) may represent an accurate "read-out" of the individual's internal state (Alexander et al., 2004; Driscoll, Zinkivskay, Evans & Campbell, 2006). Because individuals with poorer inhibitory control express their anger behaviourally at a lower level of arousal (since they inhibit it less effectively) they are more able to control their behaviour, and therefore the experience is more instrumental (aggression is experienced as a means of control over others). In contrast, individuals with better inhibitory control express their anger behaviourally less frequently, but at a higher level of arousal (since they inhibit it more effectively). The experience is therefore expressive; aggression is experienced as an expressive outburst, and a loss of control. When angry, women often cry, scream or throw things, which suggests that anger discharge, rather than tactical domination of another person, is the aim. The proposed model by which sex differences in inhibitory control result in sex differences in the experience of aggression is shown in Fig. 3.1.
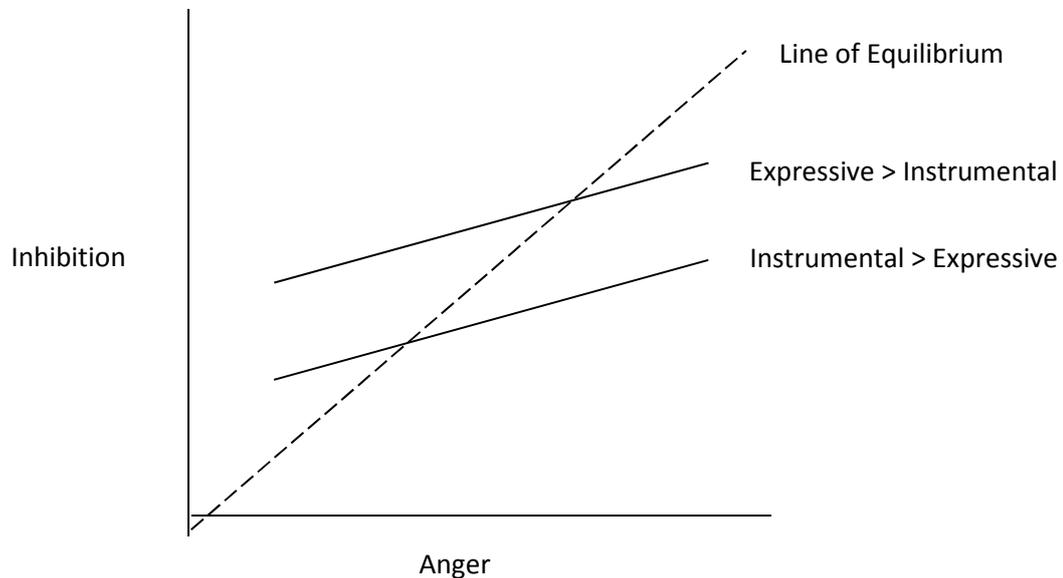
Figure 3.1. Proposed phenomenological representation of aggression as a function of anger inhibition. *Note:* Where inhibition rises at the same rate as anger, no aggression is overtly expressed (line of equilibrium). Where anger overtakes inhibition, aggression is expressed behaviourally. Where inhibition is weaker, anger reaches a behavioural threshold; that is overtakes inhibition, at lower values, which results in a relatively more instrumental experience ('taking control of the situation'). Where behavioural inhibition is higher, anger reaches a behavioural threshold at higher values, which results in a relatively more expressive experience ('losing control of myself'). (From Driscoll et al., 2006, modified from Alexander et al, 2004).

A previous study (Alexander et al., 2004) found preliminary evidence for the proposal that sex differences in social representations can be explained by differences in impulsivity and the ability to control anger. Alexander et al. found sex differences on the impulsivity and risk-seeking subscales of the low self-control scale LaGrange & Silverman, 1999). They combined these two variables (which were highly colinear; $r = .70$) into an 'impulsive risk' variable, and this was predictive of greater instrumentality. The subsequent contribution of sex to explaining instrumentality remained significant, but was reduced. This suggests that lower

levels of inhibition (indexed in their study by high levels of impulsive risk) are associated with men's more instrumental experience of aggression.

Issues with the 'impulsive risk' measure, however, limit the conclusions that can be drawn from this study; exactly what is measured by the combined impulsivity and risk-seeking measure was unclear and the authors discuss overlap and ambiguity between the subscales. Additionally, their measure was appetitive; the low self-control scale measures variables (impulsivity and risk-seeking) that serve as *impelling* forces to aggression and have featured in appetitive theories of crime (the low self-control scale forms the basis of Gottredson and Hirschi's (1990) general theory of crime). Hence, their findings indicate that greater impulsivity in men is predictive of their greater instrumentality. However, as noted above, Campbell's (2006) theory specifies women's greater *inhibitory* control. Alexander et al. (2004) did not find the proposed relationship between lower levels of impulsivity and expressivity, and this may be because low impulsivity is not the same as inhibitory control. This study addresses the relationship between social representations and inhibitory control, rather than impulsivity

As well as addressing the relationship between inhibition and social representations, another key issue is the relationship between social representations and sex differences in aggression. If the sex difference in social representations is a consequence of sex differences in the effectiveness of inhibitory control of aggression, then social representations should mediate the relationship between sex and aggression. Previous research suggests that instrumentality is related to physical aggression in a prison sample (Archer & Haigh, 1997). This study directly addresses the relationship between sex differences in aggression and social representations in an adolescent sample.

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The original Expagg scale and subsequent revisions have been used extensively to measure sex differences in social representations of aggression. The study reported in Chapter 2 confirmed the superior factor structure of the ten-item Expagg scale. Based on these findings, the ten-item Expagg was used to measure instrumental and expressive representations in this study. This study returns to the original formulation of Campbell, Muncer and Coyle (1992) in arguing that it is the relative strength of the two representations that is critical in determining relationships with inhibition, aggression and sex. Although sex differences are reported separately for the two subscales, it is the composite Expagg measure (Expressive score minus Instrumental score) which is analysed as a predictor variable in regression analyses. Whilst sex differences are commonly reported (favouring men) for instrumentality, sex differences on expressivity are less consistent, and both sexes tend to report a more expressive than instrumental experience. Therefore, what most distinguishes the sexes is the extent to which expressivity is greater than instrumentality, and this is reflected in the composite score.

3.1.7: Aggression

A simple, self-developed frequency measure of aggressive behaviour was devised, which asked respondents to indicate the number of times (in the past year) they had engaged in physical, verbal and indirect aggression. Whilst the primary focus of this study was to explain sex differences in direct aggression, indirect aggression was measured to examine the extent to which it might also be explained by sex differences in harm avoidance, inhibitory control, and social representations. Sex differences on indirect aggression appear to favour women (Section 1.3.3), and Campbell (1999) argued that indirect aggression may provide a lower risk means of engaging in intrasexual competition for women. Women's use of indirect aggression

therefore, as well as their desistance from direct aggression, may result from fear of harm and better inhibitory control; when inhibition of direct aggression occurs, women may resort to indirect aggression.

3.1.8: Hypotheses

The following hypotheses were tested in this study: (1) Men will score higher on frequency of direct (physical and verbal) aggression, and will report a relatively less expressive experience of aggression than women. (2) Women will score higher than men on the measure of indirect aggression, inhibitory control, anger-specific control and harm avoidance, and will report a relatively more expressive experience of aggression than men. (3) Lower levels of direct aggression will be associated with greater inhibitory control, anger-specific control, harm avoidance, and a relatively more expressive experience of aggression. It was expected that greater inhibitory control would be more strongly associated with lower aggression than harm avoidance, since aggression is inhibited even in situations where there is no risk of harm. (4) Inhibitory control, harm avoidance and social representations will mediate the sex difference in direct aggression (such that the subsequent contribution of sex to a multiple regression model predicting aggression would be eliminated or markedly reduced). (5) Directional hypotheses regarding the relationships between inhibitory variables, social representations and indirect aggression were not formulated since theoretical approaches have largely focussed on relationships with direct aggression and crime, although it was tentatively suggested that higher levels of all inhibitory variables might be associated with greater indirect aggression, since inhibition of direct aggression may increase women's reliance on less risky (indirect) forms of aggression. (6) it was expected that the removal of the Aggression subscale (on which men were expected to score higher) from the Negative Emotionality factor

of the MPQ would eliminate sex differences on the higher order factor, and render the remaining subscales redundant in predicting aggression and mediating sex differences in aggression (though sex differences were anticipated on these subscales in line with those reported by Moffitt et al.; men were expected to score higher on Alienation, and women were expected to score higher on Stress Reaction).

3.2. Method

3.2.1. Participants

607 participants were recruited from three secondary schools and four colleges of higher education in the north east of England. The sample overall was comprised of 221 males (36 per cent) and 386 females (64 per cent). Within the school and college samples, the sex distribution was almost exactly the same. The college sample comprised 65 males (36 per cent) and 117 females (64 per cent). The school sample comprised 156 males (37 per cent) and 269 females (63 per cent). The mean age for males was 16.84 (SD = 1.26) and the mean age for females was 16.86 (SD = 1.24). The age range was from 13 to 24 (mean = 16.84, SD = 1.26). However, 568 participants (94 per cent) were in the 16 to 19 age range. The distribution of participants across the age range is shown in Figure 3.2.
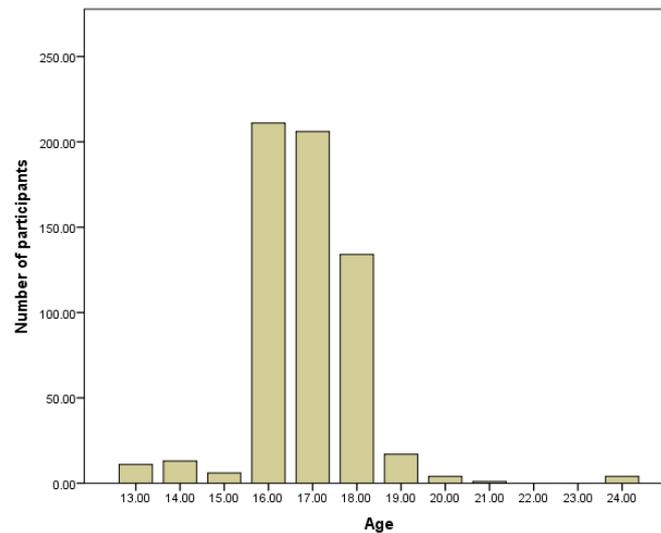
Figure 3.2: Distribution of participants by age

3.2.2. Instruments

Anger control: State-Trait Anger Expression Inventory-2 (STAXI-2: Spielberger, 1999)

The State-Trait Anger Expression Inventory-2 (STAXI-2: Spielberger, 1999) provides a concise measure of the control of anger. Three 8-item scales were used from the STAXI-2. Anger Expression-In (AX-I) measures how often angry feelings are experienced but not expressed. Anger Control-Out (AC-O) measures how often a person controls the outward expression of angry feelings. Anger Control-In (AC-I) measures how often a person attempts to control angry feelings by calming down or cooling off (Spielberger, 1999, p.2). Respondents indicated the extent to which each item described their experience on a scale of 1-4. The STAXI-2 includes a further subscale of Anger Expression-Out (AX-O). However, this was not included since the expression of anger is essentially aggressive behaviour, and would overlap with the criterion variable. The characteristics of high scorers and the items comprising each subscale are given in Table 3.1. Despite rather similar conceptualisations, factor

analysis with oblique rotation indicates that the items form distinct factors corresponding to these scales (Spielberger, 1999). Internal consistencies (male/female) reported by Spielberger (1999) for the scales are as follows: AX-I: .78/.74, AC-O: .8/.85 and AC-I: .93/.91.

Table 3.1: State-Trait Anger Expression Inventory 2 (STAXI-2)

Subscale and characteristics of high scorers (from Spielberger, 1988, pp.16-17)	Items When angry or furious…
Anger Control-Out (AC-O) Tend to expend a great deal of energy in monitoring and preventing the outward experience and expression of anger. Although controlling outward or external manifestations of anger may be desirable, over-control can lead to passivity, depression and withdrawal. People with high AC-O and low AX-O scores may experience these problems due to their chronic anger and lack of an easy way to express it.	I control my temper I am patient with others I control my urge to express my feelings I keep my cool I control my behaviour I can stop myself from losing my temper I try to be tolerant and understanding I control my angry feelings
Anger Control-In (AC-I) Expend a great deal of energy in calming down and reducing their anger as soon as possible. The development of internal controls over the experience and expression of anger is generally seen in a positive light, but it can reduce the person's awareness of the need to respond with assertive behaviour when this might facilitate a constructive solution to a frustrating situation.	I take a deep breath and relax I try to calm myself as soon as possible I try to simmer down I try to soothe my angry feelings I endeavour to become calm again I reduce my anger as soon as possible I do something relaxing to calm down I try to relax
Anger Expression-In (AX-I) Frequently experience intense angry feelings, but they tend to suppress these feelings rather than expressing them either physically or verbally. However, some persons with high AX-I scores may also have high AX-O scores, in which case they may express their anger in some situations and suppress it in others.	I keep things in I pout or sulk I withdraw I boil inside, but I don't show it I tend to harbour grudges that I don't tell anyone about I am secretly quite critical of people I am angrier than I am willing to admit I'm irritated a great deal more than people are aware of

General behavioural restraint and harm avoidance: The Multidimensional
Personality Questionnaire Brief Form (MPQ-BF: Patrick, Curtin & Tellegen, 2002).

The MPQ (Tellegen, 1982) is a well-established structural personality model which has been standardised in non-clinical populations. Behavioural genetic studies suggest that MPQ traits are both heritable (Bouchard, 1994) and stable (Roberts, Caspi & Moffitt, 2001; McGue, Bacon & Lykken, 1993). However, the original MPQ is extremely long. This study used the brief form MPQ (MPQ-BF: Patrick et al., 2002) which correlates at higher than .93 for all scales with the longer original. Internal consistency for all MPQ-BF scales is in excess of .76 and 30-day test-retest reliabilities are in excess of .82. The MPQ-BF measures three higher-order traits from ten subscales: Positive Emotionality (Wellbeing, Social Potency, Social Closeness and Achievement), Negative Emotionality (Stress Reaction, Alienation and Aggression) and Constraint (Control, Harm Avoidance and Traditionalism). Only Constraint and Negative Emotionality are considered in this study since previous research suggests that Positive Emotionality is not relevant to the study of aggression (Moffitt et al., 2001). Although the Control and Harm Avoidance subscales were of most interest, the Traditionalism subscale was retained since Moffitt et al. did report a small effect for sex differences on Traditionalism, but did not assess the individual role of these subscales in explaining aggression. Due to the problems of confounding predictor and outcome variables identified in previous research (see Section 3.1.4), this study investigated the higher order factor of Negative Emotionality both including and excluding the Aggression subscale.

The MPQ subscales are scored by summing an individual's scores on each of the 12 binary items that make up each subscale. The MPQ higher order factor scores are obtained by summing an individual's scores on each of the subscales that

make up the higher order factor. The structure of the two MPQ higher order factors included in this study is shown in Table 3.2 (Constraint factor) and Table 3.3 (Negative Emotionality factor).

Table 3.2: Items comprising MPQ-BF Constraint subscales

Constraint	Items
Control	I am more likely to be fast and careless than to be slow and plodding
	I almost never do anything reckless
	I am a cautious person
	I often prefer to "play things by ear" rather than plan ahead
	I don't like to start a project unless I know exactly how to proceed
	I generally do not like to have detailed plans
	I like to stop and think things over before I do them
	I often act on the spur of the moment
	I am very level-headed and always keep my feet on the ground
	I usually make up my mind through careful reasoning
	When faced with a decision I usually take time to consider and weigh all aspects
	Before I get into a new situation I like to find out what to expect from it
Harm Avoidance	*Of the following two situations I would like least:*
	Having to walk around all day on a blistered foot/Sleeping out on a camping trip in an area where there are rattlesnakes
	Being chosen as the "target" for a knife-throwing act/Being sick to my stomach for 24 hours
	Having a pilot announce that the plane has engine trouble and he may have to make an emergency landing/Working in the fields digging potatoes
	Being at the circus when two lions suddenly get loose in the ring/Bringing my whole family to a circus and then not being able to get in because they sold me tickets for the wrong night
	Being seasick every day for a week while on an ocean voyage/Having to stand on the ledge of the 25th floor of a hotel because there's a fire in my room
	Being out on a sailboat during a great storm at sea/Having to stay home every night for two weeks with a sick relative
	Being in a flood/Carrying a ton of coal from the backyard to the basement
	Riding a long stretch of rapids in a canoe/Waiting for someone who's late
	It might be fun and exciting to experience an earthquake
	I might enjoy riding in an open lift to the top of a tall building under construction
	I would enjoy trying to cross the ocean in a small but seaworthy sailboat
	It might be fun to learn to walk a tightrope
Traditionalism	The best way to achieve a peaceful world is to improve people's morals
	Higher standards of conduct are what this country most needs
	People should abide by moral laws more strictly than they do
	No decent person could ever think of hurting a close friend or relative
	I don't like to see religion overturned by so-called progress and logical reasoning
	I would prefer to see: Stricter observance of Sundays and Holy Days/Greater freedom in regard to divorce
	Strict discipline in the home would prevent much of the crime in our society
	High moral standards are the most important thing that parents can teach their children
	It is a pretty unfeeling person who does not feel love and gratitude toward their parents
	More censorship of books and movies is a violation of free speech and should be abolished
	I am not at all sorry to see many of the traditional values change
	I am disgusted by foul language and swearing

Table 3.3: Items comprising MPQ-BF Negative Emotionality subscales

Negative Emotionality	Items
Stress Reaction	Often I get irritated at little annoyances
	Minor setbacks sometimes irritate me so much
	My mood often goes up and down
	Occasionally I experience strong emotions – anxiety, anger – without knowing what causes them
	I sometimes change from happy to sad, or vice versa, without good reason
	I suffer from nervousness
	I sometimes get myself into a state of tension and turmoil as I think of the day's events
	There are days when I am "on edge" all of the time
	I am often troubled by guilt feelings
	I am too sensitive for my own good
	I often find myself worrying about something
	I often lose sleep over my worries
Alienation	My "friends" have often betrayed me
	I have often been lied to
	People often try to take advantage of me
	People often just use me instead of treating me like a person
	When people are friendly they usually want something from me
	Many people try to push me around
	I would be more successful if people did not make things difficult for me
	I know that certain people would enjoy it if I got hurt
	Some people oppose me for no good reason
	People often say mean things about me
	I know that people have purposely spread false rumours about me
	I have had a lot of bad luck
Aggression	I admit I sometimes take pleasure in hurting someone physically
	I can't help but enjoy it when someone I dislike makes a fool of himself or herself
	Sometimes I seem to enjoy hurting someone by saying something mean
	I enjoy a good brawl
	I like to watch a good, vicious fight
	When I get angry I am often ready to hit someone
	Sometimes I hit people who have done something to deserve it
	Sometimes I just like to hit someone
	When someone hurts me I try to retaliate (get even)
	I would rather turn the other cheek than get even when someone treats me badly
	When people insult me, I try to get even
	I see no objection to stepping on people's toes a little if it is to my advantage

Self-developed aggression frequency measure

Frequency of aggressive behaviour was measured using a simple three-item frequency measure, designed to provide respondents with an easy-to-complete measure of their general tendency to engage in three broad categories of aggressive behaviour. The measure asked respondents to indicate how often they had perpetrated acts of physical, verbal and indirect aggression in the past year. The physical aggression item asked respondents to indicate how often they had hit, slapped, kicked, punched or thrown something at another person in the past 12 months. The verbal aggression item asked respondents to indicate how often they had sworn or shouted at another person in this time, and the indirect aggression item asked respondents to indicate how often they had ignored, spread rumours or talked behind the back of someone they did not like. Response options for all items were 'none', '1-3 times', '4-6 times' and 'more than 6 times'. The response options were intended to allow discrimination between respondents who never engaged in the behaviour, and those who engaged in it rarely, occasionally and frequently.

Social representations of aggression: Ten-item Expagg (Muncer & Campbell, 2004)

Based on the strength of the confirmatory factor analysis documented in Chapter 2, the 10-item Revised Short Expagg (Muncer & Campbell, 2004; Driscoll, Campbell & Muncer, 2005) was used to measure instrumental and expressive social representations of aggression. Respondents were presented with a series of statements with which they indicated their agreement or disagreement on a 5-point scale. Scores on each of the subscales represent the degree of endorsement of expressive or instrumental representations. For the reasons discussed in Section

3.1.6, the composite Expagg measure (Expressive minus Instrumental) was analysed as a predictor in regression analyses.

All measures were considered appropriate for the age range sampled. The items comprising all measures are clear and easy to understand, and do not enquire about attitudes or situations which are likely to be difficult for an adolescent or young adult to make a judgement about. The STAXI has been established as reliable for use in samples aged 13 years and above (Armstead & Clark, 2002). The MPQ has frequently been used in adolescent samples (for example, Elkins, McGue, Malone & Iacono, 2004), and Expagg has also been used in adolescent and school samples (for example, Osuwu-Banahene & Amedahe, 2008).

3.2.3. Procedure

Questionnaires were completed at the participant's school or college. In most cases, the questionnaire was completed under the supervision of a teacher, researcher, or both. In one college, the questionnaires were distributed to students and returned in a sealed envelope after completion in their free time. All participants were informed that their participation was entirely voluntary and that their responses would remain anonymous. Participants indicated their sex and age and were then asked to complete the questionnaires, which were presented in the following order: (1) STAXI-2, (2) MPQ brief form, (3) Expagg, (4) Frequency of aggression measure.

3.3 Results

3.3.1. Psychometric analysis

Cronbach's alphas for the STAXI subscales, each of which had 8 items, were as follows: Anger Expression-In $\alpha = .70$, Anger Control-In $\alpha = .81$; Anger Control-Out

α = .80. For the MPQ-BF subscales, each of which had 12 items, the alphas were as follows: Stress Reaction α = .79, Alienation α = .80, Aggression α = .84, Control α = .76, Harm Avoidance α = .75 and Traditionalism α = .62. The internal consistency of the Expagg Instrumental scale (5 items) was α = .75 and for the Expressive scale (5 items) α = .63.

3.3.2. Sex differences

To test hypotheses regarding sex differences whilst guarding against the risk of Type 1 error, separate MANOVAs were conducted; in each case, sex was entered as the independent groups factor and the subcomponents of each measure (STAXI-2, MPQ higher order factors, MPQ Negative Emotionality, MPQ Constraint, Expagg, and self-reported aggression) were entered as multiple dependent variables in each case. Significant multivariate effects were followed by univariate independent groups ANOVAs to determine significant sex differences on each subscale. Table 3.4 provides *F* and *d* values for sex differences on all variables included in the study. Note that values are reported separately for sex differences on Negative Emotionality both with and without the inclusion of the Aggression subscale, for comparison.

There was no significant multivariate effect of sex on STAXI-2 scores, which measure the specific control of anger, $F(3, 603) = 1.98$, $p = .115$, Pillai's Trace = .01.Therefore, there was no sex difference on the control of anger.

When all subscales of MPQ Negative Emotionality were entered as dependent variables in a MANOVA, there was a significant multivariate effect of sex, $F(2, 604) = 38.16$, $p < .001$, Pillai's Trace = .11. As expected, men scored significantly higher on the Aggression subscale ($d = 0.41$), but (contrary to Moffitt et

al.'s (2001) findings) there was no sex difference on Alienation, and women scored higher on Stress Reaction (d = -0.43). Overall, this resulted in no sex difference on the higher order factor. When the Aggression subscale was excluded from the higher order factor, there was a sex difference on Negative Emotionality in favour of *women* due to their higher scores on Stress Reaction. When all subscales of MPQ Constraint were entered as dependent variables in a MANOVA, there was a significant multivariate effect of sex, $F(3, 603)$ = 34.74, $p<.001$, Pillai's Trace = .15. Consistent with hypothesis 1, women scored markedly higher on Constraint (d = -0.68), a result of their significantly higher scores on all of the component subscales (Harm Avoidance d = -0.77, Control versus Impulsivity d = -0.37, and Traditionalism d = -0.29).

There was a significant multivariate effect of sex on Expagg score, $F(2, 604)$ = 20.47, $p<.001$, Pillai's Trace = .06. Women scored significantly higher on the Expagg Expressive subscale (d = -0.25) and men scored significantly higher than women on the Instrumental subscale (d = 0.45). This resulted in a significant sex difference on Expagg (Expressive minus Instrumental), with women showing a preference for a relatively more expressive representation of aggression (d = -0.52). These findings are consistent with the hypothesised sex differences (hypotheses 1 and 2).

There was a significant multivariate effect of sex on frequency of aggression, $F(3, 603)$ = 6.60, $p<.001$, Pillai's Trace = .08. Consistent with hypothesis 2, women reported greater frequency of acts of indirect aggression than did men (d = -0.27). However, contrary to this hypothesis, neither of the measures of direct aggression showed a sex difference, though the effect for physical aggression was in the male direction (d = 0.15).

Though there was little variability in the ages of participants in the sample, with 94 per cent in the 16-19 age range, to provide reassurance that sex differences were not obscured or magnified by age differences, the above analyses were conducted again, with age entered as a covariate in each case. Partialing out the effects of age made negligible difference to F values, and had no effect on significance.

Table 3.4: Means (and standard deviations), F and d values for male and female participants on all variables.

Variable	Male	Female	F (sex)	D
AX-I	17.95 (4.50)	18.59 (4.10)	3.21	−0.15
AC-O	20.62 (4.77)	20.42 (4.40)	0.27	0.04
AC-I	21.51 (4.81)	21.00 (4.52)	1.72	0.11
Negative Emotionality (all subscales)	16.85 (6.62)	16.65 (7.10)	0.12	0.03
Stress reaction	6.38 (3.20)	7.74 (3.01)	27.45***	−0.43
Alienation	4.62 (3.05)	4.47 (3.28)	0.32	0.05
Aggression	5.85 (3.33)	4.45 (3.36)	24.77***	0.41
Negative Emotionality (no Aggression)	11.00 (5.36)	12.21 (5.49)	6.91**	−0.21
Constraint	18.13 (6.19)	22.36 (6.24)	71.94***	−0.68
Control	6.29 (3.05)	7.42 (3.02)	19.72***	−0.37
Harm avoidance	5.57 (2.97)	7.91 (2.67)	99.82***	−0.77
Traditionalism	6.28 (2.56)	6.99 (2.41)	11.87***	−0.29
Expagg Instrumental	16.34 (4.14)	14.37 (4.43)	29.29***	0.45
Expagg Expressive	16.55 (3.84)	17.43 (3.33)	8.72**	−0.25
Expagg (E-I)	0.21 (5.63)	3.06 (5.18)	40.06***	−0.52
Physical aggression	2.32 (1.19)	2.13 (1.13)	3.63	0.15
Verbal aggression	3.27 (1.07)	3.28 (0.99)	0.04	−0.02
Indirect aggression	2.34 (1.19)	2.66 (1.12)	10.82**	−0.27

Note: *p <.05, **p <.01, ***p <.001.
Negative d values indicate effect sizes in the direction of higher female scores.

3.3.3. Correlational analysis

Before proceeding with multiple regression, the intercorrelation matrix was inspected (Table 3.5). The STAXI-2 subscales showed an unusual pattern of relationships. Anger Control-In and Anger Control-Out were very highly correlated (r = .73), suggesting that a tendency to control the outward expression of anger was very strongly associated with internal attempts to calm angry feelings, although both

of these were distinct from the frequency with which anger is experienced but not expressed (Anger Expression-In). Due to their lack of independence, Anger Control-In and Anger Control-Out were summed to form a new Anger Control subscale (STAXI AC) for which α = .88 (16 items).

The relationships between aggression, inhibitory variables, and social representations were all as predicted (hypothesis 3). Lower levels of direct (physical and verbal) aggression and also trait (MPQ) aggression were associated with higher STAXI Anger Control, MPQ Control, MPQ Harm Avoidance, and a preference for a relatively more expressive experience of aggression. For all of these variables, however, relationships were stronger with MPQ Aggression than with the frequency of aggression measures. As expected, the Traditionalism subscale of the MPQ Constraint factor did not appear to be strongly related to aggression, showing only weak or non-significant relationships with the aggression measures. Indirect aggression showed weak negative associations with STAXI Anger-Control and MPQ Control, but was unrelated to Harm Avoidance. Indirect aggression was positively correlated with the internal experience of anger (Anger Expression-In) All of the frequency of aggression measures were significantly positively correlated with Negative Emotionality (both with and without the inclusion of the Aggression subscale, though the correlations were substantially reduced when the Aggression subscale was removed), as expected (hypothesis 6).

Table 3.5: Intercorrelations of measures of aggression, anger control, MPQ personality measures and social representations.

	AC	AX-I	CON	CONT	HA	TRAD	NEM	NEM2	ALIEN	SR	AGG	E-I	PA	VA
AX-I	.12**													
CON	.23***	.08												
CONT	.27***	.07	.79***											
HA	.09*	.04	.74***	.37***										
TRAD	.14**	.06	.63***	.29***	.18***									
NEM	−.35***	.41***	−.12**	−.14***	−.14***	.05								
NEM2	−.13**	.48***	.09*	.04	.04	.14**	.87***							
ALIEN	−.09*	.35***	−.00	−.04	−.04	.10*	.78***	.87***						
SR	−.14**	.49***	.16***	.11**	.10*	.13**	.73***	.86***	.49***					
AGG	−.50***	.06	−.39***	−.35***	−.35***	−.12**	.63***	.17***	.19***	.11**				
E-I	.32***	.11**	.35***	.28***	.32***	.16***	−.18***	.09*	−.03	.18***	−.51***			
PA	−.29***	−.01	−.23***	−.23***	−.18***	−.06	.36***	.14**	.16***	.08	.51***	-.34***		
VA	−.26***	.01	−.16***	−.19***	−.08*	−.07	.32***	.18***	.14***	.16***	.38***	-.18***	.41***	
IA	−.15***	.16***	−.04	−.10*	.03	.01	.23***	.17***	.08*	.21***	.20***	-.05	.27***	.25***

Note: AC = STAXI Anger Control; AX-I = STAXI Anger Expression-In; CON = MPQ Constraint (higher order factor), CONT = MPQ Control; HA = MPQ Harm Avoidance; TRAD = MPQ Traditionalism; NEM = MPQ Negative Emotionality (higher order factor), NEM2 (higher order factor, excluding Aggression subscale), ALIEN = MPQ Alienation; SR = MPQ Stress Reaction; AGG = MPQ Aggression; E-I = Expagg; PA = Frequency of physical aggression; VA = Frequency of verbal aggression; IA = Frequency of indirect aggression.
Note: *p <.05, **p <.01, ***p <.001.

3.3.4. Regression and mediation analyses

The primary aim of the regression analyses was to identify variables which mediated the relationship between sex and aggression (to test hypothesis 4). To determine this, the intention was to enter potential predictor variables into the first block of a regression analysis, and to enter sex into the second block. If the significant predictors from block one mediated the relationship between sex and aggression, a significant relationship (zero-order correlation) between sex and aggression would be eliminated, or at least attenuated.

Because there were no significant sex differences on the frequency of direct aggression measures (possible reasons for this are discussed in Section 3.4.4), they were not suitable as the criterion variable in the regression analysis: To test a meditational model, the predictor (sex) must be related to the criterion variable (aggression) (MacKinnon, Fairchild & Fritz, 2007). Therefore, to investigate mediators of the relationship between sex and aggression, MPQ Aggression scores were used as the criterion variable because the expected sex difference in favour of men was substantial on this measure. There was, however, a sex difference on the frequency measure of indirect aggression; indirect aggression was therefore investigated in a separate regression analysis.

Assumptions and data screening

For each of the analyses, values of Cook's Distance, leverage and Mahalanobis' Distance were inspected to assess whether any cases had undue influence on the model (a case which exerts excessive influence may substantially affect the coefficients obtained). Based on standard criteria obtained from Field (2009), no cases were deemed to exert excessive influence on either of the

regression models. Inspection of the correlations between predictor variables gave

no cause for concern regarding multicollinearity (none approached .8). The

Tolerance values for the predictor variables in each of the final models did not

approach the cut-off value of .1, and Variable Inflation Factor (VIF) values did not

approach a value which would give cause for concern (around 10). In each case, a

number of eigenvectors were found to underlie the data, further supporting the

absence of multicollinearity. The assumption of independence of errors was

supported in each case (values for the Durbin-Watson statistic were close to the

optimal value of 2). Casewise diagnostics showed that the number of cases outside

of two standard deviations of the predicted value was very low for each model. There

was no evidence of heteroscedascity. The range of values for the two models on key

indices is given in Table 3.6.

Table 3.6: Values of Tolerance, VIF and Durbin-Watson for regression models

Model	Tolerance (range)	VIF (range)	Durbin-Watson	Approx. % of predicted values in excess of 2 SDs of actual value
MPQ Aggression:	.86 to .80	1.16 to 1.26	1.88	3%
Indirect aggression	.90 to .71	1.11 to 1.42	1.74	0%

MPQ Aggression

MPQ aggression was entered as the criterion variable in a hierarchical regression model. The following potential explanatory variables were entered stepwise at Step 1: STAXI Anger Control (summed Anger Control subscales), STAXI Anger Expression-In, MPQ Control, MPQ Harm Avoidance, MPQ Traditionalism, MPQ Alienation, MPQ Stress Reaction, Expagg (E minus I). Sex was entered at Step 2 to evaluate the extent to which the above variables attenuated the zero-order correlation between sex and MPQ Aggression. Stepwise regression was chosen for the variables entered at block 1 since no study has examined the relative importance of the combination of variables included in this study; therefore, it was not possible to make definite a priori predictions regarding relative importance.

At Step 1, lower levels of Anger Control emerged as the strongest predictor of Aggression, followed by lower Expagg score (lower relative preference for an expressive representation), lower levels of Harm Avoidance, and lower levels of Control. Higher levels of internal anger (Anger Expression-In) and Alienation were also significant predictors. This model was significant, $F(6, 600) = 86.14$, $p < .001$, and explained 46 per cent of the variance in Aggression. At Step 2, sex did make a significant contribution to the model, indicating that sex differences on the predictors from Step 1 did not completely account for the relationship between sex and aggression. However, the subsequent contribution of sex was very small, explaining only a further 0.4 per cent of variance. Consistent with hypothesis 4, the zero-order correlation between sex and aggression ($r = -.20$) was reduced to a semi-partial correlation of $sr = -.06$, indicating partial mediation. The semi-partial correlation for sex indicates the degree of association between sex and MPQ Aggression that exists when the influence of the variables entered at Step 1 is removed. Unlike a

partial correlation, the common variance between the other predictors and the

criterion is not removed from the criterion (it is unchanged). Semi-partial correlations

are therefore easier to interpret than partial correlations.

Table 3.7: Summary of hierarchical regression analysis for variables predicting MPQ Aggression score

Variable	B	SE B	B
Step 1			
Anger Control	−0.14	0.01	− .36***
Expagg	−0.20	0.02	− .32***
Harm Avoidance	−0.20	0.04	− .18***
Anger Expression-In	0.10	0.03	.12***
Control	−0.12	0.04	− .11**
Alienation	0.10	0.03	.09**
Step 2			
Sex	−0.48	0.23	− .07*

Note: R^2 = .46 for Step 1, ΔR^2 = .004 for Step 2.
***p <.001, **p <.01, *p <.05.

Mediation analysis was conducted to identify variables which significantly

mediated the relationship between sex and Aggression. Hypothesis 4 predicted that

Control, Harm Avoidance and Expagg would emerge as mediators. The effect of sex

on Aggression may be partially mediated by any of the predictor variables on which a

significant sex difference exists. If partial mediation occurs, then the effect of sex on

Aggression would be significantly reduced when the effect of the mediator is

controlled for. Baron and Kenny (1986) specified four steps necessary for

determining mediation: 1) The independent variable (in this case, sex) must

significantly predict the criterion variable (Aggression) in a simple linear regression

analysis (i.e. there must be a relationship to mediate). 2) The independent variable

must significantly predict the mediator in a simple linear regression analysis; this

analysis yields the coefficient *a* (unstandardised regression coefficient between the

independent variable and the moderator variable) and its standard error, s_a. 3) The

mediator variable must significantly predict the criterion variable in a regression analysis where the independent variable and the mediator variable are both entered as predictors (the mediator and criterion may be related if they are both influenced by the independent variable; therefore, the independent variable must be controlled when determining the effect of the mediator on the criterion). This analysis yields the coefficient b (the unstandardised coefficient of the relationship between the mediator and the criterion when the independent variable is also entered as a predictor) and its standard error, s_b. 4) The effect of the independent variable on the criterion variable must be significantly reduced when the effect of the mediator is controlled. To establish whether this is the case, the Sobel Test (Sobel, 1982) is most commonly used.

The following variables were considered as mediators of Aggression: Expagg, Harm Avoidance and Control. Mediation analysis (as described above) was conducted for each of these potential mediators. Because there were no sex differences on Anger Control, Anger Expression-In and Alienation, they could not mediate the relationship between sex and Aggression, and they were not analysed further. For each potential mediator, the requirements of steps 1-4 (above) were met.

Expagg ($z = -5.75$, $p < .001$) significantly mediated the relationship between sex and Aggression; when the effect of women's greater preference for an expressive representation was controlled, the effect of sex on aggression remained significant, but was significantly reduced. The path diagram is shown in Fig. 3.3.
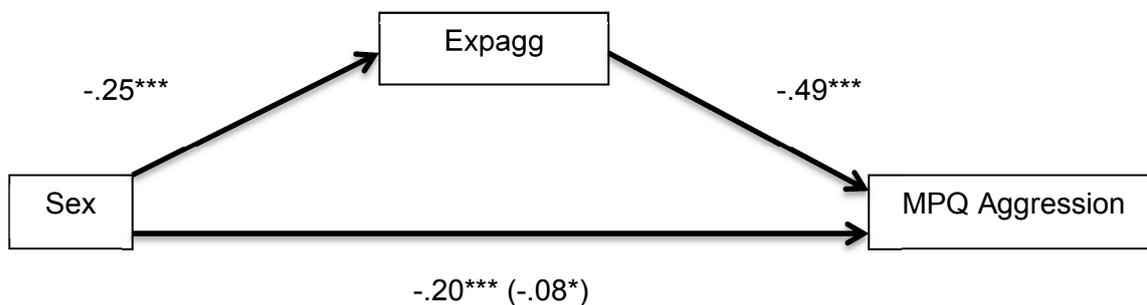
Fig 3.3: Standardised regression coefficients for the relationship between sex and MPQ Aggression as mediated by Expagg (the standardised regression coefficient between sex and MPQ Aggression controlling for Expagg is in parentheses).

Note: ***p <.001, p <.05.

Harm Avoidance (z = -6.11, p <.001) significantly mediated the relationship between sex and Aggression; when the effect of women's greater Harm Avoidance on Aggression was controlled, the effect of sex was no longer significant (although the standardised coefficient between sex and MPQ Aggression was also -.08 when Expagg was controlled, the effect of sex did remain significant in that analysis; the coefficients appear identical when rounded to two decimal places). The path diagram is shown in Fig 3.4. Although all significant predictors combined did not completely mediate the relationship between sex and aggression, the effect of Harm Avoidance alone rendered sex non-significant. The mediating effect of Harm Avoidance may have been suppressed in the regression analysis by the presence of important predictor variables which did not mediate the sex difference, such as Anger Control.
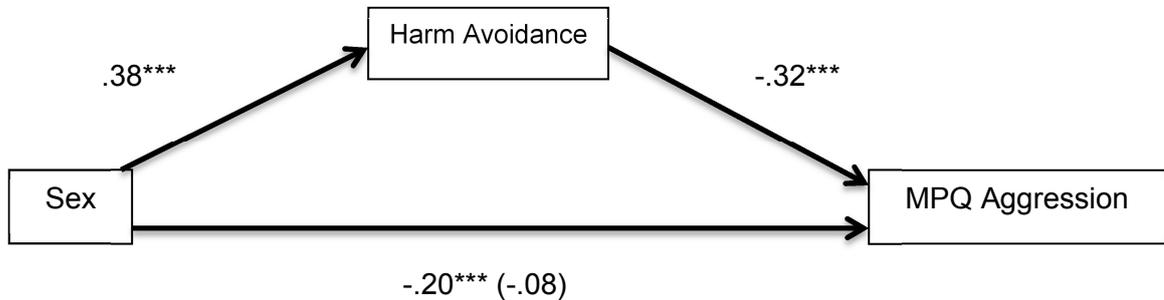
Fig 3.4: Standardised regression coefficients for the relationship between sex and MPQ Aggression as mediated by Harm Avoidance (the standardised regression coefficient between sex and MPQ Aggression controlling for Harm Avoidance is in parentheses).

Note: ***p <.001

Control (z = -3.94, p <.001) also significantly mediated the relationship between sex and Aggression; when the effect of women's greater Control was partialed out, the effect of sex on Aggression continued to be significant, but was significantly reduced. The path diagram is shown in Fig. 3.5.
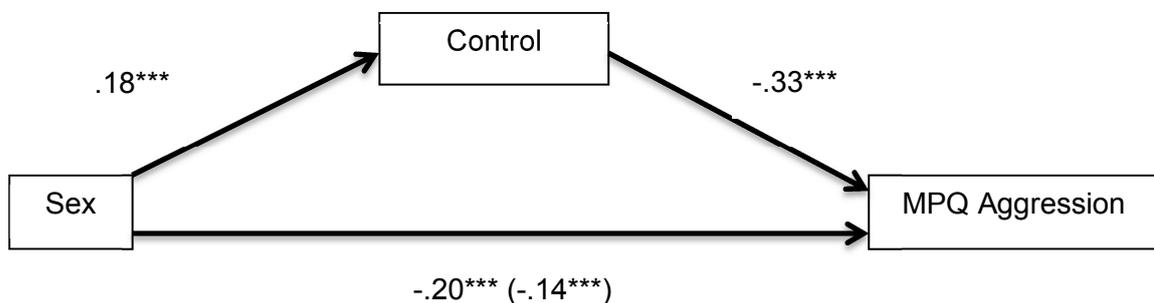
Fig 3.5: Standardised regression coefficients for the relationship between sex and MPQ Aggression as mediated by Control (the standardised regression coefficient between sex and MPQ Aggression controlling for Control is in parentheses).

Note: ***p <.001

Indirect aggression

To investigate predictors of indirect aggression and mediators of its relationship with sex (hypothesis 5), frequency of indirect aggression was entered as the criterion variable in a hierarchical regression model. The model for the initial regression analysis was specified exactly as for MPQ Aggression.

At Step 1, higher levels of MPQ Stress Reaction and STAXI Anger Expression-In, and lower levels of MPQ Control and Anger Control provided the best model for predicting frequency of indirect aggression. This model was significant, $F(4, 602) = 12.40$, $p<.001$, but explained only 8 per cent of the variance in indirect aggression. At Step 2, sex continued to make a significant contribution to the model, indicating that sex differences on the predictor variables entered at Step 1 did not completely account for the relationship between sex and indirect aggression. Indeed, the zero-order correlation between sex and indirect aggression ($r = .13$) was only reduced to a semi-partial correlation of $sr = .12$. This small reduction in the relationship between sex and indirect aggression suggests that sex differences on the predictor variables played little role in mediating the sex difference. The regression coefficients are shown in Table 3.8.

Table 3.8: Summary of hierarchical regression analysis for variables predicting frequency of indirect aggression.

Variable	*B*	*SE B*	B
Step 1			
Stress Reaction	0.05	0.02	.15**
Control	−0.04	0.02	−.12**
Anger Control	−0.02	0.01	−.11**
Anger Expression-In	0.03	0.01	.11*
Step 2			
Sex	0.27	0.10	.11**

Note: R^2 = .08 for Step 1, Δ R^2 = .01 for Step 2 (p = .005)
***p <.001, **p <.01, *p <.05.

The significant predictors which showed a sex difference (Stress Reaction and Control) were investigated as potential mediators. Although the reduction in the zero-order correlation between sex and indirect aggression was reduced only marginally, it was still necessary to investigate potential mediators; the small reduction in the zero-order correlation could result from some predictors increasing the effect of sex on indirect aggression, whilst others reduced it. Mediation analysis (as described above) was conducted on Stress Reaction and Control. In both cases, the requirements of steps 1-4 for mediation analysis (described above) were met.

Stress reaction (z =3.43, p <.001) significantly mediated the relationship between sex and indirect aggression. Women's higher Stress Reaction scores account for their greater indirect aggression to the extent that the relationship between sex and indirect aggression is reduced, but remains significant. The path diagram is shown in Fig. 3.6.
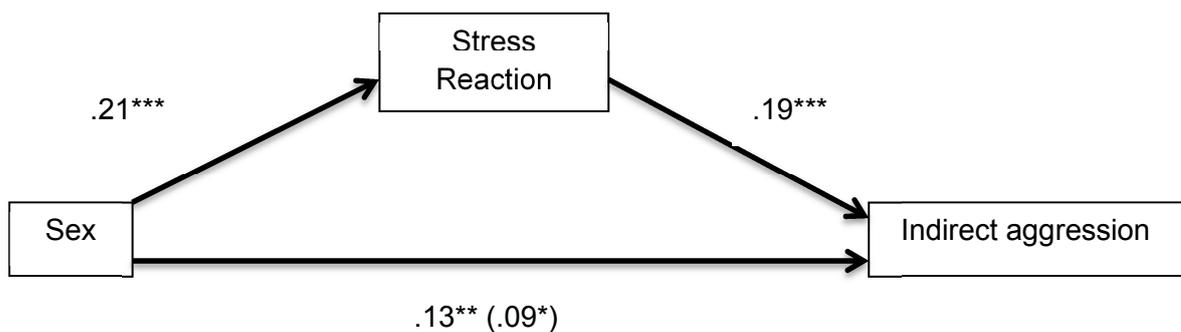
Fig 3.6: Standardised regression coefficients for the relationship between sex and indirect aggression as mediated by Stress Reaction (the standardised regression coefficient between sex and indirect aggression controlling for Stress Reaction is in parentheses).

Note: ***p <.001, **p<.01, *p<.05.

Control (z = -2.63, p = .009) emerged as a significant mediator of the relationship between sex and indirect aggression (the path diagram is shown in Fig. 3.7). However, when the effect of women's greater Control was controlled, the relationship between sex and indirect aggression was stronger. Therefore, Control mediates the relationship between sex and indirect aggression such that when the effect of women's greater control is removed, the effect of sex on indirect aggression is greater. This suggests that whilst women engage in more indirect aggression than men, women's involvement in indirect aggression might be greater still, without their greater inhibitory control.
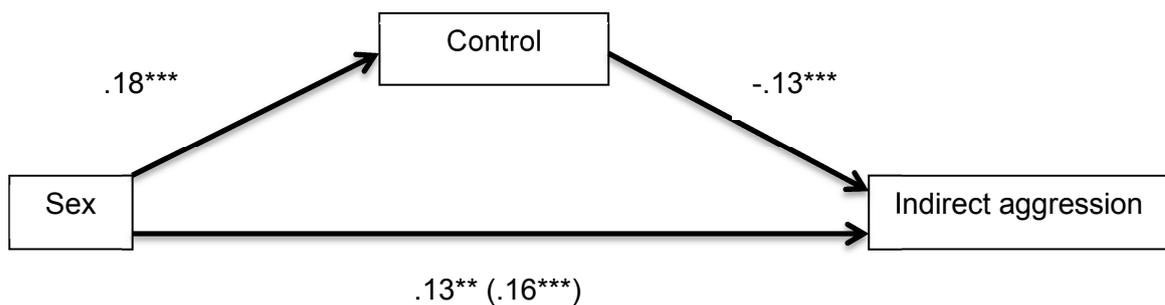
Fig 3.7: Standardised regression coefficients for the relationship between sex and indirect aggression as mediated by Control (the standardised regression coefficient between sex and indirect aggression controlling for Control is in parentheses).

As in Section 3.3.2 (above), to confirm that age effects were not present in the regression models, the regression analyses of MPQ Aggression and indirect aggression were conducted again, specified exactly as above, but also including age as a predictor at Step 1. Age did not emerge as a significant predictor in either case.

3.4. Discussion

3.4.1: Sex differences

Although there was a clear sex difference favouring men on the MPQ measure of trait aggression, surprisingly the frequency measures of direct aggression did not yield significant sex differences (possible reasons for this are discussed in Section 3.4.4, below). Women did report significantly more indirect aggression, as expected. The sex differences in social representations of aggression replicated those of previous studies (Campbell, Muncer & Gorman, 1993; Archer & Haigh, 1997). Men scored higher than women on the Instrumental scale, and this sex difference was reversed for the Expressive scale. It is worth noting that Cronbach's alphas for the ten-item Expagg were very similar to those reported in Chapter 2; α =.75 for the instrumental subscale (comparable to α = .78 from Chapter 2) and α = .63 for the expressive subscale (identical to alpha reported in Chapter 2). These findings support the conclusions drawn in Chapter 2; the five-item Instrumental scale has high internal consistency, but the internal consistency of the five-item Expressive scale remains lower than optimal.

In light of research on inhibitory control discussed in Section 1.7.4, it was expected that women would score significantly higher on the Constraint factor of the MPQ, and on all of its component subscales (Control, Harm Avoidance and Traditionalism), and this was the case. The Control subscale was included in this study as a measure of Campbell's (2006) proposed mediator of general inhibitory control. High scores reflect a tendency to be cautious and planful, rather than impulsive, spontaneous and reckless (Patrick et al., 2002). There was a small to moderate sex difference (d = -0.37) favouring women. The magnitude of this sex

difference is similar to that reported by Moffitt et al. (2001) (d = -0.34). The MPQ

Harm Avoidance subscale (which provided a measure of Campbell's proposed

mediator of fear of physical harm) yielded the largest sex difference of all variables

included in the study (d =-.77), more than double the effect size for Control. On this

forced choice measure where respondents were asked to indicate which of two

activities they would least prefer, women more often chose tedious or painful

activities (for example, having to walk around all day on a blistered foot, having to

stay at home every night for two weeks with a sick relative) in preference to more

exciting activities which carried a serious risk of physical injury (such as being the

target for a knife throwing act or camping in an area where there are rattlesnakes).

In a meta-analysis of sex differences on measures of impulsivity, Cross, Copping

and Campbell (2011) reported a comparable effect size of d =-0.78 for MPQ Harm

Avoidance, and a similar effect size was reported by Moffitt et al. (2001) (d =-0.72).

In drawing conclusions regarding sex differences on the MPQ Harm

Avoidance subscale, a note of caution is perhaps needed regarding the forced

choice format. It is possible that the sex difference to some extent results from men's

greater intolerance of boredom (Zuckerman, Eysenck & Eysenck, 1978) rather than

just women's greater fear of harm. However, a tendency to avoid tedium itself would

seem insufficient to explain a preference for activities as risky as sleeping with

rattlesnakes or potentially being involved in a plane crash. Endorsement of such

activities, whilst perhaps reflecting intolerance of tedium, would still seem to require

a lack of fear of physical harm. Additionally, as discussed in Section 1.7.3, women

show greater fear of physical harm across a variety of indices, consistent with the

present findings.

The Traditionalism subscale of Constraint was retained in the current study to investigate its discriminative utility relative to the other subscales. This subscale measures preference for traditional attitudes. Whilst Moffitt et al. did not distinguish between the subscales of Constraint in predicting aggression, it was expected that Control and Harm Avoidance would be more important. Indeed, the effect size for the sex difference on Traditionalism (d = -.29) was smaller than for the remaining subscales of Constraint.

Although not specified in Campbell's model, anger-specific control was considered in this study as a potential mediator of sex differences in aggression since it seemed plausible to propose that sexual selection may have acted to reduce women's involvement in aggression by affording them greater ability to control anger. The three STAXI-2 subscales provided measures of the more specific tendency to control anger. However, none of these subscales yielded a sex difference, and effect sizes were actually in the direction of greater male anger control. This may indicate that women have better inhibitory control of behaviour and engage in greater planning, but are not necessarily better at inhibiting the expression of anger. However, it should be noted that the items comprising the three STAXI subscales do not directly refer to the inhibition of physical aggression. The majority of the items refer to internal experiences (e.g. 'I try to soothe my angry feelings') and, of those that refer to behavioural acts (e.g. 'I pout or sulk'), none implies restraint over an act of direct physical aggression. Future studies might usefully measure the control of anger specifically in relation to the inhibition of physical aggression before it is possible to conclude that there is definitely no sex difference

This study did not find a sex difference favouring men on the MPQ higher order factor of Negative Emotionality, even when the Aggression subscale was

included. Contrary to the findings of Moffitt et al. (2001), there was no sex difference on the Alienation subscale (which measures the tendency to feel suspicious, mistreated, persecuted and threatened). This meant that men's higher Aggression scores were balanced by women's higher scores on Stress Reaction. Alienation is the subscale emphasised by Moffitt et al. in their discussion of the relationship between negative affect and delinquency; they argue that men's higher scores may reflect different information processing mechanisms, including a greater likelihood of perceiving challenge or threat. However, the lack of a sex difference in this study suggests that high levels of Alienation in men may not be normative, but are perhaps more characteristic of the delinquent group of males in Moffitt et al.'s (2001) sample. The Alienation subscale is closely related to psychoticism ($r = .61$; Harkness, McNulty & Ben-Porath, 1995) and psychoticism has often been implicated in persistent antisocial behaviour and serious delinquency (see S.B.G. Eysenck, 1981).

The only sex difference on negative affect therefore, is women's higher scores on the Stress Reaction subscale. Stress Reaction measures a tendency to nervousness, worry, sensitivity and guilt, and appears closely related to neuroticism, an internalising dimension on which women universally score higher (Costa, Terracciano & McCrae, 2001; Jorm, 1987; Lewinsohn, Gollib, Lewinsohn, Seeley & Allen, 1998). Young women are also approximately twice as likely as young men to suffer from depression (Nolen-Hoeksema & Girgus, 1994) and this may also contribute to their higher Stress Reaction scores. Given that sex differences are not consistent across the subscales of Negative Emotionality, it does not appear useful to consider the higher order factor as a mediator of sex differences in aggression (or related constructs, such as antisocial behaviour) since the effect of sex differences on one subscale are cancelled out by those on another.

3.4.2: Predictors and mediators of trait aggression

The main focus of this study was the extent to which lower levels of aggression were associated with greater inhibition, anger control, harm avoidance, and relative preference for an expressive social representation, and crucially, the extent to which these variables mediate sex differences. A subsidiary question concerned the role of negative affect when the Aggression subscale was not included in the MPQ higher order factor of Negative Emotionality.

As expected, lower levels of trait aggression were associated with all inhibitory variables (anger control, general inhibitory control and harm avoidance), as well as preference for a relatively more expressive experience of aggression. Anger Control was the strongest predictor of (low) aggression. Whilst the specific ability to control anger appears to be a key individual difference variable associated with lower aggression, it does not mediate the sex difference (there was no sex difference on Anger Control). This suggests that women's lesser involvement in aggression is not a result of better anger specific control, though as noted above, the STAXI subscales do not specifically measure restraint of aggression when angry.

The findings of this study provide support for the role of general inhibitory control and harm avoidance in (negatively) predicting aggression. As expected, these variables emerged (with Expagg, discussed below) as the only significant mediators of sex differences in aggression. However, their relative explanatory power was the reverse of what was expected, with Harm Avoidance emerging as both a more powerful predictor of aggression and mediator of sex differences. Whilst Control was only a partial mediator, Harm Avoidance mediated sex differences in aggression to the extent that the relationship between sex and aggression became

non-significant. The role of fear as the source of sex differences in aggression (Campbell, 1999, 2002) was proposed in Sections 1.7.3 and 3.1. The crucial role of maternal investment in the ancestral environment meant that maternal injury or death would have extremely detrimental consequences for infant survival, thereby reducing the inclusive fitness of the mother. Evidence reviewed in Chapter 1 suggests that women have far greater fear of activities associated with risk of physical injury. Direct aggression carries substantial risk of physical harm due to the risk of retaliation. It was expected, therefore, that women would show greater avoidance of harm, and this would to some extent mediate sex differences in aggression.

However, it was anticipated that general inhibitory control (as measured by the Control subscale of the MPO) would emerge a more powerful mediator of sex differences in aggression than avoidance of harm. Campbell (2006) noted that aggression is restrained even when there is no apparent risk of physical harm, indicating that fear of harm may be too specific to account entirely for women's lower involvement in aggression. Drawing on research concerned with the development of effortful control Campbell argued that girls' greater fear also provided the developmental foundations for the acquisition of greater inhibitory control over behaviour. According to this account therefore, women's greater fear was proposed to inhibit their involvement in aggression by two means; it acts directly to restrain aggression where there is risk of harm, but it may also act indirectly via the development of superior inhibitory control. Because superior inhibitory control leads to restraint of behaviour more generally, favouring greater planning and control, it should cause women to be less likely to engage in aggression generally, even when there is no risk of harm. The primary role of Harm Avoidance was therefore

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surprising. One possibility is that the extent of women's fear of harm may cause them to avoid conflict situations generally, thereby largely eliminating the possibility of aggressive encounters. The influence of women's superior inhibitory control may only be relevant when conflict is unavoidable. Even then, avoidance of harm would be expected to continue to influence likelihood of using direct aggression in response to conflict. Clearly, however, women's better restraint is important, emerging as a significant partial mediator. Future research could examine the extent to which fear of harm mediates sex differences in aggression by promoting avoidance of conflict, and the extent to which inhibitory control and fear of harm mediate sex differences when conflict situations are unavoidable.

Research published subsequent to this study has not provided strong support for a substantial female advantage in inhibitory control. In their meta-analysis, Cross et al. (2011) found an overall effect size of only $d = 0.08$ for measures of impulsivity, though sex differences varied across measures. In Section 3.1.2, however, it was argued that inhibitory control may be more than just a lack of impulsivity. Most of the measures included in Cross et al.'s meta-analysis were oriented towards impulsivity. In the present study, the MPQ measure of Control was chosen precisely because it was oriented towards inhibitory control. The stronger sex difference on this measure indicates that sex differences are greater for inhibitory control than for impulsivity; women's tendency to exercise planning and control over behaviour may be greater than men's tendency to be impulsive.

Whilst recent research has cast doubt on the extent of sex differences in impulsivity, clear sex differences have been found for measures of harm avoidance. Cross et al. (2011) report an almost identical effect size ($d = -0.78$) to that reported in this study for MPQ Harm Avoidance. Clear sex differences have also been found for

risk- and sensation-seeking, which can be considered the inverse of harm avoidance; Zuckerman (1979) defined sensation-seeking as, "the need for varied, novel and complex sensations and experiences, and the willingness to take physical and social risks for the sake of such experiences" (p. 10). In a meta-analysis, Byrnes, Miller and Schafer (1999) reported significantly higher levels of risk-taking in men in 14 out of 16 types of risky behaviour, and this effect was particularly strong in real (rather than hypothetical) situations. Cross et al. (2011) reported an overall effect size of d = 0.41 across thirteen measures of risk-taking and sensation seeking (although this included reversed MPQ Harm Avoidance). These effects are specific to sensation seeking which involves risk; the Experience Seeking subscale of Zuckerman's Sensation Seeking Scale (SSS: Zuckerman, 1994) measures the extent to which respondents enjoy non-risky new experience, and is the only subscale which does not yield sex differences. The findings of this study suggest that sex differences in aggression may be completely mediated by sex differences in fear of harm. Likewise, Zuckerman and Kuhlman (2000) found that sex differences in impulsive sensation seeking completely mediated sex differences on a range of risky behaviours. Whilst evidence of the mediating role of both risk-seeking and harm avoidance appears to present a conundrum for motivational theories of sex differences in aggression, the greater effect size for (non-appetitive) harm avoidance than (appetitive) measures of risk-seeking indicates that women's sensitivity to harm may be more important than men's appetite for risk. Implications for avoidant and appetite approaches (and associated measurement issues) are discussed more fully in Section 7.1.3.

It has also been proposed that women's greater inhibitory control may explain their more expressive experience of aggression (Alexander et al., 2004; Driscoll et

al., 2006). It was proposed that sex differences in social representations of aggression represent an accurate 'read-out' of an individual's internal experience of aggressive behaviour. If women inhibit aggression more effectively, aggression should occur at a higher level of emotional arousal, and therefore be experienced as a loss of control, an expressive outburst. Consistent with this argument, a relatively more expressive experience of aggression was positively related to all inhibitory variables included in this study (Anger Control, Anger Expression-In, Control and Harm Avoidance). The findings extend those reported by Alexander et al. (2004); they considered the instrumental and expressive subscales separately, and found that an instrumental experience of aggression was associated with impulsive risk, but impulsive risk was not predictive of low expressivity. However, Alexander et al. used the summed (because they were highly collinear) impulsivity and risk-seeking scales of the low self-control scale as an index of inhibitory control (the validity of equating inhibitory control with low impulsivity is questioned above). Additionally, their consideration of the Expagg subscales separately may be problematic. This study returns to Campbell at al.'s (1992) conceptualisation in measuring social representations as the relative preference for expressivity. Both sexes endorse both representations to some extent, and both endorse expressivity more strongly that instrumentality. What distinguishes the sexes most is the extent to which expressivity is greater than instrumentality. As well as showing positive relationships with all inhibitory variables, relative preference for an expressive representation also emerged as a strong predictor of aggression in the current study, and was a significant partial mediator of sex differences. Women's lower aggression is therefore strongly associated with their relatively more expressive experience.

The argument that social representations may arise from an individual's phenomenological experience is inconsistent with traditional approaches, which view the origin of social representations as social (Moscovici, 1981). Yet it should not be surprising if both a behaviour and the experience of that behaviour share the same psychological underpinnings; phenomenal experience can follow directly from psychological processes (Damasio, 1995).

The MPQ higher order factor of Negative Emotionality was included in this study since previous research suggests it plays a significant role in predicting sex differences in delinquency (Moffitt et al., 2001). However, as noted in Section 3.1.4, their inclusion of the Aggression subscale as part of the higher order factor may have rendered the findings tautological. Therefore, this study examined the role of Negative Emotionality with and without the Aggression subscale. When the Aggression subscale was included, correlations between Negative Emotionality and self-reported verbal and physical aggression were $r = .32$ and $r = .36$ respectively; this reduced to $r = .18$ and $r = .14$ respectively when the Aggression subscale was not included in the higher order factor. This indicates that the relationship between Negative Emotionality and aggression is primarily due to the inclusion of the Aggression subscale. Using all three subscales, Moffitt et al. reported significantly higher scores for men. As noted above, the usual sex difference (favouring males) was reversed for the higher order factor when Aggression was not included. Both Stress Reaction and Alienation were positively associated with aggression (trait and behaviour), and Alienation emerged as a significant predictor of MPQ Aggression, but could not mediate sex differences. Whilst a positive relationship between Alienation and aggression is not surprising, their joint inclusion as part of a higher order factor implies that they measure two aspects of the same construct, when it is

possible that they measure distinct constructs which have a causal relationship. Negative affect, whether it be neurotic tendencies measured by Stress Reaction, or the perception of threat measured by Alienation, does therefore appear to be weakly associated with aggression, but the inclusion of the Aggression subscale in previous research suggests its explanatory power has been overstated. Of greatest importance for theories of sex differences in aggression, it is clear that men's higher scores on trait aggression did not result from greater negative affect. Women's use of indirect aggression, however, was mediated by their higher Stress Reactions scores; this is discussed in the subsection below.

3.4.3: Predictors and mediators of indirect aggression

This study also examined the relationship of the variables discussed above to indirect aggression. No specific hypotheses were made, though it was tentatively suggested that women's higher levels of indirect aggression might be explicable in terms of the same variables expected to predict their reduced involvement in direct aggression: high levels of inhibitory control and harm avoidance. Although (from a fitness perspective) women would prefer not to engage in aggressive competition for mates, choosing instead to rely on intersexual competition (epigamic display), where circumstances necessitate more aggressive competition, indirect aggression provides a lower risk (relative to direct aggression) means of competing for mates, whilst also inflicting harm on the sexual reputation of rivals. Therefore, it was suggested that women's use of indirect aggression may be associated with harm avoidance and inhibitory control.

The findings do not support this suggestion. Indirect aggression was associated with somewhat lower levels of anger control and lower inhibition, and was

unrelated to Harm Avoidance. The mediation model indicates that women's greater control, rather than favouring the use of indirect aggression as a lower risk strategy, serves to restrain it somewhat (the relationship between sex and indirect aggression was stronger when the effect of sex differences in Control was controlled). So although women use more indirect aggression than men, women's greater control lessens the sex difference. The lack of any relationship between harm avoidance and indirect aggression suggests that use of indirect aggression does not represent an alternative low risk strategy. Perhaps women favour indirect aggression not because it is low risk, but because it is more suited to their intrasexual competitive needs; derogation of the sexual reputation of rival females is better achieved by indirect than direct aggression. The low proportion of variance in indirect aggression explained by the variables in this study (around 8 per cent, compared to 46 per cent for direct aggression) is further testament to the existence of unexplored and more relevant predictors.

It is worth noting the relationship between high Stress Reaction scores and indirect aggression, particularly as the sex difference in indirect aggression was partially mediated by women's higher Stress Reaction scores. This may indicate that women's greater use of indirect aggression may be partly explained by their greater tendency towards anxiety and worry. The anxious emotions measured by this subscale may lead to increased aggression, but perhaps women resort to their more characteristic form of aggressive behaviour (indirect aggression) when anxious, hence the weaker relationship of Stress Reaction with direct forms of aggression. However, the direction of causality cannot be determined from this study; it is also possible that high levels of indirect aggression within the female peer group could induce high levels of stress.

3.4.4: Limitations

The lack of a sex difference on the frequency of direct aggression measures resulted in reliance on the trait measure. Although a number of the items on the MPQ Aggression measure clearly imply involvement in aggressive behaviour, this is not an unambiguous measure of involvement. The small effect size and lack of statistical significance for the frequency measure of direct aggression in such a large sample was unexpected. There are two possible reasons for this anomalous finding; either the self-report frequency measure was unsuitable or alternatively, a sex difference does not exist in the largely student population sampled in this study.

The frequency measure employed in this study was designed to provide participants with an easy-to-complete measure of their general tendency to engage in three broad categories of aggressive behaviour. It is possible that the measure lacked the ability to adequately discriminate between male and female rates of aggression. There is some debate regarding the reliability of single item measures. Whilst multiple item scales are generally preferred, Wanous and Reichers (1996) challenged the view that they are necessarily superior. Loo (2001) found that single item measures were suitable when the measured constructs are homogenous, but to ensure adequate reliability, argued that more complex constructs should be measured with multiple items. It may be that measurement of aggressive behaviour requires a multiple item scale which measures the frequency of a range of common acts of aggression; within the field of partner aggression, this multiple act-based approach has yielded a reliable frequency measure (The Conflict Tactics Scales; Straus, 1979). In the present study, the mean score for both men and women on the physical aggression measure was between category 2 (one to three incidents of aggression in the past year) and category 3 (four to six incidents of aggression),

though the male mean was slightly higher. On the verbal aggression measure, the means for the two sexes were almost identical and were closest to category 3 (four to six incidents of aggression). For verbal aggression therefore, it seems clear that there was no detectable sex difference. Whilst a more discriminative measure may have revealed a difference on physical aggression, the self-report measure of indirect aggression did demonstrate the discriminatory ability to reveal a small to moderate effect in the female direction.

There are two characteristics of the sample which suggest that the findings of this study are accurate, and the effect size for use of direct physical aggression in this population was sufficiently small as to yield a non-significant result despite a large sample. Firstly, the males in the sample may have been too young to have experienced the normative rise in aggression which occurs in the early reproductive years. The mean age for both boys and girls in the sample was just short of seventeen years, and participants were asked to report aggressive episodes during the past year. On average, this covered the period from just under sixteen years to just under seventeen years. Because boys reach puberty later than girls, the boys in this sample may not have experienced the normative increase in competitive and aggressive behaviour that occurs in the early reproductive years. This effect may have been compounded by the fact that most of the girls in the sample (even the younger ones) would probably have reached puberty. The net result of this could be a very small (non-significant) sex difference for physical aggression.

It is also the case that there may be some differences between school and college samples. In this study, school and college samples were analysed together to provide a more representative sample of adolescents. Whilst participants in the college sample were slightly older, age appeared to have no effect on analyses of

sex differences. However, there are potentially contextual differences between school and college environments. For example, the schoolyard environment may present more opportunities for fights to take place. However, other studies have reported clear sex differences in direct aggression in both school samples (Bjorkqvist, Lagerspetz & Kaukianen, 1992), and in undergraduate samples (Gladue, 1991).

It is also possible that the measure failed to elicit a sex difference because no target was specified. Evidence discussed in Chapter 4 strongly suggests that women's use of aggression increases towards intimate partners (relative to other targets). If women's responses include (perhaps more salient) instances of aggression towards intimate partners, this could have the effect of eliminating reported sex differences. It would therefore be worthwhile specifying intrasexual targets to avoid this possibility.

It would be useful for future research to attempt replication of the results of this study using a more sensitive and reliable frequency measure analogous to the CTS. This measure is employed later in this thesis as a measure of frequency of aggression in that context. Modified versions have been successfully used in other studies outside of the context of intimate relationships. Although the measure employed here enquired about the frequency of similar acts (hitting, throwing things), in hindsight, a modified Conflict Tactics Scale may have provided a more comprehensive and discriminative measure. The CTS also includes a measure of victimisation (utilised in the study reported in Chapter 6). It would be worthwhile including a measure of victimisation when studying intrasexual aggression. This would allow analysis of mutuality of aggression, and also of the extent to which the

variables included in this study are associated with perpetration *and* victimisation of aggression.

3.4.5: Conclusions

The sex difference on general inhibitory control and harm avoidance, and their role in mediating aggression provide support for Campbell's (2006) proposal that women's lower involvement in direct aggression can be explained in terms of their higher levels of fear of harm and inhibitory control. However, whilst a greater role for general behavioural restraint was anticipated, fear of harm appears to be more important in explaining sex differences. The distal sexual selection pressure for greater fear of physical harm may have twofold effects on women's desistance from aggression. Firstly, fear may enhance the development of inhibitory control in women, leading to greater restraint of behaviour, including aggression. Secondly, women's greater fear may act as a direct restraining force in relation to behaviours associated with the risk of physical harm, again including aggression. The combination of high behavioural restraint and fear of physical harm may exert a powerful disinclination to aggression. The relative strength of these two variables in inhibiting female involvement in aggression may also vary with context. Clearly, individuals regularly inhibit aggression when there is no risk of injury; for example, adults inhibit aggression towards small children. Fear is not directly implicated here, and there may be a stronger role of general behavioural restraint (an indirect consequence of greater fear). The findings also provide support for the proposal that social representations of aggression represent accurate 'read-out' of the experience of aggression for the two sexes; women's preference for an expressive representation was associated with inhibitory control, and was directly related to their lower aggression.

Chapter 4: Sex differences in perpetration of aggression towards intimate partners

4.1: Scope of this chapter

The central tenet of this thesis is that women's lesser involvement in direct aggression is the result of an evolved sex difference in fear-based inhibition, due to the greater cost incurred to offspring as a result of maternal injury or death in the ancestral environment. The first half of this thesis examined this proposal in relation to general sex differences in aggression, providing evidence that fear of physical harm and inhibitory control mediate the relationship between sex and aggression.

The second half of this thesis is concerned with sex differences in aggression towards intimate partners. There are two main schools of thought regarding sex differences in perpetration of partner aggression; feminist researchers have traditionally argued that perpetrators are almost exclusively male. However, over the past thirty years, family conflict researchers have amassed a large body of evidence which suggests that perpetration of partner aggression is sex symmetrical.

If family conflict researchers are correct in claiming sex symmetry in perpetration of partner aggression, this presents a challenge to Campbell's (2006) inhibition theory since it constitutes a markedly different pattern of behaviour for the two sexes relative to that observed towards other potential targets of aggression. This chapter begins by reviewing theory and research relating to sex differences in partner aggression to determine the extent to which the usual pattern of sex differences is altered. Subsequently, evidence concerning the relative behavioural change by each sex towards intimate partners (relative to other targets) is discussed. Finally, factors which may inhibit or disinhibit men's and women's aggression towards partners are considered.

4.2: Feminist approaches to partner aggression

Feminist theories propose that partner aggression arises from patriarchal societies, in which men use their power to control and subjugate women. Partner aggression is placed in the context of historical social and political forces which favour patriarchy (Dobash & Dobash, 1977-78; 1979). Dobash and Dobash argued that from the birth of the legal institution of marriage, women were under their husband's controls; marriage gave a husband the right to physically reprimand his wife should she fail to conform to prescribed standards of behaviour (in particular, adultery or suspected adultery was likely to be met with severe retribution). This state of affairs was argued to be supported and upheld by religious, legal and political institutions, which specified legitimate means of chastisement. Despite the repeal of such laws in western society from the middle of the nineteenth century, along with legal prohibitions of domestic violence (George, 2003), feminists argue that the patriarchal societal structures and values which allow and encourage wife assault continue to support the use of violence towards women as a means of patriarchal control.

The context of power and control is central to feminist theories (e.g. Dobash & Dobash, 1979), which portray male batterers as excessively controlling and pathologically jealous. Aggression is considered to be one of a range of male control tactics (Pence & Paymar, 1993). According to this view, men are overwhelmingly the perpetrators of partner aggression and women are the victims (Pagelow, 1984; Walker, 1979; 1990). Feminist researchers typically employ qualitative research methods to acquire self-report data from small samples of women residing in shelters for abused women. Almost invariably, this research supports the view that women are the victims of violent patriarchal control at the hands of their partners.

Based on studies of women in shelters, Walker (1979) stereotyped female victims as suffering from 'battered woman syndrome'. Women were portrayed as the innocent, passive victims of controlling male batterers, and when feminist writers do acknowledge women's use of aggression, this is usually interpreted as an act of self-defence.

Feminist researchers have also drawn on data from crime surveys and police files in support of their arguments. These data sources provide estimates of the relative proportions of men's and women's perpetration and typically (though not always) support the view that partner aggression is predominantly perpetrated by men. For example, in the US, the National Crime Survey (NCS) and its successor, the National Crime Victimisation Survey (NCVS) have both yielded data which suggests that perpetration of partner aggression is essentially a male behaviour (Straus, 1999). Straus reported male to female assault ratios of 13:1 derived from the NCS and 7:1 derived from the NCVS. However, there are a number of potential biases (these are discussed in Section 4.5.3).

4.3: Evolutionary approaches to partner aggression

Evolutionary accounts (e.g. Daly & Wilson, 1998; Wilson & Daly, 1992a, 1996, 1998; Buss & Shackleford, 1997; Buss & Duntley, 2011) have largely supported feminist conceptualisations of partner aggression as a means for men to exert control over women. Wilson and Daly (1992b) examined rates of spousal homicide for the two sexes from the US, Europe, Scandinavia and Canada. They argued that homicide data is more reliable than data relating to sub-lethal assaults since homicides are almost invariably included in crime statistics regardless of the sex of the perpetrator. Daly and Wilson reported that women perpetrated a lower proportion

of spousal homicides than men (between 17 and 40 per cent of the rate for men, varying across nations), although they acknowledged that the proportion of male and female offenders in the US was almost equivalent. The reason for the anomalous pattern in the US remains unclear. They speculated that the higher female rate in the US may be attributable to stronger networks of female kin, women acting in defence of children, or in response to greater male coercion. However, it is not clear why these factors should specifically affect the US and not other western nations. The availability of weapons in the US may better explain the higher female rate; Steinmetz and Lucca (1988) have argued that weapons can act as an equalising force, compensating for women's lesser ability to inflict harm. However, Campbell (2007) offered a different interpretation of patterns of sex differences in intimate partner homicide. Based on data from Greenfeld and Snell (1999), she estimated the relative change in homicide rates for the two sexes (from non-intimate victims to spouses). Campbell argued that women's homicide rate actually increases towards intimate partners compared to non-intimate victims (this is discussed more fully in Section 4.8). However, Wilson and Daly (1992a; 1993) assume a higher rate of male perpetration and use this as the basis for an evolutionary account of partner aggression. Their account is broadly complementary to the feminist approach and provides an ultimate explanation for male perpetration in terms of control and proprietary motives.

In fitness terms, men clearly have a great deal to lose as a result of a female partner's infidelity since she represents in large part his current and future reproductive potential. However, internal fertilisation and extra-pair copulations (Baker & Bellis, 1995) mean that cuckoldry is a real adaptive problem for men (Buss & Duntley, 2011). The fitness cost of unwittingly investing in the offspring of another

man is very high. Extra-pair copulations have played an important role in women's reproductive strategies throughout human evolutionary history (Benshoof & Thornhill, 1979), compounding adaptive problems for men. Consequently, an evolutionary arms race has ensued in which women seek to conceal fertility and reproductive activities which are disadvantageous to their long term partners, and men seek to discover such activities and to guard their mates in order to prevent cuckoldry (Buss, 2000; Thornhill & Gangestad, 2008). Daly and Wilson argue that men seek to control their wives' reproductive potential, that men view wives as possessions, and that "men around the world think and talk about women and marriage in proprietary terms" (Daly & Wilson, 1988, p. 200). Perceived challenges to male proprietary concerns (including cues to possible sexual infidelity) can result in a variety of mate guarding and control tactics, of which violence is one. Patriarchal values are believed to support male proprietariness by legitimising harsh punishment of women's infidelity. Research addressing the role of proprietary motives is considered in Section 4.9.2.

4.4: Family conflict research

In the late 1970s, a different picture of partner aggression began to emerge. Based on data from a preliminary small scale study, Steinmetz (1977) published a paper entitled 'The Battered Husband Syndrome' in a direct challenge to the prevailing feminist view. Steinmetz suggested that battered husbands might be as common as battered wives, but that under-reporting of wife assault rendered battered husbands the hidden victims of domestic violence. The subsequent publication of the 1975 National Family Violence Survey (NFVS: Straus, Gelles & Steinmetz, 1980) caused great controversy. Based on data drawn from a large scale representative American sample, the NFVS appeared to show virtual parity between

the sexes in the use of aggression toward intimate partners. Subsequent NFVS data (Straus & Gelles, 1990) and other surveys of households in the US and Canada (Grandin & Lupri, 1997) confirmed a similar pattern.

The family conflict view distinguishes between family conflicts and the tactics used to resolve them (Straus, 1979). Conflicts of interest are considered to be a normal part of family life; inevitably many situations arise where a benefit to one family member constitutes a cost to another. Whilst conflicts are a universal aspect of family life, the tactics employed to further one's own interest vary. These so-called conflict tactics may be constructive behaviours such as negotiation and discussion, but can also include physical aggression. As in any other context, aggression can be indirect and psychological. It can also encompass a whole range of physically aggressive behaviours, from minor acts such as slapping to severe life-threatening violence. These conflict tactics are most often measured by the Conflict Tactics Scales (CTS: Straus, 1979) and its subsequent revision, the Revised Conflict Tactics Scales (CTS2: Straus, Hamby, Boney-McCoy & Sugarman, 1996). The CTS and CTS2 are act-based frequency measures of aggression. Family conflict studies typically employ representative community samples or student dating samples; they ask men and women to indicate the frequency with which they have used a number of aggressive acts of varying severity towards their partner over the past year. The CTS thereby provides a quantitative measure of perpetration. Using these measures, family conflict researchers have amassed a large body of evidence in support of their original findings of sex symmetry in perpetration.

Following the publication of over 100 studies using a family conflict approach (Straus, 1999), Archer (2000) published a meta-analysis of male and female perpetration of physical aggression towards heterosexual partners. Archer's analysis

was based on 82 studies which provided a total sample size in excess of 60,000,

and he reported a very small overall effect in the female direction (d = -0.05) for use

of physical aggression towards an intimate partner. This value was unaffected by

removal of outliers and increased marginally when studies with sample sizes in

excess of n = 800 were excluded (d = -0.07), demonstrating that the results were not

unduly influenced by the inclusion of a small number of large scale studies. Archer's

study has been described as 'the "gold standard" of studies in gender usage of

violence' (Dutton & Nicholls, 2005, p. 702) and provides the best available estimate

of effect size.

4.5: Methodological and sampling issues in partner aggression research

Clearly research from the feminist and family conflict perspectives presents

markedly different accounts of the pattern of sex differences in partner aggression.

Feminist researchers are able to draw on a large number of qualitative shelter

studies in support of their claim that men are the primary perpetrators. In addition,

they cite a number of large scale and representative crime surveys which also find

that partner aggression is predominantly perpetrated by men. The validity of feminist

theories of male perpetrators and female victims is heavily dependent on these

findings. From the perspective of this thesis, if men are the primary perpetrators of

partner aggression, it would suggest that the pattern of sex differences observed for

intrasexual aggression is also found in the context of intimate relationships, and this

would be consistent with Campbell's model of greater female inhibition of direct

aggression. However, the findings of well in excess of 100 family conflict studies,

which also include large scale representative surveys, consistently report results

which range from sex symmetry to a small effect size in the female direction. If the

results of these studies are correct, the markedly different pattern of sex differences

in this context relative to others requires explanation. The discrepancies in findings

have been a source of intense, often vitriolic debate between feminist and family

conflict researchers for the past thirty years (see Straus, 1999). Below, criticisms of

feminist and family conflict research are discussed, followed by attempts to reconcile

their apparently contradictory findings. Criticisms of family conflict research focus

largely on the CTS methodology, whereas feminist research has been criticised for

reliance on data from non-generalisable samples, bias in data sources and lack of

objectivity. These issues are important in terms of establishing patterns of sex

difference in intimate relationships. Additionally, the evidence used to address them

often reveals important information about the nature of men's and women's

aggression in this context (for example, relative seriousness, extent of injuries,

motivations for aggression, rates of initiation). These issues are discussed below.

4.5.1: The importance of severity and consequences

Research based on the CTS has been criticised for failing to consider the

consequences of aggression, and the CTS has been described as merely a checklist

of the frequency of aggressive acts (Dobash, Dobash, Wilson & Daly, 1992). Dobash

et al. argued that if the consequences of aggression (in terms of injuries) were taken

into account, it would be clear that the victims of partner aggression are women.

Archer's (2000) meta-analysis directly addressed the issue of injury. He calculated

effect sizes based on 58 studies which specifically examined sex differences in

injuries requiring medical treatment, and self-reported injury. He reported a small

effect size in the male direction for causing injury (d = 0.15) and a very small effect

size in the male direction for partner requiring medical treatment (d = 0.08). Sixty-five

per cent of injuries inflicted by partners involved women as the victims and 71 per

cent of those requiring medical treatment as a result of injury were women. When

severe injury was considered separately, far more women (25 per cent) than men (2 per cent) were victims. This data does clearly show that men inflict far more severe injuries on their partners. Felson (1996) argued that this is a result of men's (on average) greater size and strength; therefore, a sex difference in injuries does not necessarily reflect sex differences in intent, but in the ability to inflict harm. Archer's analysis of injury data does suggest that feminist researchers are correct to draw attention to asymmetry of sex differences in injury, although women do inflict a substantial proportion of less severe injuries on their partners.

A related criticism is that the CTS format obscures the potentially more serious nature of men's aggression since the finding of overall sex symmetry could mask an underlying pattern of greater male perpetration of more serious acts (White, Smith, Koss & Figueredo, 2000). This concern was addressed by Archer (2002) in a second meta-analysis. He examined studies in which men's and women's reports of specific acts on the CTS Physical Assault scale were analysed. Minor acts of aggression were defined as those with less damaging consequences, and it was anticipated that women would more frequently perpetrate these. However, these predictions were not fully borne out. Two minor acts ('throw something at' and 'slap') showed a small effect size in the female direction (d = -0.09 and d = -0.12, respectively), and 'push, grab, shove' showed only a small effect size in the male direction (d = 0.05). Two of the most severe acts ('beat up' and 'choke or strangle') showed small effect sizes in the male direction (d =0.06 and d = 0.13, respectively). However, contrary to predictions, the remaining severe acts did not follow the same pattern. The effect sizes for 'hit with an object' and 'kick, bite, punch' were in the female direction (d = -0.10 and d = -0.12, respectively), and two further items ('threaten with a knife or gun' and 'used a knife or gun') showed effect sizes close to

zero (d = -0.03 and d =0.002, respectively). The pattern was largely unchanged whether reports were based on self, partner or composite reports. Archer also reported effect sizes separately for samples selected for marital violence. Here, he did find a large effect size in the male direction; from a measurement perspective, this is reassuring since it suggests that the CTS is sensitive enough to detect serious male violence.

The evidence discussed in this section demonstrates that women use specific acts of aggression more frequently than men, but men do more often cause injury (and particularly serious injury) to their partners (Archer, 2000; 2002). However, a woman's intent to cause harm may be just as great, but due to sexual dimorphism, a woman has (on average) a reduced ability to inflict physical injury. For example, Brush (1990) found that women more often sustained injury even when both partners engaged in violence. Broadly these findings support the family conflict view; women perpetrate equal or greater proportions of aggressive acts, though men are more able to inflict injury when they do aggress. From the perspective of this thesis, the crucial point is this: the pattern of sex differences in aggression towards intimate partners stands in marked contrast to patterns of general sex differences. Evidence reviewed in Chapter 1 consistently showed that women are less likely to engage in direct aggression, and particularly that their perpetration decreases with the increasing seriousness of the act. Yet, when the target is an intimate partner, this does not appear to be the case; women are more likely than men to perpetrate some serious acts of aggression.

4.5.2: The importance of context

Some feminist researchers have acknowledged that women do perpetrate acts of partner aggression, but argue that the findings reported by family conflict researchers are not valid since they fail to take into account the context in which aggression takes place (Pagelow 1984; Saunders, 1988). Dobash et al. (1992) argue (correctly) that the CTS does not provide the researcher with any information regarding the motives for aggression; therefore, women may report a number of acts of physical aggression, but they may all be acts of self-defence. This is an important point to address; if women are only acting in self-defence, then sex symmetry in partner aggression may not require a special explanation.

Saunders (1988) proposal that women's partner aggression is primarily self-defensive was based on data from shelter samples of women selected for high levels of victimisation, and therefore cannot be considered representative. Self-defence accounts propose that women use aggression towards their male partners mainly in self-defence in response to cumulative abuse. Evidence in support of this theory is based on studies of women in abusive relationships who ultimately kill their partners (Serran & Firestone, 2004). Certainly a number of cases of female perpetrated homicide appear to occur in response to years of abuse (Bannister, 1991). However, it would be unwise to generalise from a lethal response to an extreme situation to the conclusion that all female partner aggression occurs in self-defence. Additionally, it is worth noting that the UK Criminal Justice System considers self-defence to be a mitigating factor in spousal homicide. More female perpetrators of intimate partner homicide cite self-defence as the motive (Dixon & Graham-Kevan, 2011). Many self-defence claims are not upheld in the UK courts (Nutall, 1993, cited in Dixon & Graham-Kevan). Nevertheless, regardless of true motives, awareness that self-

defence may constitute a mitigating factor provides a strong incentive for women to claim it as a motive. This may inflate estimates of self-defence motives in statistics based on intimate partner homicide.

Family conflict researchers have responded to these criticisms concerning context by citing research relating to i) initiation of aggression and ii) motives for aggression. Neither of these avenues supports a self-defence explanation. A number of studies have examined sex differences in initiation of aggression. Bland and Orn (1986) surveyed Canadian participants and asked who initiated violence. Seventy three per cent of women who reported using violence towards their husbands claimed to have initiated it. Using observational methods in a sample of at-risk couples, Capaldi, Kim and Short (2007) reported that women were more likely to initiate physical aggression towards partners in adolescence, but there were no sex differences for older participants.

As part of the 1985 National Family Violence Survey, respondents were asked to indicate which partner was the first to strike a blow when physical aggression occurred; the proportion of men and women was approximately equal (Stets & Straus, 1990). Stets and Straus (1992) combined this data from the NFVS with additional data from a sample of dating couples. They compared initiation of aggression for the two sexes in a subset of participants reporting one or more episodes of physical assault. In 28 per cent of cases, the woman alone was violent (compared to 23 per cent for men). Additionally, Stets and Straus (1992) reported that a number of women in their sample perpetrated aggression towards non-violent men, and this was a more common occurrence (12 per cent of the sample) than male-perpetrated aggression against non-violent women (4 per cent of the sample). Women also reported initiating aggression in 53 per cent of cases. Likewise, in a

dating violence sample, Deal and Whampler (1986) reported that men were three times more likely than women to report being the sole victim when violence was not reciprocal. Other studies have reported similar rates of non-reciprocal female violence in dating samples (Arias, Samios & O'Leary, 1987) and also in marital samples (Brinkerhoff & Lupri, 1988). The high rate of female initiation and the finding that women report themselves to be the sole aggressors in a substantial proportion of cases indicates that self-defence cannot be a full explanation of women's perpetration of partner aggression.

Research which has examined women's motives for aggression also fails to support self-defence as the primary motive. Stuart, Moore, Hellmuth, Ramsey and Kahler (2006) reported that women who were victims of severe violence more often endorsed self-defence as a motive than women who were victims of minor violence. However, in addition to self-defence, poor regulation of emotion, provocation and retaliation were also commonly cited reasons for women's perpetration. In community samples, self-defence does not appear to be the most common motive. Fiebert and Gonzales (1997) asked women about their motivations for aggression; the most commonly cited reasons were 'insensitivity of partner' and 'to get my partner's attention'. In a British study, Carrado, George, Loxam, Jones and Templar (1996) found that more men reported a self-defence motive than women (27 per cent versus 21 per cent), and the motive most often cited by both sexes was 'to get through to my partner'. In a (Canadian) national survey of dating relationships, (DeKeseredy, Saunders, Schwartz & Alvi, 1997) female respondents did report a substantial amount of violence in self-defence. Nevertheless, the majority (61 per cent of those who used minor acts of aggression, and 57 per cent of those who used severe acts of aggression) did not endorse self-defence motives. In a large

undergraduate sample, Follingstad, Wright, Lloyd and Sebastian (1991) found roughly equal percentages of men (18 per cent) and women (19 per cent) reporting self-defence as a motive. Women more commonly endorsed the motive 'to get control over the other person' (22 per cent) than men (8 per cent), and also more commonly endorsed the vindictive motive of 'to punish person for wrong behaviour' (17 per cent of women versus 13 per cent of men). Men more commonly endorsed the motive of 'in retaliation for being hit first' (29 per cent of men and 14 per cent of women) and 'because of jealousy' (42 per cent of men versus 9 per cent of women). These findings indicate that in community samples, women's motives for partner aggression are predominantly instrumental and coercive. Graham-Kevan and Archer (2005) found support for this proposal. They measured women's use of controlling behaviours on the Controlling Behaviours Scale, and this positively predicted perpetration of partner directed aggression on the CTS. Indeed, the relationship between control and partner aggression appears consistent for men and women (Graham-Kevan and Archer, 2009).

Some authors have gone so far as to suggest that in cases of mutual aggression, it may often be the man who is acting in self-defence or retaliation. George (2003) drew attention to the potentially defensive nature of some of the CTS acts commonly endorsed by men. Using data from Laner and Thompson's (1982) study of dating violence, George noted that a pattern commonly found in dyads was a high incidence of pushing and shoving by men, in combination with slapping, hitting and scratching by women. George's argument is speculative, but serves to demonstrate that context is relevant to understanding aggression perpetrated by both sexes.

The CTS focuses on the frequency of specific acts of aggression and is therefore able to provide a quantitative and standardised estimate of rates of partner aggression. In doing so, it does not gather data regarding the circumstances surrounding aggressive episodes. The research discussed above suggests that findings indicating greater female aggression towards partners are not an erroneous consequence of measuring acts of aggression 'out of context'. A contextual analysis does not favour self-defence theories of female perpetration, indicating instead that women initiate a substantial proportion of aggressive episodes and, by their own admission, rarely aggress in self-defence. The role of context is arguably equally relevant to understanding male perpetration. Feminists have tended to justify instances of female perpetration in terms of situational factors, but almost always attribute male aggression to the influence of patriarchy. Consideration of context suggests that self-defence may sometimes be an important motive for male aggression. Dutton and Nicholls (2005) ask of feminist authors: "....how is that violence [female violence] any different from male violence? How can male violence still be depicted as being in pursuit of power and control when female violence is also frequent, and, according to the women themselves, not defensive?"

Evidence relating to the context in which women's partner aggression occurs again contrasts with the general patterns of aggression discussed in Chapter 1. High endorsement of instrumental motives such as 'to get through to my partner', or 'to get control of the other person' suggests that women may be operating at a lower level of emotional arousal in this context, perhaps indicating reduced fear (see Section 4.9.3) rather than engaging in self-defensive reactive aggression. Likewise, high levels of female initiation may also be indicative of more instrumental aggression.

4.5.3: Issues surrounding data from crime surveys and the Criminal Justice System

In response to criticisms that findings from shelter samples are not generalisable, feminist researchers have argued that a number of large scale government surveys in the US, UK and Canada support their claims of greater male perpetration (Dobash et al., 1992). One of the most often cited surveys is the National Violence Against Women in America Survey (NVAW: Tjaden & Thoennes, 1997). The authors reported that men assault their partners approximately three times more frequently than do women. The findings were published subsequent to several National Family Violence Surveys, and were widely reported as in direct contradiction to the findings of family conflict researchers. However, the 3:1 male to female ratio was based on lifetime estimates (i.e. whether respondents had ever been assaulted by a partner). When calculated based on incidents reported in the past year (in line with the CTS approach) the male to female ratio was actually 1.3:0.9. Nevertheless, the findings were substantially different to NFVS estimates. Since it was an apparently representative and well-conducted survey which sampled equal numbers of men and women from 16,000 US households, family conflict researchers considered the results of the NVAS in detail. Straus (1999) addressed the discrepancy in findings arguing that crime surveys reveal a much lower spousal assault rate by both sexes (between 0.02 per cent and 1.1 per cent) than family conflict studies which report overall assault rates around 16 per cent (Straus, 1999). This suggests that crime surveys fail to elicit reports of assaults by both sexes. Straus argued that underreporting can be explained by the context in which crime surveys are presented, i.e. as studies of *crime*, or in the case of the NVAW, of injury and violence. The implication to respondents is that they should only report incidents which are deemed criminal. Straus argued that relatively few domestic assaults are

perceived as criminal by victims, and the result is that crime surveys exclude the majority of incidents of partner aggression. Furthermore, it may be less likely that men will perceive women's aggression as a crime, and so less likely that it will be reported as such. In a representative British crime survey, Mirlees-Black (1999) found that men reported a higher rate of victimisation when they completed the survey in the presence of their female partners, who often reminded them of their own assaults, which the men had not thought to report. Men's disinclination to view women's partner aggression as criminal is likely to be the result of social norms trivialising women's aggression (see Section 4.9.1). The presence of these social norms is evident in historical accounts (George, 2003) and one of the consequences of feminist research may have been to encourage this view of women's aggression as trivial by downplaying its seriousness and conceptualising it as non-criminal (Dutton & Nicholls, 2005).

Other crime surveys have similarly revealed higher rates of male perpetration. The National Crime Victmisation Survey reported a male to female ratio of approximately 13:1, and its successor, the National Crime Victim Survey reported a ratio of approximately 7:1. A UK Home Office Survey (Walby & Allen, 2004) reported a ratio of 9:1 for repeated abuse. However, all of these surveys emphasise crime and victimisation, and reveal very low annual assault rates of around one per cent or less. Because the CTS enquires about partner aggression in the context of relationship conflict rather than crime, it appears to elicit far more comprehensive reporting of aggressive incidents than crime surveys.

Feminist researchers also rely on data from police and hospital records which often (but not always) suggests that perpetration of partner violence is primarily a male affair. However, a number of biases are evident in these data sources, to which

feminist researchers have often failed to draw attention. Kaufman-Kantor and Straus (1990) examined reporting of domestic assaults in a nationally representative sample and estimated that only 7 per cent of all assaults were reported to police; therefore estimates based on crime statistics represent only a very small proportion of all domestic assaults (Straus, 1999). Additionally, female perpetrators are under-represented in crime statistics since men are less likely to report abuse to the police (Stets & Straus, 1992), less likely to press charges when they do, and police are less likely to make arrests and bring prosecutions (Brown, 2004). Indeed, there is evidence that male victims are ignored even when they have sustained significant injury (Buzawa & Austin, 1993). Steinmetz (1977) argued that husband-beating is a hidden problem since a man must overcome immense social stigma to admit that he has been beaten by his wife. This is a view supported by George (1994; 2003) who details a long history of ridicule for men who were beaten by their wives: the most prominent example of this was the 'Skimmington' procession which conferred public shame on the beaten husband rather than exposure of the female abuser (George, 2003). Therefore, it seems likely that a great deal of male victimisation never appears in police or crime data. Indeed, Brown estimated that only 2 per cent of female perpetrators are ever arrested due to the reluctance of men to report assault and the reluctance of police to arrest and prosecute.

Data from hospital records has also been used in support of feminist claims. However, this data is subject to similar biases since men may be less likely to seek treatment for injury or to access any kind of help. Despite this, some studies of hospital data do not support the claim that men are always the perpetrators. In a study in a UK hospital, Smith, Baker, Buchan and Bodiwala (1992) reported approximately equal numbers of men and women seeking emergency treatment as a

result of partner violence. Additionally, they reported that injuries sustained by men were more serious and more often resulted in loss of consciousness.

4.6: Reconciling conflicting findings

Clearly a substantial body of evidence supporting the family conflict view has existed for some years. Despite this, many feminist researchers have continued to argue against the findings of family conflict researchers. This feminist 'paradigm' (Dutton & Nicholls, 2005) continues to influence public policy, and a refusal to acknowledge the extent of women's use of partner aggression has led to accusations of lack of objectivity and groupthink mentality (Dutton & Nicholls, 2005).

Despite the robustness of the findings of family conflict research, the fact remains that a significant number of women do suffer extreme abuse at the hands of their male partners. A number of authors have suggested that the polarised conclusions drawn by two groups of researchers may result from their study of two different populations (Johnson, 1995; Straus; 1997; Archer, 2000, 2002). Johnson's (1995) typology of partner aggression appeared to provide a resolution to the issue. Johnson proposed that there are at least two distinguishable forms of intimate partner violence, which are distinguishable in terms of the level of controlling behaviour exerted by the perpetrator. He argued that shelter samples are drawn from a population of severely abused women whose partners perpetrate a form of non-reciprocal violence as a means of control (Johnson, 1999). Johnson termed this patriarchal terrorism (though he subsequently refers to it as intimate terrorism). Johnson's typology implies that conclusions drawn from shelter samples cannot be generalised to the general population since women who seek refuge in shelters are victims of controlling aggression. Johnson argued that more representative

community samples (typically studied by family conflict researchers) are characterised by a different form of violence, which he termed common couple violence (CCV). CCV is mutual aggression, which is used equally by men and women, is not associated with control, does not always get worse over time, and rarely results in injury. Johnson (1999) argued that intimate terrorism is rarely detected in community samples. He suggested that almost all cases are likely to be included in the percentage of non-respondents (who do not complete surveys), which can be as high as 40 per cent on the NFVS (Johnson, 1995).

There is broad empirical support for Johnson's (1999) claim that the two groups of researchers are studying different populations. Using data from the US, Johnson (2001) reported estimates of male perpetration of intimate terrorism to be 11 per cent in a community sample, 68 per cent in a court sample, and 79 per cent in a shelter sample. Johnson also reported that 97 per cent of the intimate terrorism was perpetrated by men, compared to 56 per cent of CCV. Graham-Kevan and Archer (2003a) examined Johnson's typology using data from women from a domestic violence refuge, male prisoners and students. Physical aggression, fear and injuries distinguished the groups, but controlling behaviour did not. Graham-Kevan and Archer (2003b) examined intimate terrorism and CCV in four samples: students, prisoners, women in domestic violence shelters, and men from domestic violence treatment programs. They found that 94 per cent of relationships classified as CCV were derived from non-selected samples, and 70 per cent of all intimate terrorism was found in the shelter sample.

In his meta-analysis, Archer (2000) calculated effect sizes separately for four types of sample: community samples, student samples, samples selected for marital problems, and refuge samples. Effect sizes for physical aggression towards partners

were in the female direction for student samples (d = -0.10) and community samples (d =- 0.03) and in the male direction for marital treatment samples (d = 0.14) and refuge samples (d = 0.86). Archer also compared the different samples on measures of injuries sustained, although data was not available for the refuge samples. Student samples (d = 0.13) and community samples (d = 0.11) both showed a small effect size in the male direction, but samples selected for marital problems showed a much larger effect in the male direction (d = 0.54). Archer's later (2002) meta-analysis which considered sex differences on specific CTS acts (see Section 4.5.1) also compared student samples, community samples and samples selected for marital problems. In contrast to student and community samples, samples selected for marital problems showed effect sizes in the male direction on almost every act; the largest effect sizes reported were for 'choke or strangle' (d = 0 .61) and 'beat up' (d = 0.85).

Research therefore generally supports the view that violence in selected samples is more severe, and more often perpetrated by men. However, the distinguishing role of control is not supported by evidence. Graham-Kevan and Archer (2005) found that control is associated with women's (as well as men's) perpetration of partner aggression in non-selected samples. In a later study, Graham-Kevan and Archer (2008) found that control predicted partner-directed physical aggression in male and female students, male prisoners, and women residing in a shelter. Johnson (2006) revised his typology, proposing four distinct relationship profiles which reflect the presence of control motives in common couple violence. Johnson continues to argue that intimate terrorism is primarily associated with men, but acknowledges that control motives may be evident in CCV, and in both sexes. However, Johnson's argument that feminist and family conflict researchers

are studying different populations remains useful. Intimate terrorism does represent an extremely severe form of abuse which is distinct from common couple violence, and may not be sex symmetrical. Johnson proposes that acknowledgement of these two different populations 'provides a simple approach to the theoretical impasse: different theories for different types of violence' (2005, p. 1129).

4.7: Interim summary

It is clear from the research reviewed above that women do engage in substantial amounts of physical aggression towards intimate partners. Whilst women sustain more injuries, this is likely to be a result of men's greater size and strength, since women are at least as likely to initiate aggression. Whilst feminist research clearly reveals a population of severely abused women, it is also clear that this pattern is much less evident in community samples. Whether or not the abuse suffered by women in shelter samples represents a qualitatively different kind of phenomena, the reported severity and sex differences are not found in representative samples. Although it is difficult to precisely quantify effect sizes for CCV, family conflict research suggests that it falls somewhere between sex symmetry and a small effect size in the female direction. The CTS is not a perfect measurement instrument, and undoubtedly there are individual cases in which CTS scores do not accurately represent the context of the aggression. Nevertheless, family conflict researchers have been able to demonstrate that the general pattern of sex differences found is little affected by consideration of context and consequences.

Johnson's distinction urges researchers to be clear about the kind of violence they are studying. Johnson (2005) stated that it is not "scientifically or ethically acceptable to speak of domestic violence without specifying, loudly and clearly, the

type of violence to which we refer" (p. 1126), since conclusions drawn from community samples regarding CCV cannot be extended to intimate terrorism. The dynamics are likely to be very different from those operating in couples characterised by CCV, and may require explanations in the clinical domain. To mistakenly apply findings from community samples can lead to serious theoretical flaws and misguided policy recommendations, with potentially serious consequences (Johnson, 2005). It is therefore very important to make clear that CCV (and not intimate terrorism) is the focus of this thesis. It is CCV which is clearly sex symmetric, and it is that which requires explanation as a unique exception to the usual pattern of greater male perpetration.

Campbell's (2006) inhibition theory explains sex differences in intrasexual aggression in terms of evolved sex differences in fear-based inhibition, and the study described in the previous chapter considers these as enduring traits. However, evolved traits in humans are rarely hardwired, fixed and inflexible; their adaptive nature is enhanced by their ability to produce different outputs in response to different environmental inputs. Thus, whilst traits may evolve to a differential characteristic level for the two sexes, different contexts may adaptively result in fluctuations in the expression of these traits (i.e. states). An adaptation which always served to inhibit women's aggression would not be universally adaptive since there are clearly some contexts where the fitness benefits of aggressive behaviour outweigh the potential costs. One obvious example is defence of offspring. But women may use aggression in other contexts where the risk is low. For example, women frequently use verbal aggression towards offspring to chastise undesirable behaviour. Clearly, there is little risk of harmful retaliation. Both girls and boys engage in aggressive sibling rivalry, the ultimate function of which is to gain

additional investment from parents at the expense of siblings. Again, there are fitness benefits, but due to the high proportion of DNA shared with siblings, it is unlikely that conflict would escalate to the point where serious harm is inflicted. These examples serve to indicate how evolved adaptations are responsive to varying costs and benefits associated with different contexts and targets. Likewise, although lower levels of inhibition generally result in aggression being triggered more readily in men, there may be some contexts in which male inhibition of aggression confers fitness benefits. Intimate relationships may represent a situation whereby expression of these evolved traits is calibrated differently in the two sexes. A precise explanation of why this should be is required.

Before this can be addressed, it is essential to attempt to establish exactly what we are trying to explain in accounting for sex symmetry in partner aggression. Sex symmetry may result from: (1) an increase in women's aggression (2) a decrease in men's aggression or (3) a combination of the two (relative to other targets of aggression). Below, evidence is discussed which helps to address the extent to which rates of perpetration for the two sexes change towards intimate partners relative to other potential targets.

4.8: Sex differences in partner aggression relative to other targets

Most of the research discussed in this chapter so far is concerned with quantitative comparisons of male and female aggression towards intimate partners. Approximate sex symmetry has been established, but research which estimates relative proportions of perpetration for the two sexes for partner aggression cannot reveal the extent of behavioural change for each sex relative to other targets.

Research which addresses this issue is limited, but some tentative conclusions can be drawn.

Using data on intimate partner homicide, Felson and Messner (1998) identified the proportions of male and female intimate homicide offenders who also had a criminal record for violence. Eleven per cent of female intimate homicide offenders and 31 per cent of male intimate homicide offenders had committed other violent crimes. This evidence suggests that women aggress at a disproportionately higher rate against partners than do men since few of the women homicide offenders had been convicted for violence in other contexts. However, the biases in the criminal justice system (discussed in Section 4.5.3) cast doubt on the validity of this evidence. Because women's violence is less likely to be reported, and women are less likely to be arrested or prosecuted (Brown, 2004), it is unlikely that an estimate of previous violence based on convictions is accurate.

Using homicide data from Greenfeld and Snell, Campbell (2007) estimated relative differences in perpetration rates of homicide for the two sexes between non-intimate victims and intimate partner victims. Daly and Wilson (1992) used homicide data to argue that male perpetration of partner aggression is higher (despite the unexplained anomalous finding approaching sex parity in the US, discussed in Section 4.3). However, Campbell pointed out that men are responsible for a higher proportion of all homicides (see also Harris, 2003). Campbell presented the relative proportions of the two sexes killing their spouses, taking into account the fact that men generally kill more. She demonstrated that men are actually less likely to kill their spouses than a non-intimate (spouses comprised 20 per cent of their victims) whereas women are more likely to kill their spouses than a non-intimate (spouses comprised 60 per cent of their victims). This data tentatively suggests that women's

violence is disproportionately directed to spouses, while male violence against spouses is lower relative to other targets. However, although homicide data are largely devoid of reporting bias (since homicides are almost always detected and investigated), findings from homicide data cannot necessarily be generalised to CCV.

Some research has attempted to address the issue for sub-lethal forms of partner violence. Moffitt, Kreuger, Caspi and Fagan (2000) used self-reports of violence towards intimates and non-intimates, and revealed a pattern comparable to that found in Felson and Messner's (1998) homicide data. Forty per cent of women reported perpetrating at least one act of partner violence, and 7 per cent also reported at least one act of violence towards a non-intimate. Twenty five per cent of men reported at least one act of partner violence, and 11 per cent also reported at least one act towards a non-intimate. The pattern suggests that most of the women who assaulted their partners did not engage in such behaviour towards non-intimates, whereas almost half of the men did. However, the sex difference in the relationship between violence to intimates and non-intimates failed to reach statistical significance.

Other research suggests a relative reduction in men's aggression in the context of intimate relationships. Using US crime data from Durose et al. (2005), Campbell (2007) compared frequency of attacks on intimate partners and non-intimates for the two sexes and found that the proportion of men's attacks towards a spouse (whilst higher than women's) was less than their proportion of attacks against strangers, therefore suggesting a relative reduction in this context. Felson and Cares (2005) conducted further analysis of the NVAW data (Tjaden & Thoennes, 2000) in which they compared rates of violence towards partners and violence towards

strangers for both sexes. They concluded that male aggression is lower towards partners than strangers. The crime data on which both of these pieces of evidence are based may suffer from the biases associated with criminal justice system data (Section 4.5.3), making it difficult to draw conclusions about CCV, which is rarely a police matter. However, Stets and Straus (1992) reported a similar pattern from the 1985 US NFVS and described as "surprising" the finding that the male violence towards intimate partners was lower than violence towards non-intimates (see also Straus & Gelles, 1992).

Felson, Ackerman and Yeon (2003) examined the effect of the relationship between perpetrator and target on use of physical aggression. The proportion of men's aggression that was physical was lower for spouses (where men reported more verbal arguments) than for strangers. Women's proportion of physical to verbal aggression was similar for both targets, but they reported a greater frequency of verbal aggression, and minor and severe physical aggression towards partners than strangers. The authors emphasised the apparent reduction in male aggression and Felson (2002) has argued that the convergence of rates of aggression in intimate relationships results from a decrease in male aggression in this context. However, Cross, Tee and Campbell (2011) pointed out that the sex of the stranger was not specified in this study; therefore, it is unclear whether the findings represent an effect of relationship with target or an effect of target sex.

Felson and Cares (2005) argued that it is not the nature of the relationship that is important here, it is the sex of the target. Felson (2002) proposed that partner aggression parallels aggression which occurs in other contexts, in that men show reduced aggression towards female targets. This 'target sex' effect could also account for women's increased rate of aggression towards spouses, simply as a

consequence of their partners being male. Other research suggests that both sexes show more aggression towards men than women. In a meta-analysis of aggression in real-world contexts, Archer (2004) found that men showed more aggression towards same-sex opponents (d = 0.89) and women showed more aggression towards opposite sex opponents (d = -0.46). Therefore, women may augment their aggression towards partners simply as a function of their partner being a man.

The problem with this account is that most of the research on which it is based confounds sex and relationship with target. In studies which compare self-reported rates of aggression to intimates and non-intimates, the sex and/or relationship of the non-intimate may not be specified. Respondents may assume an unspecified non-intimate to be same sex, and an intimate to be opposite-sex. If so, an apparent effect of perpetrator-victim relationship may in fact be an effect of target sex. Likewise, self-report studies which appear to show an effect of target sex cannot discount the possibility that participants interpret opposite-sex targets as referring to partners, and therefore their responses are due to their relationship to the target.

A recent study directly addressed the issue of the confounding of sex and relationship status. Using a scenario study with an undergraduate sample, Cross, Tee and Campbell (2011) asked participants about their likelihood of using aggression towards a same-sex friend, an opposite-sex friend and an (opposite sex) intimate partner, so that they were able to assess separately the effects of sex of target and relationship to target. The use of scenarios allowed them to hold provocation constant. They found that women reported greater likelihood of using aggression towards an intimate partner than did men (d = -0.63), and men reported greater likelihood of using physical aggression to same-sex friends than did women (d = 0.57). Men were more likely to use physical aggression towards same-sex

friends than to either opposite sex friends or partners. For opposite sex targets, men reported no difference in likelihood of aggression towards friends and partners. The authors concluded that the reduction in male aggression towards their partners is primarily a result of target sex, i.e. men inhibit aggression towards all women regardless of the nature of their relationship with them. For women however, physical aggression towards a partner was reported to be significantly more likely than physical aggression to either same-sex or opposite-sex friends. Physical aggression was slightly more likely towards an opposite-sex than a same-sex friend, but this difference did not reach significance. The authors concluded therefore that women's increase in aggression in the context of intimate relationships is primarily due to the intimacy of their relationship with their partner, and is not simply an effect of target sex.

Sex symmetry in partner aggression would therefore seem to result from both a relative increase in women's aggression, and a relative reduction in men's aggression. The change in men's behaviour appears to be an effect of target sex. This is compatible with Felson's (2002) argument that male aggression shows a relative reduction in this context. He argued that this is due to social norms for chivalry operating in western society, which prohibit use of aggression towards women in general (this is discussed in Section 4.9.1). However, Felson pays little attention to the relative increase in women's aggression towards intimate partners. Cross, Tee and Campbell's (2011) findings suggest that women's relative disinhibition in using aggression is specific to intimate relationships. Men's relative restraint is an interesting question (Campbell, 2007), and is of significant theoretical and practical importance since it challenges traditional approaches to domestic violence and also poses the question as to whether male inhibitory control of

aggression varies in relation to different targets. However, women's apparent disinhibition towards partners remains unexplained and presents a challenge to theories that have been used to explain sex differences in aggression in terms of enduring traits. The next section provides discussion of the factors which may inhibit men and disinhibit women in the context of intimate relationships.

4.9: Inhibitory and disinhibitory forces to partner aggression in men and women

4.9.1. Social norms

Wife-beating has been illegal in the UK and most western countries for decades. Despite this, a key tenet of feminist theory is that patriarchal societal structures still exist which legitimise and even promote wife beating (Dobash & Dobash, 1977; Pagelow, 1984). Dutton (1994) makes an important point regarding the explanatory role of social norms related to patriarchal values: Citing research which estimates the prevalence of wife beating at around 10 per cent of marriages, he asks, "What kind of causal weight does patriarchy have if 90 per cent of men raised under it are nonassaultative?". Holtzworth-Munroe, Bates, Smutzler and Sandin (1997) reviewed literature which addresses the relationship between men's attitudes towards women (usually operationalized as sex role egalitarianism or stereotyped sex role attitudes) and their use of marital violence. They found no consistent relationship, with some studies finding an effect, and others not. However, the discrepancy may be understood in terms of Johnson's typology; studies which report a relationship typically involve men known to be maritally violent (e.g. Rosenbaum & O'Leary, 1981) whereas studies which find no relationship do not (e.g. Neff, Holamon & Schluter, 1995; Stith, 1990). The authors concluded that sex role attitudes may be associated with severe, but not minor violence. The low

endorsement of patriarchal values and their weak relationship with aggression in community samples may to some extent account for men's relatively low rate of aggression towards women.

Archer (2009) argued that sex symmetry in partner aggression in western society can be understood in terms of the interaction between conflicts of interest inherent in pair-bonded men and women, and the relative costs and benefits of aggression imposed by the society in which they live. Archer argued that, throughout human evolutionary history, greater male partner-directed aggression is likely to have been the norm, not because women had nothing to gain from the use of aggression, but because men's greater size and strength would induce compliance from their female partners. He suggested that the ubiquitous pattern of sex symmetry in the western world results from historically recent changes in the status of women and associated changes in social norms regarding the legitimacy of wife-beating. Social and legal prohibitions against violence towards women alter the cost-benefit ratio associated with use of partner aggression for both sexes. Archer (2000, 2009) and Felson (2000) both argue that in contemporary western societies, powerful social norms actually militate against male violence towards women, and men who violate these norms risk severe retribution and even social exclusion. Research supports this argument (Felson, 2000). In a nationally representative sample, Feld and Felson (2008) reported that both men and women strongly disapproved of male retaliatory aggression towards women. Feld and Robinson (1998) found that men were less likely to retaliate against a girlfriend when a bystander was present, whereas women were more likely to retaliate against a boyfriend in the same situation. Davidovic, Bell, Ferguson, Gorski and Campbell (2011) reported sex differences in inhibitory forces related to use of partner violence. These included

men's greater belief in consequent loss of face and condemnation. These findings suggest that men have internalised social norms which prohibit aggression towards women, whereas women perhaps view aggression towards men as less unacceptable.

There is also evidence that the emergence of powerful social norms prohibiting wife-beating are negatively related to men's use of aggression. This argument is supported by data from three national surveys across three decades (1975, 1985 and 1992) showing a decrease in partner violence perpetrated by men (particularly for serious violence) but a small increase in women's perpetration across the same period (Straus, 1995; Straus & Kaufman-Kantor, 1994). This corresponds to a period when social approval for wife-beating was shown to decline significantly, but there was no such change in approval for husband-beating. Straus, Kaufman-Kantor and Moor (1997) measured attitude change in approval for husbands slapping wives and vice versa in the US between 1968 and 1995. Approval for a husband slapping his wife's face under certain circumstances declined from 20 per cent to 10 per cent; however, approval for a wife slapping a husband's face remained constant at 22 per cent. This corresponds to a time when there was increasing public awareness and disapproval of wife-beating, presumably increasing the perceived costs of aggression for men. Indeed, Miller and Simpson (1991) found that men perceived legal and non-legal retribution for partner aggression to be more costly than did women. A small number of studies have found greater levels of male than female perpetration in societies where patriarchal values are still accepted, for example in Nigeria (Efoghe, 1989). In Korea, Kim & Cho (1992) found a sex difference in the male direction for a number of CTS acts. They argued that the cultural context allowed men to use aggression towards their wives because

men's violence towards their partners was tolerated and little support was available to women. The existence of social norms for male chivalry may therefore largely explain men's relative inhibition of aggression towards their partners.

While social norms in western societies emphasise the serious nature of men's partner aggression, they simultaneously trivialise women's aggression towards men. In Miller and Simpson's study, participants of both sexes reported viewing women's aggression as more trivial. Male partner violence is condemned in the media, whilst the equivalent behaviour by women is trivialised, often portrayed as humorous (George, 1994) and even culturally prescribed in certain circumstances (Straus, 1999); for example, it is generally considered acceptable to 'slap the cad' (Straus, 2004). Felson and Feld (2009) reported that approval for women's retaliation against men was just as high as approval for men's retaliation against other men. The refusal to take women's perpetration seriously extends to support organisations, most of which are directed towards women. Government initiatives emphasise women's victimisation, promoting support services available to women and money invested in tackling abuse towards women and children. Support services typically endorse feminist views of perpetrators as controlling and male (for example, www.womensaid.org.uk; www.thewnc.org.uk). Despite awareness of and help for female victims of male domestic violence, male victims remain all but invisible (George, 1994). Legal sanctions also appear to be considerably lower for female perpetrators. Men are less likely to report abuse to the police (Miller & Simpson, 1991), less likely to press charges if they do seek police assistance, and less likely to be taken seriously by the police. Indeed, when men report abuse at the hands of their partners, police are often unwilling to make an arrest (Migliaccio, 2002). Men's

aggression towards women is also generally viewed as more warranting of police intervention than women's violence towards men (Felson & Feld, 2009).

Western society therefore sends a powerful message to men that violence towards women is unacceptable and likely to be met with severe retribution, whereas the message to women appears to be that their use of aggression towards men is trivial, humorous, often justified, and unlikely to incur costs. The effect of this may be increased inhibition of spousal assault in men, paralleled by disinhibition in women. Ironically, given men's greater size and strength, this trivialisation of women's aggression has potentially dangerous consequences for women should male retaliation occur.

4.9.2: Proprietary and protective motives

Evolutionary accounts of intimate partner violence (discussed in Section 4.3) have largely focussed on explaining male aggression towards their female partners, but provide useful insights into the ultimate costs and benefits associated with this behaviour, and how it may be responsive to different environmental inputs. The proprietary motives emphasised by evolutionary theories of male aggression (Wilson & Daly, 1996; Shackleford & Buss, 1997) may not be exclusive to men. Additionally, male proprietary behaviour may also encompass protective behaviours. These are not evident in previous accounts but may be important in understanding men's relative restraint in this context.

Wilson and Daly (1992b) use spousal homicide data (see Section 4.3) to support their argument regarding the importance of male proprietary motives. However, given the fact that men are less likely to kill a partner than a non-intimate (Section 4.8) their argument is perhaps overstated. Nevertheless, there is

considerable evidence that male perpetrated partner aggression is influenced by proprietary motives. Jealousy is one of the primary motivations in male homicide of female partners and ex-partners (Daly & Wilson, 1988; Block & Christakos, 1995; Crawford & Gartner, 1992) and in men's perpetration of partner violence generally (Follingstad et al., 2001). Furthermore, the age at which women are most at risk of being killed by their male partner coincides with the age at which they are most fertile, and therefore of greatest reproductive value. Women under 25 years of age have been shown to be at greatest risk (Mercy & Saltzman, 1989). However, it is worth noting that the partners of young women are likely to be young themselves, and young men are more aggressive than older men.

Undoubtedly there are fitness benefits associated with male mate guarding behaviours aimed at prevention of cuckoldry (Harris, 2003). There is no question that men have evolved an acute sensitivity to indicators of infidelity, and the associated emotion of jealousy serves to instigate a behavioural response. One of the fitness benefits of male partner aggression may be enhanced control of a partner's reproductive abilities. However, Graham-Kevan and Archer (2009) found that whilst men's controlling behaviour increased as a function of their partner's fecundity, physical aggression did not.

However, evidence from non-western societies indicates that when proprietary motives are not held in check by social norms prohibiting aggression, male aggression is more prevalent. Hence, male proprietary motives may act as an impelling force to aggression. Wilson and Daly's (1996) account has parallels with both feminist accounts of controlling abusers and Johnson's (1999) concept of the patriarchal terrorist. They suggest that men should be particularly concerned with sexual infidelity, hence its relationship to aggression as a form of mate-guarding and

control. However, Wilson and Daly's analysis assumes proprietary motives only influence men. Whilst their male-oriented theory of same-sex sex differences in aggression (Section 1.7.1) emphasises male appetitive motives and assumes women having nothing to gain, the same assumption is implicit in their account of male proprietary motives for partner aggression.

It is not proposed here that women's use of partner aggression is solely concerned with proprietary motives. Research reviewed in Section 4.5.2 suggests a range of motives for female partner aggression, and the same is true for male aggression. However, proprietary motives should not be ascribed automatically and exclusively to men. Wilson and Daly (1996) argued that women should be less preoccupied with sexual infidelity since cuckoldry is not possible. The literature on sex differences in jealousy has long dichotomised men's jealousy as sexual and women's jealousy as emotional (since emotional infidelity poses the risk of loss of resources and investment in offspring) (e.g. Buss, 2000). However, most of the research on which these conclusions are based is drawn from forced choice responses to imagined infidelity. Research which has examined responses to real infidelity using continuous measures suggests there is not a sex difference in jealousy, either in extent or form (Harris, 2003). Indeed, women arguably have a great deal to lose as a result of sexual infidelity, since emotional attachments often follow, and if pregnancy occurs, mate desertion (and associated loss of resources) may follow. Women are just as upset and angry as men in response to infidelity (Campbell, 2002). Additionally, self-report data suggests that women are more likely to express anger and behave aggressively in response to infidelity (De Weerth & Kalma, 1993). The relationship between jealousy and partner aggression has been shown to be stronger for women than for men (Sugarman & Hotaling, 1989). Based

on partner reports, Graham-Kevan and Archer (2009) found that women (and men) of lower self-perceived mate value engaged in more controlling behaviour and physical aggression, indicating a role of control and aggression in mate-guarding for both sexes. Therefore, whilst there is substantial evidence that proprietary concerns can motivate male aggression towards their partners, the same may be true for women. Whilst social norms prohibiting aggression may prevent men from pursuing proprietary motives aggressively, the trivialisation of women's aggression may allow women to aggressively pursue their own proprietary desires with relative impunity.

Wilson and Daly's (1996) account of the influence of male proprietary motives focuses on the fitness benefits of partner aggression. However, use of aggression may incur a number of costs. These costs are not simply those associated with societal and legal condemnation, but also the fitness costs of causing harm to a partner. Proprietary motives may therefore include the desire to protect female partners. Indeed, the ability to protect is an attribute that women find attractive in a potential partner (Barber, 1995; Buss & Schmitt, 1993). A man's reproductive potential is linked to the health and wellbeing of his partner; should she sustain injury, her ability to bear and invest in offspring may be damaged. Likewise, her death is very costly to her partner's fitness since any existing children would be left without a mother (the fitness costs for offspring are discussed in Section 1.7.6), and no further children would be born. Thus, sexual selection has presented men with a double edged sword; violence can be used towards a partner as a means of reproductive control, offering protection from the threat of cuckoldry, but violence also carries the risk of injury, which may have severe reproductive consequences. Additionally, a man's use of aggression towards his partner would, to a large extent, negate the belief that he could protect her, possibly leading her to seek out new

relationships. From an evolutionary perspective therefore, we would expect that in general, men would seek to protect their partners from harm, and this would serve as an inhibitory force to aggression.

However, the fact remains that in the absence of social norms prohibiting aggression, male aggression towards their partners is more common (Archer, 2006), which does suggest that if men can 'get way with' using aggression towards partners, they will use it. The cultural context is a potentially powerful mediator of the costs associated with male aggression. This tension between the desire to protect and the need to guard against cuckoldry and desertion is perhaps a delicate evolutionary balancing act. In western societies, the presence of powerful social norms increases the cost of violence for men, and favours protection of women. In patriarchal societies which condone and even encourage violence towards women, the costs of men's aggression are reduced. In a Mexican study, the presence of close kin was associated with less victimisation for women (Figueredo et al., 2001). Under these circumstances, the potential costs of male aggression are reduced in that retribution is unlikely (either in the form of his partner leaving, or retaliation from her family).

In cultural contexts where violence towards women is legitimised, it is possible for men to reap the fitness benefits of aggression motivated by proprietary. This should largely take the form of sub-lethal aggression since killing a partner clearly does not result in a fitness gain. Some research suggests that death threats, for example, are a tactic used by some men to maintain control of their partner's reproductive abilities (Polk & Ranson, 1991). This may act as an effective deterrent whilst causing no physical harm. Indeed, Wilson and Daly (1998) argued that intimate partner homicide represents "… the dysfunctionally extreme products of

violent inclinations whose lesser manifestations are effective means of coercion" (p. 299). They suggested that the motivational underpinnings of both lethal and non-lethal wife assault are often the same, but homicide represents an attempt at control which has gone too far. Research which provides an objective assessment of the form that violence takes in patriarchal societies would be useful to determine the extent to which violence is orchestrated to limit fitness losses. However, the operation of powerful chivalry norms in western society may serve as an inhibitory force against the violent pursuit of male proprietary motives. At the same time, the lack of social prohibition against women's partner aggression may afford women the opportunity to use aggression to enhance their own fitness. Women's endorsement of instrumental motives for partner aggression (Section 4.5.2) suggests that this may be the case.

4.9.3. Fear

Fear appears to be central to women's likelihood of using aggression. In the study reported in the previous chapter, harm avoidance emerged as the primary mediator of the relationship between sex and aggression, with women reporting significantly higher levels of harm avoidance than men. If women's aggression is higher towards intimate partners than to others, it seems likely that fear and behavioural restraint may be reduced. The dynamic interaction of the forces acting on men and women to impel and inhibit aggression may be important here; if it is the case that men inhibit their aggression towards their partners, this is likely to have a reciprocal effect on women's likelihood of using aggression (Davidovic et al., 2011). Archer (2002) suggested that one possible consequence of male inhibition of aggression towards a female partner is to make it safer for her to use aggression against him. Over the course of a relationship, a woman may learn that her partner is

unwilling to cause her physical harm, and that she need not fear him. Based on the findings of the previous study, it was concluded that fear of physical harm is both an ultimate and a proximate causal factor influencing women's use of aggression (Section 3.4.5). Sexual selection appears to have favoured both general behavioural restraint (based on a developmental foundation of fear) and fear of physical harm more directly. However, assessment of situations and people which pose the threat of physical harm partly depends on learning. If women learn (from society and interpersonal experience) that intimate partners do not pose a threat, women's fear is likely to be reduced. This reduction in fear may also adaptively reduce general behavioural restraint, allowing women to act on their own impelling forces to aggression.

There is some evidence which suggests that women in community samples do not fear retaliation from their partners. Fiebert and Gonzales (1997) reported that 29 per cent of women in an undergraduate sample had initiated aggression towards their partners, and around half of those reported no fear of retaliation. Indeed, the extent of women's initiation of aggression (see Section 4.5.2) is also consistent with the view that women are not particularly fearful of their partners. In his meta-analysis, Archer (2000) reported that a larger effect size in the female direction for aggression towards male partners was associated with a lower proportion of men using aggression. This suggests that perception of a reduced risk of male retaliation (presumably accompanied by reduced fear) is associated with an increase in women's aggression. Indeed, Brahan (2000) in a UK study found that a large proportion of female participants reported that they felt able to use aggression towards male partners precisely because they did not fear retaliation. Capaldi and Owen (2001) examined sex differences in fear of partners in a sample of couples

deemed at risk (due to perpetration of violence by both partners). They predicted greater fear in women (due to greater chance of injury), but found no sex differences. However, women's fear was positively associated with their partner's use of physical aggression and injury incurred as a result. Men's fear was positively associated with injury only (but approaching significance for frequency of aggression). Graham-Kevan and Archer (2005) found that the extent to which women feared danger in partner conflict was positively associated with aggression. However, when entered into a predictive model with measures control and victimisation, the contribution of fear was negative; women's aggression was best explained by low levels of fear in combination with higher levels of control and victimisation.

Whilst it seems that a large proportion of women in community samples do not fear retaliation from their partners, they also believe their own aggression is relatively harmless, a view that is reinforced by the media. In Fiebert and Gonzales's (1997) sample, 63 per cent of women who had hit their partners stated that they did not think their aggression could hurt them. Women's reduced fear of retaliation combined with the belief that their own aggression is harmless, and not likely to be met with retribution, is likely to be a powerful disinhibitory combination. The increase in women's aggression towards intimate partners may therefore be explicable in terms of adaptive changes in fear and inhibitory control. In contrast, the potentially greater consequences for men may serve to increase inhibition.

4.10: Aims

Studies of CCV consistently show sex symmetry in perpetration in western societies. Sex symmetry requires explanation since this represents a substantially different pattern to that documented for the two sexes in Chapter 1, whereby men

perpetrate the vast majority of direct aggression against other targets. This marked difference is yet to be explained; Dobash et al. (1992) challenged sex symmetry theorists "to develop coherent theoretical models that would account for a sexual monomorphism of violence in one social context and not in others" (p. 72). A comprehensive theory of sex differences in aggression must be able to account for this. It is not correct, however, to argue that such accounts must be gender blind (Dobash et al., 1992), only focussing on individual level variables such as childhood experiences, stressors, anger and so on. This approach is based on the mistaken premise that sex symmetry implies that sex plays no part in aggressive behaviour, when in fact what requires explanation is the sex-specific *change* in behaviour towards intimate partners relative to other targets. Sex symmetry in CCV appears to result from a relative decrease in men's aggression towards women, and a parallel increase in women's aggression, specifically towards intimate partners (Cross et al., 2011). This marked difference in the behaviour of the two sexes could not be explained by a gender-blind account. The social norms operating in western society may serve to inhibit men's aggression towards their partners, and in doing so, simultaneously reduce women's fear and inhibitory control, increasing their use of aggression. Thus it is proposed that sex symmetry in CCV may be explicable in terms of the same inhibitory variables that mediate sex differences in aggression in other contexts.

The purpose of the second half of this thesis therefore is to investigate the role of fear and inhibition in explaining sex symmetry in CCV. In the previous chapter, these variables were operationalised as trait measures of general behavioural restraint, harm avoidance, and anger-specific control. It is proposed that evolved optimal levels of these traits in the two sexes fluctuate adaptively in

response to environmental inputs, which alters the cost-benefit ratio, resulting in different context-specific states. The operation of social norms promoting male chivalry, prohibiting male partner aggression, and trivialising women's partner aggression are likely to alter the costs and benefits of aggression for the two sexes relative to other targets. The aim of the second half of this thesis therefore, was to operationalise the variables that were measured in the previous study specifically in the context of intimate relationships in order to determine whether changes in fear and inhibition can explain sex symmetry in CCV. Measures of fear and inhibition specific to this context were needed. The next chapter documents the development of a measure of inhibition in intimate relationships. This measure was subsequently used in the study documented in Chapter 6, which examines the relationships between sex, fear, inhibition, social representations of aggression and aggression in the context of intimate relationships.

Of primary interest was the relative increase in women's aggression to intimate partners. Felson (2002) has focussed on the factors which may serve to inhibit male aggression to partners. Clearly this is important, but to date, little attention has been paid to explaining why women's aggression rises against partners. Because Campbell's theory emphasises the selection pressures which may have acted on women to inhibit their aggression, it is of primary importance for the theory to explain why women's behaviour changes in intimate relationships. However, the measure described in the next chapter was designed to be equally applicable to male respondents to allow comparison of levels of fear and inhibition between the two sexes in this context.

Chapter 5: The development and factor analysis of a measure of inhibition in intimate relationships

5.1 Introduction

5.1.1. Rationale for the development of a new measure

In the previous chapter it was established that in western society, there is approximate sex symmetry in perpetration of mild to moderate forms of partner aggression (Common Couple Violence, or CCV) (Archer, 2000, 2002). Sex symmetry appears to be the net result of a reduction in men's aggression relative to other targets, and an associated increase in women's aggression. It represents a marked exception to the otherwise ubiquitous pattern of lower female involvement (described in Section 1.3) and presents a critical test of Campbell's (1999, 2002, 2006) theory. The focus of the first half of this thesis was to explain women's usually greater desistance from direct forms of aggression in terms of the psychological mediators proposed by Campbell (1999, 2006). The findings reported in Chapter 3 indicate that the relationship between sex and aggression is mediated primarily by harm avoidance, but also by general inhibitory control. If fear and inhibitory control are the psychological mechanisms which reduce women's involvement in aggression, their greater use of aggression towards intimate partners may be explicable in terms of a context-dependent variation in sex-typical calibrations of these variables.

Although sexual selection is likely to result in sex-calibrated levels of attributes or traits, these 'optimal' trait levels are unlikely to be stable across all situations. Adaptive social behaviour is adaptive by virtue of its plasticity in response to fluctuations in the ratio of costs and benefits associated with different contexts. In

relation to higher-order effortful control of socioaffective impulses, MacDonald (2008) argued that the conscious processing which is characteristic of effortful control allows explicit evaluation of costs and benefits associated with different contexts. Indeed, if optimal 'trait' levels of inhibitory control did not vary adaptively, the effortful control system would not require cortical processing of environmental information. MacDonald uses the example of intimate jealousy to demonstrate how such a contextual cost-benefit appraisal might interact with an evolved prepotent aggressive response to determine behaviour. Cues to infidelity are likely to trigger affective states of anger and jealousy, resulting in a prepotent aggressive response. However, contextual evaluation of perceived costs (for example, legal consequences or retaliation) may cause individuals with sufficient inhibitory control to inhibit the aggressive response. MacDonald argues that effortful control of evolved prepotent responses is itself an adaptation, and one that is unique to humans; 'socioaffective impulses' towards aggression (and other behaviours) are regulated by conscious evaluation of context-dependent costs and benefits.

Based on evidence discussed in Chapter 4 (Section 4.9.3), it is proposed that the context of intimate relationships is one that women generally do not associate with risk of harm. Women report low levels of fear of intimate partners and do not fear the consequences of using aggression themselves, either in terms of retaliation or legal sanctions, and report initiating a high proportion of aggressive encounters, often for instrumental motives. It is proposed that sex-correlated changes in perceived risk of harm will be reflected in situational measures of both fear and inhibitory control (the proposed mediators in Campbell's model, for which support was found in the study reported in Chapter 3). In Chapter 3, there was a large effect (favouring women) on the harm avoidance measure; women overwhelmingly opted

for tedious or painful activities in preference to activities associated with risk of physical harm, and it was harm avoidance that emerged as the primary mediator of sex differences. If women do not fear their partners, nor the consequences of aggression towards them, partner-directed aggression should not be perceived as a risky activity, and women are less likely to desist from it. It was therefore expected that low levels of fear of the consequences of aggression would predict women's perpetration. A simple fear measure was developed for use in the subsequent study and is described in Chapter 6.

Campbell (2006) argued that because the acquisition of effortful control is based on fear, and girls show greater fear and superior effortful control abilities from an early age (Else-Quest, Hyde, Goldsmith & Van Hulle, 2006), women should acquire all kinds of affective inhibition more easily than men, one consequence of this being better inhibitory control of aggression. Consistent with this argument, support was found for the role of general inhibitory control as a mediator of sex differences in aggression in the study reported in Chapter 3. If however, (as MacDonald (2008) suggests) effortful control abilities are sensitive to contextual fluctuations in cost-benefit ratios, then in line with a reduction in fear (an emotional indicator of low risk of harm), we might expect a reduction in inhibitory control of behaviour towards an intimate partner.

If this is found to be the case, it would represent a marked deviation in sex differences in inhibitory control of social behaviour. A review of sex differences in the evolution of inhibitory mechanisms (Bjorklund & Kipp, 1996) concluded that sex differences in inhibitory control particularly favour women when the context is clearly social (their use of the term social inhibition refers to behaviours which have their primary consequence for social interaction or relationships). In their narrative review,

they report a strong female advantage, with studies finding superior ability in the control of emotional arousal and expression. Bjorklund and Kipp's account of the selection pressures favouring better inhibitory control in women is discussed briefly in Section 1.8.4. It differs from Campbell's (1999, 2002) account in terms of its proposed origin; they argue that the requirements of high quality mate acquisition and childrearing necessitated better inhibitory control. Bjorklund and Harnishfeger (1995) did acknowledge the necessity of inhibition for the control of aggressive behaviour. They propose that an increase in the size of the neocortex (and associated connections between the prefrontal cortex and limbic system) were selected to allow inhibitory control of aggression, facilitating effective cooperation and competition. They propose that these brain areas were subsequently harnessed for the inhibition of other social behaviours. A recent meta-analysis of sex differences in impulsivity provided further support for a female advantage in inhibitory control in interpersonal domains; Cross, Copping and Campbell (2011) reported a larger effect (d = 0.32) on the Social Problem Solving Inventory than for more general measures of impulsivity, indicating men's greater tendency to resort to impulsive solutions (characterised by a lack of consideration and planning) to interpersonal problems.

If women do not associate risk of physical harm with intimate partners, this lack of fear may also be manifest in reduced inhibitory control. Additionally, in an established relationship, women may no longer need to engage in the high levels of inhibitory control which Bjorklund and Kipp (1996) suggest is necessary for successful mate acquisition. For these reasons, it was expected that women would show a stable, context-specific reversal of their usually higher levels of inhibitory control, and that this would be associated with greater use of aggression towards

intimate partners, reflecting a consistent reduction in perceived costs of aggression when the target is an intimate partner.

The study reported in the subsequent chapter intended to measure the same variables included in Chapter 3, but in the context of intimate relationships. This correspondence would allow assessment of whether sex differences in fear and inhibitory control (on which women showed an advantage in Chapter 3) disappear or reverse in parallel with sex symmetry in use of aggression towards partners, and most importantly, the extent to which lower levels of fear and inhibitory control can explain women's use of partner-directed aggression. This required situational measures of these variables. Despite the large number of inhibition and impulsivity measures (discussed in Chapter 3), most take a trait approach in assuming these to be enduring, cross-situational properties of individuals. Prior to embarking on the development of a new relationship-specific measure, a literature search was conducted to determine whether any suitable measure existed, or alternatively, a measure which might be adapted (for example, a measure of marital quality); no suitable measures were identified.

This chapter details the construction and psychometric evaluation of a self-report measure of changes in inhibitory control of behaviour towards intimate partners over the course of (heterosexual) intimate relationships; the Inhibition in Intimate Relationships Scale (IIRS). The development of this measure was guided by the need for an instrument that could measure inhibitory control of behaviour towards a partner in the final study, and which could easily be administered to a large community sample. The section below discusses how inhibitory control was conceptualised in this context.

5.1.2. Identification of relevant domains of inhibitory control

A measure was needed which would capture general behavioural restraint in relation to an intimate partner, the extent to which respondents are generally inhibited or disinhibited in the presence of their partner. No measure has been developed previously to assess inhibitory control in this context; therefore no previous measure could guide the development of the new one. However, two sources were particularly important in conceptualising this domain: Goffman's (1959) account of self-presentation in interpersonal situations, and Bjorklund and Kipp's (1996) review of inhibitory control in social contexts, which identified aspects of interpersonal behaviour where women show a particular advantage in inhibitory control (and might therefore be expected to disappear in intimate relationships, if behavioural restraint is lowered). Bjorklund and Kipp suggest that new measures of inhibition are needed for assessment of inhibitory abilities in different social contexts. The forms of social inhibition they discuss provided a useful starting point for identifying relevant domains of measurement. The subsection below describes three domains of measurement derived from these accounts, which would subsequently be used to guide item generation for the new measure.

Relaxation of public behavioural standards

Goffman (1959) considered humans in their social world as actors on a stage, maintaining a performance in presenting to the world the 'face' they wish to have accepted. Goffman emphasised the importance of withholding or inhibiting certain behaviours in social situations, and he made a distinction between 'frontstage' and 'backstage' behaviours. Frontstage behaviours refer to acceptable public standards. He argued that 'dramaturgical discipline' is needed to successfully carry off the

performance; in other words, it requires effortful control. Goffman's references to acting and discipline infer the need for effort and restraint in maintaining a performance.

Goffman (1959) argued that when this public face slips, socially 'undesirable' behaviours begin to emerge, for example, sexual comments, complaining, sloppy posture, use of dialect, inconsiderateness, self-involvement, bad habits and behaviours relating to bodily functions. He terms this 'backstage' behaviour. These backstage behaviours can be considered disinhibitory, since effort is required to prevent their expression. Hence Goffman's conceptualisation of the effort required to maintain a public face is akin to the component of effortful control which involves the suppression of a prepotent response (backstage behaviours being the prepotent response). Whilst some of Goffman's examples of socially unacceptable behaviours may be outdated, the principles underlying his account provided a useful starting point for the generation of items which would capture disinhibition in an interpersonal context.

It was expected that both men and women in intimate relationships would show substantial relaxation of public standards of behaviour. As individuals get to know one another more intimately, the effort required to maintain 'frontstage' behaviour cannot be maintained, and is arguably unnecessary. Once a relationship is established, the high degree of familiarity and time spent together should afford both partners the security to be somewhat disinhibited. Goffman himself suggested that the presence of backstage behaviours associated with reduced control (inhibition) should be seen as "symbolic of intimacy" (Goffman, 1959, p. 129). What was of interest was not whether disinhibition occurs in intimate relationships (for it is

clear that it must), but the relative extent to which it occurs in the two sexes, and how sex differences differ to those found in other contexts.

The control of emotional expression and arousal

In their account of sex differences in inhibitory control in interpersonal contexts, Bjorklund and Kipp (1996) focus on the ability to inhibit a prepotent emotional response by hiding true feelings. In their review, Bjorklund and Kipp reported a female advantage on two facets of this. They found that women had superior ability in the domain of expressive control, which refers to control of facial expressions and body language to conceal true feelings or simulate false feelings. Because body language is largely unconscious, it is unlikely that respondents would be able to accurately self report the extent to which they engage in these behaviours. However, Bjorklund and Kipp also discuss the control of emotional arousal, presenting evidence of women's superior inhibitory abilities. This refers to the ability to conceal negative emotions (for example, disappointment and dislike). Control of emotional arousal may lend itself more readily to self-report since emotions (and the behaviours that result from them) are accessible to conscious awareness. The control of emotional arousal is likely to require a high degree of effortful control since it necessitates the inhibition of a (presumably often powerful) prepotent socioaffective response. Further effortful control is required if this is to be successfully masked with a simulated positive emotion.

Tactful withholding of information ('white lies')

Bjorklund and Kipp (1996) focus on the control of one's emotional arousal in their account of social inhibitory processes. However, the information they are concerned with is affective information representing the individual's own internal

state. In contrast, Goffman's (1959) account refers to tactful withholding of information about other individuals, which constitutes a polite reluctance to tell the truth ('white lies'). Goffman argued that tactful withholding of information about others is an essential part of the social glue which allows society to function. If individuals always confessed to their true opinions of others, challenging their presentation of self, interpersonal relationships would cease to function effectively. When disinhibition occurs in more intimate relationships, this tendency to tactfully withhold information may decline, resulting in more honest appraisals of the other person. The subsequent section describes how these domains were used to guide the development of the new measure.

5.2. Method

5.2.1. Initial item generation and response format

The development of a new measure began with the generation of a relatively large number of items. The intention was to administer these items to a sample of participants in relationships, and to subsequently use Principal Components Analysis to identify the most appropriate dimensional structure and to remove redundant items. Sex differences could then be investigated.

Guided by the domains discussed above, forty-seven initial items were generated, designed to encompass general disinhibition in relation to an intimate partner. Over-sampling of items was intentional to ensure adequate content validity, and to allow for likely loss after psychometric analysis, resulting in a manageable number of items in the final questionnaire. Care was taken to ensure relevance to the context of contemporary intimate relationships, given that Goffman's (1959) account is somewhat dated in terms of the specific kinds of behaviours which are

now socially acceptable. A large number of items were generated which were designed to assess the relaxation of public behavioural standards. In line with Goffman's account, these included items which enquired about bodily functions, awareness of body language, the need to be on one's best behaviour, and behaviours which would generally be considered impolite in a non-intimate context (e.g. helping oneself to food from another's plate, turning up the heating in someone else's car, making small jokes at someone else's expense). Items designed to assess the control of emotional arousal focussed on the tendency to conceal negative emotions, for example, "Pretend you're not upset when your partner unintentionally says something hurtful", and simulating positive emotions, for example, "Pretend to like an unsuitable present he/she has bought for you". Items aimed at assessing tactful withholding of information focussed on situations where individuals would be expected to tell white lies out of politeness when showing behavioural restraint, for example, "Tell your partner you do not like his/her awful new haircut" and "Truthfully tell your partner that he/she has gained weight when asked for your opinion". It should be noted that items specifically measuring the control of anger and aggressive behaviour were not included. The new measure was intended to assess general behavioural restraint in an interpersonal context, not the control of anger or aggression. A combination of positively and negatively phrased items was included. The complete set of initial items is given in Table 5.1, below.

The questionnaire items were prefaced with the following instructions: 'In relation to the following scenarios, please rate your typical current behaviour to your current partner *comparing it to how you behaved when you first met them*. Please tick the box next to the response which best describes how you feel in each case. If you feel that any of the scenarios described do not apply to you, please indicate

what you think you might do'. The intention was to measure *change over time*, i.e. respondents were asked to indicate the extent to which their behaviour towards their partner had changed compared to when they first met them. This choice of a measure of change over time resulted from a lack of knowledge regarding the impact of length of relationship on disinhibition; disinhibition might occur relatively early in a relationship and stabilise, or alternatively, disinhibition might increase linearly over a period of years. If the change in inhibition was substantially greater for respondents who had been in relationships for longer, then it might be necessary to enter length of relationship as a covariate in analysis of sex differences. It was also thought necessary to provide response options which allowed for the possibility that inhibition might potentially increase over the course of a relationship although this was not expected for either sex. Since no study is known to have measured inhibitory control of behaviour towards an intimate partner, it was not possible to exclude this possibility prior to data collection. In order to measure change over time and to allow for the possibility of an increase in inhibition, respondents rated each item on a scale of one (A lot less than when they first met their partner) to five (a lot more than when they first met their partner). All items were scored so that a score of 1 corresponded to a response indicating that inhibition lowered over the course of a relationship, and a score of 5 corresponded to a response indicating increasing inhibition over time. A score of 3 indicated no change in level of inhibition. The items which were negatively phrased (and were therefore reverse scored) are marked with an asterisk. Respondents were also asked to indicate their sex, age, length of relationship with current partner, and whether or not they were living with their current partner.

Table 5.1: Inhibition questionnaire items

1.	Pretend to like an unsuitable present he/she has bought for you?
2.	Pretend you're not upset when your partner unintentionally says something hurtful?
3.	Pretend to like a tasteless new item of clothing your partner is wearing?
4.	Pretend to enjoy a film that your partner likes, even though you find it boring?
5.	Tell your partner you do not like his/her awful new haircut?*
6.	Tell your partner that you are upset when they cancel a date in order to spend time with another friend?*
7.	Sing along to music in the car in the company of your partner?*
8.	Tell your partner they need a bath?*
9.	Pretend you are delighted when your partner surprises you with tickets to the cinema, even though you are coming down with a heavy cold and would prefer not to go?
10.	Hide the fact that you are in a bad mood whilst spending time with your partner?
11.	Leave the bathroom door open whilst using the toilet when spending time at home with your partner?*
12.	Pretend to be interested in something your partner is saying, even though it is very boring?
13.	Pretend to be amused when your partner tells a poor joke?
14.	Cut your toenails in front of your partner whilst watching TV?*
15.	Help yourself to your partner's chocolates in his/her company without waiting to be offered?*
16.	Give your partner a spontaneous hug if you felt like it?*
17.	Jokingly hit your partner if they said something rude to you in jest?*
18.	Turn up the heating in your partner's car if you felt cold?*
19.	Take care to appear attentive when listening to a story your partner has told you several times before?
20.	Tell your partner when you have done something embarrassing, such as falling over in the snow?*
21.	Let your partner know when he/she is boring you?
22.	Sprawl comfortably on the sofa whilst watching TV with your partner?*
23.	Truthfully tell your partner that he/she has gained weight when asked for your opinion?*
24.	Pretend to be happy with your partner's choice of restaurant, even if you would prefer to go somewhere else?
25.	Look at an interesting article in a newspaper or magazine whilst in conversation with your partner?*
26.	Tell your partner that you do not like one of his/her close friends?*
27.	Allow your partner to come into the bathroom and continue a conversation whilst you are having a bath?*
28.	Pretend to be happy about your partner bringing his/her mother on a day out, even though you feel annoyed?
29.	Get changed in front of your partner?*
30.	Tell your partner if you think he/she is driving badly?*
31.	Make sure you are well dressed when meeting your partner for a quick coffee?
32.	Express your honest opinion to your partner, even if it is not in agreement with his/hers?*
33.	Have a frank discussion about contraception with your partner?*
34.	Make small jokes at your partner's expense?*
35.	Express sarcasm towards your partner?*
36.	Take a mouthful of food from your partner's plate?*
37.	Lounge around in nightwear whilst watching TV with your partner?*
38.	I would feel embarrassed if my partner saw me throw up.

39. When spending time with my partner, I feel I can be myself.*
40. When spending time with my partner, I feel relaxed.*
41. I would feel embarrassed if my partner heard me swear.
42. I feel the need to be on my best behaviour in the company of my partner.
43. When spending time with my partner, I am aware of my own body language.
44. I would feel embarrassed if I passed wind in the company of my partner.
45. I would feel comfortable sitting in silence whilst spending time with my partner.*
46. I would feel embarrassed if my partner saw me drunk.
47. If I was very tired, I would feel comfortable dozing in a chair whilst spending time at home with my partner.*

5.2.2. Sample characteristics

Whilst an undergraduate sample was more readily available, this was not deemed most appropriate for this study. It was important to ensure the sample incorporated respondents of a wide range of ages and relationship lengths because the extent to which disinhibition varied with length of relationship and age was unknown. Additionally, once developed, the measure was intended for use (in the study reported in Chapter 6) with a community sample of participants (since this is the population where sex symmetry in partner aggression is known to exist). For these reasons, a more varied adult sample was preferable to a student sample.

Respondents were recruited by two different means. Initially, members of staff and postgraduate students from Durham University completed an online version of the questionnaire. However, only 57 responses were obtained, which was insufficient for factor analysis. Therefore, 750 questionnaires were delivered by hand to homes in Newcastle upon Tyne. This yielded a further 149 responses, providing a sample of 206. Sixty-six respondents were male (32 per cent) and 140 were female (68 per cent). Ages ranged from 18 to 73 years, with a mean age of 37.68 (SD = 12.48 years). The distribution of age was positively skewed with a greater number of respondents being under 50. Respondents reported the average length of their

current relationship as 13.30 years (SD = 12.30 years). The range was from 0.1 to 50 years. This distribution was markedly positively skewed with far greater numbers of respondents being in relationships for short periods of time, probably due to the fact that the age range was skewed towards younger participants. One hundred and sixty-two respondents (78.6 per cent) of respondents lived with their partners and 42 (21.4 per cent) did not.

5.2.3. Procedure

Staff and postgraduate students from Durham University

An email was sent to potential respondents requesting voluntary participation in a research project which aimed to develop a questionnaire to measure how relationships change over time. Addressees were invited to participate only if they were currently in a heterosexual intimate relationship. A link was provided to an online version of the questionnaire, which they were able to complete at any convenient time.

Respondents from households in Newcastle upon Tyne

A paper version of the same questionnaire was delivered by hand to 750 households. The questionnaire was delivered in a sealed envelope addressed to 'The Occupier', along with a letter of information (containing the same information included in the email sent to staff and postgraduate students at Durham University), a consent form, and a pre-paid addressed envelope for return of completed questionnaires and consent forms. Again, respondents were able to complete questionnaires at their own convenience.

5.3.1. Exploratory factor analysis

Exploratory factor analysis (principal components analysis; PCA) was conducted in order to examine the factor structure of the 47 item scale. This analysis was conducted on data from male and female participants combined. It would be preferable to conduct PCA on male and female data separately since it may be the case that there are some sex differences in the tendency for particular items to cluster together. However, because the sample size was only just large enough to permit PCA (see below), this was not possible. Prior to conducting the analysis, the data were screened to determine their suitability for PCA.

Suitability of data for PCA

Although the sample size and case to variable ratio were smaller than ideal, Comrey and Lee (1992) suggest that a sample size of 200 is fair. Measures of sampling adequacy confirmed that the dataset was suitable for factor analysis. The KMO measure of sampling adequacy was .84, well in excess of the minimum of .6 suggested by Tabachnick and Fidell (2007). Bartlett's test of sphericity was highly significant, χ^2(1081) = 3854.25, *p*<.001, which suggests the relationships between variables are adequate for factor analysis.

The vast majority of items showed mild to moderate skew towards lower values. This reflects respondents' tendency to report lowered levels of inhibition when comparing their current behaviour towards their partner with their earlier behaviour, as expected. Whilst the factor solution is enhanced if all variables are normally distributed, factor analysis is robust to violations of the normality

assumption (Tabachnick & Fidell, 2007), so the extent of skewness was unlikely to pose a problem.

Principal Components Analysis

Principal Components Analysis (PCA) with Varimax rotation was conducted on all 47 items. Although psychologists have often favoured factor analysis since it (correctly) assumes that not all variance can be explained. However, because it is not possible to determine the proportion of unexplained variance (Field, 2009), PCA is more legitimate psychometrically.

There is debate about which extraction and rotation method is most appropriate for particular datasets (Costello & Osborne, 2005) but in practice, the differences between results from different techniques are very slight (Tabachnick & Fidell, 2007; Velicer & Jackson, 1990), and from a practical point of view, appear to have little impact. The over-riding concern in the present study was to arrive at a clear and interpretable solution which discriminated between facets of inhibitory control in relation to intimate partners that could be used in the subsequent study to examine relationships with aggression. To this end, both initial and rotated solutions were examined and compared. In terms of choice of rotation method, although it was anticipated that factors might well be correlated, orthogonal (Varimax) rotation was chosen because it accentuates differences in loadings and makes the factor solution easier to interpret and less ambiguous, reducing the potential for error in interpretation.

Criteria for determining number of factors retained

There are various criteria for determining the number of factors to retain. Many authors use the Kaiser criterion (retaining all factors with eigenvalues greater than 1). However, this does not always lead to the most useful estimation of the number of factors (Tucker, Koopman & Linn, 1969). The Scree test can be effective as it helps researchers to identify a precipitous drop in the proportion of variance explained and therefore locate the point at which retention of further factors is of little benefit. It therefore provides useful additional information in addition to the Kaiser criterion. Rummel (1970) suggested that researchers should stop extracting factors when the proportion of variance they explain becomes trivial (although there is no absolute cut-off value and this must be judged in the context of the study). Ford, MacCallum and Tait (1986) summarised the rules of thumb available, and concluded that it is often best to employ a number of rules and examine multiple solutions in attempting to find the solution which is most interpretable. In the present study, the aim was not to maximise the proportion of variance explained, but to derive scales which would be of use in the subsequent study. A number of potentially important domains of disinhibition were suggested above. Because no study has considered disinhibition in relation to partner aggression, it was not known whether some domains might have greater explanatory power than others. It was therefore important to arrive at a set of clearly differentiated factors, rather than maximising variance explained. Therefore, decisions about the number of factors to retain had to incorporate the ultimate use of the derived questionnaire, as well as standard rules of thumb.

From the initial solution, 13 components were identified which had eigenvalues greater than 1. However, most of these explained very little variance, and had very few items loading highly on them. Following Comrey (1978) only items with a factor loading in excess of .4 were accepted as significant and used to define a factor. Relying on the Kaiser criterion alone to decide on the number of factors to retain was not useful. Inspection of the component matrix suggested a two-factor solution might be appropriate. Component 1 explained 21.9 per cent of the variance, and component 2 a further 9.8 per cent. Inclusion of a third component explained only a further 4.5 per cent of the variance, but more importantly, with only two items loading on it, component 3 was not well defined and therefore of no theoretical value. The composition of the first two extracted factors is shown in Table 5.2. Where items loaded higher than .4 onto more than one factor, they were assigned to the factor onto which they loaded most highly (though both loadings are shown in the table).

Table 5.2: Factor loadings derived from the initial solution

Item	Initial factor loadings	
	I	II
1. Pretend to like an unsuitable present he/she has bought you		.41
2. Pretend you're not upset when your partner says something hurtful		.44
3. Pretend to like a tasteless new item of clothing your partner is wearing		.45
4. Pretend to enjoy a film that your partner likes…		.44
7. Sing along to music in the car in the company of your partner	.43	
9. Pretend you are delighted when your partner surprises you with tickets to the cinema, even though you are coming down with a heavy cold…		.56
10. Hide the fact that you are in a bad mood…		.56
12. Pretend to be interested in something your partner is saying…		.59
13. Pretend to be amused when your partner tells a poor joke		.55
14. Cut your toenails in front of your partner whilst watching TV	.49	
15. Help yourself to your partner's chocolates without waiting to be asked…	.60	
16. Give your partner a spontaneous hug if you felt like it	.55	
17. Jokingly hit your partner if they said something rude to you in jest	.57	
18. Turn up the heating in your partner's car if you felt cold	.62	
19. Take care to appear attentive when listening to a story your partner has told you several times before		.52
20. Tell your partner when you have done something embarrassing…	.60	
21. Let your partner know when he/she is boring you	.59	
22. Sprawl comfortably on the sofa whilst watching TV with your partner	.56	
23. Truthfully tell your partner that he/she has gained weight…	.65	
24. Pretend you are happy with your partner's choice of restaurant…		.49
25. Look at an interesting article in a newspaper of magazine whilst in conversation with your partner	.56	
26. Tell your partner that you do not like one of his/her close friends	.52	
27. Allow your partner to come into the bathroom to continue a conversation whilst you are having a bath	.67	
29. Get changed in front of your partner	.62	
30. Tell your partner if you think he/she is driving badly	.59	
31. Make sure you are well dressed when meeting your partner for coffee		.47
32. Express your honest opinion to your partner…	.64	
33. Have a frank discussion about contraception with your partner	.67	
34. Make small jokes at your partner's expense	.54	
35. Express sarcasm towards your partner	.58	
36. Take a mouthful of food from your partner's plate	.57	
37. Lounge around in nightwear whilst watching TV with your partner	.69	
39. When spending time with my partner, I feel I can be myself	.58	
40. When spending time with my partner, I feel relaxed	.58	
41. I would feel embarrassed if my partner heard me swear	.41	
42. I feel the need to be on my best behavior in the company of my partner	.45	.48
44. I would feel embarrassed if I passed wind in the company of my partner		.43
Eigenvalue	10.29	4.60
Percentage of variance explained	21.89	9.80

Many of the items which load onto component 1 relate to feeling at ease and relaxed in the company of a partner. Additionally, a number of items indicate the propensity to be honest, rather than telling (perhaps more polite) white lies. The items which load highly on component 2 are more concerned with engaging in pretence or faking emotion. These two factors appear reasonably well defined, but not entirely distinct. The rotated solution was also examined to determine whether it might provide a more clearly differentiated solution.

Rotated solution

The rotated factor structure suggested that a four factor solution would be most appropriate. Although components 3 and 4 explained quite small proportions of variance (6.38 per cent and 5.57 per cent respectively), they appeared clearly defined and possibly important in terms of explaining the range of disinhibition that may occur in intimate relationships. The eigenvalues and percentage of variance explained by each component are shown in Table 5.6.

The first two components from the initial solution together explain slightly more variance (31.7 per cent) than the first four components from the rotated solution (29.2 per cent). However, all of the items from the first two rotated components are subsumed by component 1 from the initial solution. The rotated solution splits the initial component 1 into two components which may be more informative for the purpose of the subsequent study than explaining a large proportion of the variance in the correlation matrix. Table 5.3 shows factor loadings on the first four extracted components. Again, only items with a factor loading in excess of .4 were retained. The nature of the retained components is described briefly below, and in more detail in Section 5.4.1.

Table 5.3: Factor loadings derived from the rotated solution

Item	Initial factor loadings on components			
	I	II	III	IV
10. Hide the fact that you are in a bad mood…				.60
12. Pretend to be interested in something your partner is saying…				.74
13. Pretend to be amused when your partner tells a poor joke				.60
15. Help yourself to your partner's chocolates without waiting to be asked…		.40		
16. Give your partner a spontaneous hug if you felt like it	.47			
18. Turn up the heating in your partner's car if you felt cold	.44			
20. Tell your partner when you have done something embarrassing…	.62			
21. Let your partner know when he/she is boring you		.63		
22. Sprawl comfortably on the sofa whilst watching TV with your partner	.56			
23. Truthfully tell your partner that he/she has gained weight…		.61		
24. Pretend you are happy with your partner's choice of restaurant…				.64
25. Look at an interesting article in a newspaper of magazine whilst in conversation with your partner		.52		
26. Tell your partner that you do not like one of his/her close friends		.58		
27. Allow your partner to come into the bathroom to continue a conversation whilst you are having a bath	.81			
29. Get changed in front of your partner	.80			
30. Tell your partner if you think he/she is driving badly		.51		
32. Express your honest opinion to your partner…	.61			
33. Have a frank discussion about contraception with your partner	.65			
37. Lounge around in nightwear whilst watching TV with your partner	.74			
38. I would feel embarrassed if my partner saw me throw up			.41	
41. I would feel embarrassed if my partner heard me swear			.71	
42. I feel the need to be on my best behavior in the company of my partner			.72	
43. When spending time with my partner, I am aware of my own body language			.72	
44. I would feel embarrassed if I passed wind in the company of my partner			.47	
46. I would feel embarrassed if my partner saw me drunk			.66	
Eigenvalue	5.06	3.03	3.00	2.62
Percentage of variance explained	10.77	6.45	6.38	5.57

The first component from the rotated solution comprises items which seem to encompass Goffman's distinction between 'frontstage' and 'backstage' behaviour. They relate to generally feeling at ease in the presence of a partner, for example, adopting comfortable postures, spontaneous shows of affection, a willingness to discuss potentially embarrassing topics, and a lack of concern with public conventions of getting changed in private and closing the bathroom door. The second component is comprised of items which relate to giving an honest opinion rather than polite 'white lies', for example, telling a partner they have gained weight. They relate to the domain of tactful withholding of information. The third component consists of items largely relating to bodily functions such as passing wind, and awareness of body language. These items seem to encompass a domain of Goffman's (1959) distinction. Whereas the items comprising the second component relate to being honest (not making the effort to pretend) in relation to opinions about a partner, the fourth component consists of items which indicate actively hiding one's own true feelings and emotions (e.g. 'Hide the fact that you're in a bad mood whilst spending time with your partner'), and also active pretence (e.g. 'Pretend that you are happy with your partner's choice of restaurant'). Inspection of the component matrix suggests that all four factors are conceptually coherent and may represent distinctive aspects of disinhibition in intimate relationships. Although the inclusion of a third and fourth factor explains only a further 12 per cent of the variance, these factors appear coherent and meaningful. Based on this, a decision was made to retain the rotated solution; at this early pilot stage, a more differentiated solution was preferable to allow examination of domains which might have greater explanatory power in the subsequent study.

5.3.2. Construction of scales and analysis of disinhibition

Items loading greater than .4 on each factor were summed and averaged to form four scales. The subscales were labelled as follows: *Social Inhibition* (component 1), *Tactful Dishonesty* (component 2), *Body Function Inhibition* (component 3) and *Dissimulation* (component 4). Each subscale showed good internal consistency: α = .88 (9 items) for Social Inhibition, α = .78 (6 items) for Tactful Dishonesty, α = .75 (6 items) for Body Function Inhibition and α = .70 (4 items) for Dissimulation. Cronbach's alpha values were examined to assess whether deletion of items would improve the internal consistency of any of the components. For Social Inhibition, Tactful Dishonesty and Body Function Inhibition, there were no instances where removal of an item would result in a higher alpha. However for the Dissimulation scale, removal of item 24 ('Pretend you are happy with your partner's choice of restaurant, even if you would prefer to go somewhere else') would increase alpha marginally from .70 to .71. Since the increase in alpha would be very small, and the item does appear consistent with the other items comprising the factor, it was retained. Test-retest reliability data was gathered from 15 mature undergraduate participants. They completed the questionnaire on two occasions, with a gap of two weeks between administrations. There was a high correlation between their scores on the two occasions; $r(13) = .89$, $p < .001$. Although this was a small sample, the correlation suggests the scale has good temporal stability.

It was anticipated that respondents' scores on each subscale would generally range from a response indicating a lowering of inhibition over the course of a relationship (response options 1 & 2 on the questionnaire) to perhaps one indicating no change in level of inhibition (response option 3). Although responses corresponding to an increase in inhibition were available (response options 4 & 5), it

was thought unlikely in most cases that inhibition would increase. To determine whether these assumptions were met, mean item scores were calculated for each subscale (see Table 5.4, below) to determine whether (on average, for each subscale) responses were in the range of 1-3. Additionally, the percentage of respondents who had a score indicating increased inhibition was calculated for each subscale, and for the scale overall.

Table 5.4: Mean item scores and t values of disinhibition

Subscale	Mean item score	% reporting increased inhibition	t (reported change in inhibition)
Social Inhibition (9 items)	2.18	5.52	-17.52***
Tactful Dishonesty (6 items)	2.30	4.59	-17.72***
Body Function Inhibition (6 items)	2.24	6.09	-16.74***
Dissimulation (4 items)	2.44	14.00	-10.81***
Overall (25 items)	2.24	5.67	-21.67***

Note: *** $p < .001$

For each subscale, the average item score indicated somewhat lowered inhibition across the course of a relationship. A small percentage of respondents had scores which indicated an increase in inhibition, but in almost all of these cases, the reported increase was very small (just above an average item score of 3). The percentage of respondents reporting an overall increase in inhibition on the Dissimulation subscale was higher (14 per cent). This is probably due to the fact that this subscale had fewer items (4), and therefore a response indicating a slight increase on one item had a disproportionate effect. As expected, the majority of respondents reported a decrease in inhibition over the course of their relationship. One sample t-tests were conducted to determine whether the mean score on each subscale was significantly less than the value corresponding to no change in inhibition (t values are given in Table 5.4, above). The obtained value was significantly lower in each case. Therefore, on all subscales, respondents reported a

significant reduction in inhibition towards their partner compared to when they first met.

5.3.3. Analysis of relationships between subscales

Correlational analysis was conducted to examine the relationships between scores on the four IIRS subscales. The correlations are given in Table 5.5 below. To control for inflated Type 1 error risk as a result of multiple analyses, the alpha level was divided by the number of correlations computed (ten). Therefore, correlations were only considered significant if $p < .005$. In fact, all correlations were significant at the more stringent alpha level of $p < .001$, and so are reported as such. Scores on all subscales showed small to moderate positive correlations with one another, with the exception of Social Inhibition and Dissimulation, which were independent. Dissimulation also showed smaller correlations with the remaining subscales, indicating that simulation of emotion may represent a relatively distinct domain.

Table 5.5: Correlations between IIRS subscale scores

	Social Inhibition	Tactful Dishonesty	Body Function Inhibition	Dissimulation
Social Inhibition				
Tactful Dishonesty	.53***			
Body Function Inhibition	.36***	.44***		
Dissimulation	.10	.26***	.33***	
Overall inhibition	.82***	.77***	.72***	.49***

Note: *** $p < .001$.

5.3.4. Sex differences and age and length of relationship effects

Firstly, to establish that both sexes showed the expected significant reduction in inhibition over the course of a relationship, one sample *t*-tests were conducted (for the two sexes separately) to determine whether the mean reported change in inhibition on each subscale was significantly less than the value corresponding to no change. Both sexes, as expected, reported a significant decrease in inhibition over the course of a relationship (see Table 5.6, below). Note that the possible range of mean scores is 1 to 5, where 1 indicates lowered inhibition over the course of a relationship, 5 indicates increased inhibition, and 3 indicates no change.

Table 5.6: Mean item scores and *t* values for disinhibition for males and females (possible range for mean scores is 1 to 5).

Subscale	Mean item score	Maximum mean item score	*t* (reported change in inhibition)
Men			
Social Inhibition	2.34	3.67	-7.53***
Tactful Dishonesty	2.49	4.33	-6.41***
Body Function Inhibition	2.47	3.33	-7.05***
Dissimulation	2.65	4.75	-4.00***
Women			
Social Inhibition	2.05	3.78	-16.49***
Tactful Dishonesty	2.15	3.17	-18.35***
Body Function Inhibition	2.11	3.50	-16.05***
Dissimulation	2.34	5.00	-10.53***

*Note: ***p <.001.*

An analysis of sex differences on the four subscales was undertaken to determine whether (as expected) women report greater disinhibition over the course of an intimate relationship than men. Additionally, the effects of age and length of relationship were examined in this analysis to determine whether the extent of reported change in inhibition varied with age or length of relationship, and whether either of these variables interact with sex. A mixed ANOVA was conducted; the inhibition subscales were entered as a repeated measures variable with four levels,

and sex, age and length of relationship were entered as independent groups variables. Age and length of relationship variables were both formed into grouping variables by means of a tertile split corresponding to low, medium and high age/length of relationship. The age groups were as follows: Low (range = 18 – 29 years, n = 70), medium (range = 30-42 years, n = 66, high (range = 43-73 years, n = 70), and the length of relationship groups were as follows: Low (range = 0.1 to 5 years, n = 70), medium (range = 5.5 to 15 years, n = 68), and high (range = 16 to 50 years, n = 68) Using three groups allowed for the possibility of a curvilinear (as well as a linear) relationship. Each of the age and length of relationship groups were comprised of close to equal numbers of participants. Although correlational analysis of continuous variables such as age and length of relationship is preferable to the formation of grouping variables, the difficulty in interpreting correlations derived from a scale which runs from negative to positive was prohibitive.

There was no significant main effect of age, $F(2, 174) = 1.23$, $p = .295$ or length of relationship, $F(2, 174) = .45$, $p = .639$, on inhibition scores, and there were no significant interaction of either age or length of relationship with any other variables. This indicates that the extent of disinhibition does not depend on age or length of relationship, and the lack of any interaction with sex indicates that this finding is consistent for men and women.

There was a significant main effect of sex, $F(1, 174) = 13.92$, $p < .001$, whereby women reported significantly greater disinhibition than men. Post hoc one-way ANOVAs were conducted to identify sex differences on the individual IIRS subscales; F and d values are reported in Table 5.7, below. Men's scores were significantly higher in each case. Therefore, women reported significantly greater disinhibition on all subscales over the course of a relationship than men. Effects

sizes were moderate in each case, but slightly larger for Tactful Dishonesty and

Body Function Inhibition. Therefore, whilst both sexes reported significant

disinhibtion, this effect was greater for women.

Table 5.7: Means (and standard deviations), *F* and *d* values for sex differences on IIRS subscales.

Subscale	Male	Female	*F* sex	*d*
Social Inhibition	21.02 (6.31)	18.44 (6.05)	7.59**	0.42
Tactful Dishonesty	14.92 (3.78)	12.88 (3.23)	15.08***	0.58
Body Function Inhibition	14.84 (3.58)	12.64 (3.87)	14.73***	0.59
Dissimulation	10.61 (2.78)	9.36 (2.92)	8.20**	0.44

Note: **p <.01, ***p <.001.
Positive *d* values indicate effect sizes in the direction of higher male scores.

5.4. Discussion

5.4.1. Factor structure

The aim of this study was to develop a reliable measure of disinhibition in

intimate relationships. It was anticipated, given the source of the items, that factors

would emerge corresponding to facets of social inhibition discussed in the

introduction; adherence to public standards of behaviour, control of emotional

arousal (including inhibition of negative emotions and enhancement of positive

emotions) and withholding of information out of politeness. All of these behaviours

require inhibitory control to conceal emotions and honest opinions; to mask these

with false ones; and to inhibit more comfortable behaviours in favour of more publicly

acceptable ones.

Using standard criteria for factor retention, the initial solution suggested a

coherent two factor structure which appeared psychometrically sound. Twenty four

items loaded onto one factor and thirteen items loaded onto a second. The factors

were distinguishable, but did not appear entirely conceptually distinct. The rotated

factor structure indicated a four-factor solution which, whilst explaining slightly less variance than the initial solution, yielded factors which were more conceptually distinct. These factors are discussed below.

Factor 1: 'Social Inhibition'

The items loading onto the first extracted factor indicate the extent to which respondents generally feel at ease in the presence of their partner. It incorporates items which indicate the relaxation of public standards of behaviour, such as less formal posture and a lack of restraint in showing affection. It is therefore largely composed of items based on Goffman's (1959) distinction between 'frontstage' and 'backstage' behaviour, which in the language of this thesis, correspond to social inhibition and disinhibition. Whilst not explicitly referred to in his work, Goffman's account implied the action of effortful control in maintaining frontstage behavioural standards, and the absence of effortful control when 'backstage' behaviour occurs. The items comprising the subscale constructed from this factor reflect a lack of behavioural restraint in low scorers, a return to 'default' (or prepotent) backstage behaviour.

Factor 2: 'Tactful Dishonesty'

The second factor is defined by items related to responding with tactful dishonesty rather than brutal honesty. The items comprising this subscale generally reflect a lack of social tact in appraisals of an intimate partner (for example, honestly telling a partner that they have gained weight, that they are driving badly, that you do not like their friends, or that they are boring you). This factor incorporates items sourced from the domain identified in the introduction as tactful withholding of information (or 'white lies'). This domain is evident in Goffman's (1959) work, and in

Bjorklund and Kipp's (1996) review of sex differences in social inhibition. Low scorers on this subscale are characterised by a willingness to be brutally honest towards their partners, indicating a lack of tactful restraint.

Factor 3: 'Body Function Inhibition'

The third factor is comprised of items which relate to body function and body language disinhibition. They reflect a lack of embarrassment and inhibition in relation to the obvious presence of bodily functions. They also encompass a lack of awareness of body language, which may indicate a lack of concern with self-presentation. These items are similar to those comprising factor 1 in that they clearly indicate a relaxation of public behavioural standards, and can be understood in terms of Goffman's (1959) distinction between frontstage and backstage behaviour. The positive relationship between these two factors indicates their commonality. However, both the rotated factor structure and the nature of the items suggest that factor 3 represents a distinct component of Social Inhibition, which relates specifically to body functions.

Factor 4: 'Dissimulation'

The final factor derived from the rotated solution consists of items which relate to both concealing true negative feelings and simulating positive emotions, for example, concealing a bad mood, and pretending to be amused or happy. This factor relates most closely to the domain of control of emotional response. It is to some extent conceptually similar to Tactful Dishonesty in that high scorers do not reveal negative feelings. However, the items on the Tactful Dishonesty subscale relate to views about one's partner, whereas the items on this subscale are more

concerned with one's own feelings. Additionally, they reflect not only a tendency to engage in tactful dishonesty, but a willingness to feign positive emotions.

Summary

The four factor solution captures the aspects of inhibition discussed in the introduction. The subscales constructed from these factors appear to have reasonable to good internal consistency with alpha coefficients ranging from .70 to .88. All of these factors can be understood to some extent as different manifestations of the slippage of public standards of behaviour as discussed by Goffman (1959). However, the moderate range of inter-correlations suggests that the domains are relatively distinct. Three of the subscales (Social Inhibition, Tactful Dishonesty and Body Function Inhibition) are moderately positively correlated with one another. Dissimulation was more distinct from the other factors, showing only weak positive correlations with Tactful Dishonesty and Body Function Inhibition, and no significant relationship with Social Inhibition. Whilst all subscales measure aspects of disinhibition in behaviour towards a partner, the control of emotional arousal (Dissimulation) may be unrelated to the general slippage of public behavioural standards (measured by the remaining subscales), so that an individual who feels at ease in the company of their partner and is able to show honesty in their views of them may still inhibit their own emotional responses. Potentially the items comprising the Dissimulation subscale require a higher level of inhibitory control since they simultaneously encompass inhibition of true negative feelings and simulation of positive feelings. It may be that the disinhibitory processes captured in the remaining factors are relatively passive and occur more readily, whereas control of emotional arousal involves more active inhibitory control.

5.4.2: Sex differences

On all subscales, as expected, respondents reported a significant decrease in inhibition over the course of their relationship, and this was also the case when male and female data were analysed separately. Although it is very difficult to assess construct validity due to the lack of any pre-existing measures, this finding is reassuring. Response options had allowed for the possibility that respondents might report an increase, although this was considered unlikely. On the measure overall, a small percentage of respondents (around 6 per cent) reported a small increase, but this was the exception, with the mean for all subscales being significantly less than the value corresponding to no change. However, in light of the fact that some respondents did report increased inhibition, it seems appropriate to provide response options which allow respondents to indicate this.

The main focus was the extent to which the sexes would differ in their reports of disinhibition. On all subscales, women reported significantly greater disinhibiton towards their partners than men. The sex difference on all subscales suggests that women in intimate relationships are more willing or able than men to abandon 'frontstage' behaviour, to be brutally honest in expressing opinions of their partners to them, to be disinhibited in relation to bodily functions, and to show their true feelings. Women's apparently greater disinhibition towards intimate partners contrasts with Bjorklund and Kipp's (1996) review, which provided evidence for a female advantage in inhibitory control in other interpersonal contexts. In eight out of ten studies in their review, women were better at feigning a positive response after a negative outcome, or vice versa. These studies generally *required* participants to actively inhibit true responses and to fake false responses. For example, independent observers in Feldman and White's (1980) study were more convinced

by girl's pretence of an incongruent response. These studies are therefore indicative of inhibitory *ability* in the social domain. The results of the present study suggest that women are less inhibited in intimate relationships, *in spite of* having better inhibitory ability than men in the interpersonal domain. Women's apparent reluctance to invoke this ability in intimate relationships is consistent with the possibility (examined in the subsequent study) that women's partner-directed aggression is related to disinhibition.

5.4.3: Limitations and measurement issues

It was anticipated that disinhibition might increase with increasing length of relationship, reflecting gradually increasing disinhibition over the course of a relationship. However, there were no main effects of either of these variables, and they did not interact with either subscale or sex. This suggests that disinhibition occurs quite early in an intimate relationship, and discretely rather than continuously over a long period of time. However, because this study did not elicit a year by year response across the course of a relationship, the point at which disinhibition occurs is not evident.

The lack of a relationship between disinhibition and length of relationship has implications for the most appropriate response options for the questionnaire when incorporated into the subsequent study. The response options utilised in this study asked participants to respond by comparing their behaviour at the present time to when they first met their partner. This allowed measurement of the change in inhibition over the course of the relationship. In light of the fact that length of relationship has little or no impact on responses, and because of the difficulty involved in interpreting correlations with a scale that indicates change over time, a

decision was made to change the response options for the subsequent study in order to allow respondents to simply rate their current behaviour (more details regarding this are provided in Chapter 6). This makes interpretation easier while retaining the option of asking respondents to indicate the length of their relationship to investigate its effects.

One potential problem must be considered in relation to the interpretation of sex differences. Respondents were asked to indicate the extent of their disinhibition by comparing their current behaviour to their behaviour at the outset of their relationship. The results of this study show that women report greater change since first meeting. It was assumed that both sexes would start out with high levels of inhibition; obtaining a long-term partner necessitates inhibitory control on the part of both sexes (Bjorklund & Kipp, 1996). However, we cannot be certain that this is the case. It is possible that women's greater reported change in behaviour is due to the fact that they started out with a higher level of inhibitory control. Allowing respondents to report on their current level of inhibition in the subsequent study allowed a more definite conclusion to be drawn.

The development of a measure of disinhibition in intimate relationships was essential to allow measurement of this variable in the next study which tests hypotheses regarding the role of inhibition and fear in explaining women's partner-directed aggression. The findings reported here suggest that women do indeed appear to show greater disinhibition towards their partners than men, and this provides preliminary evidence for the hypothesis that women are relatively disinhibited in intimate relationships. Although Bjorklund and Kipp established a clear female advantage for social inhibition in other contexts, they questioned whether these inhibitory mechanisms would show the same sex difference in all interpersonal

contexts. The findings reported here suggest a clear reversal of their findings in intimate relationships. Whilst sex differences in inhibitory control may show sex differentiated optimum (trait) levels, they are likely to vary adaptively across situations. This study provides preliminary evidence of a reversal of the more usual sex difference favouring better female inhibitory control. This is what we would expect if disinhibition were partly responsible for women's greater use of aggression towards intimate partners. However, this study has not directly examined the relationship between inhibition and partner aggression in the two sexes, nor does it measure their relationship to fear. The subsequent study incorporates measures of disinhibition, partner-specific fear, anger control, and social representations of aggression in relation to intimate partner aggression.

Chapter 6: Sex differences in fear, anger control, inhibition and social representations in intimate relationships, and their role is explaining perpetration of intimate partner aggression

6.1: Introduction

Women's lesser perpetration of direct forms of aggression and violence may be understood in terms of their higher levels of inhibitory control and fear of harm, resulting from sex-specific selection pressures in the ancestral environment. The findings reported in Chapter 3 are consistent with this proposal. Whilst this pattern of lower female involvement in direct forms of aggression is ubiquitous, evidence discussed in Chapter 4 suggests that, contrary to popular belief, mild to moderate forms of partner aggression (which have been termed Common Couple Violence, or CCV) are perpetrated at least as frequently by women as men (Archer, 2000, 2002). Evidence concerning the relative extent to which sex parity in CCV arises from an increase in women's aggression and a decrease in men's aggression (relative to same-sex targets) is sparse, but indicates that it is the net result of both of these processes (Cross, Tee & Campbell, 2011; see also Section 4.8).

This thesis has been primarily concerned with explaining lower female than male involvement in direct aggression and violence. In seeking to explain sex parity in CCV, the primary aim was to account for the change in women's behaviour towards intimate partners. The validity of Campbell's (1999, 2002, 2006) theory relies not only on its ability to explain women's usually lower involvement, but also to account for exceptions to this usual pattern. If selection pressures have acted upon women to inhibit their involvement in direct aggression due to the higher risks for

offspring (Campbell, 1999, 2002), then we must be able to account for women's greater use of direct aggression towards intimate partners.

It was proposed (Section 4.9) that intimate relationships may represent a situation in which women's fear and inhibitory control are reduced in western society as a consequence of powerful social norms favouring male chivalry (Archer, 2000, 2009; Felson, 2000) coexisting alongside norms which trivialise female perpetrated partner aggression (George, 1994). The findings reported in Chapter 5 provided preliminary evidence that, across the course of an intimate relationship, women show a significantly greater reduction than men on a number of facets of social inhibition. These findings contrast markedly with evidence demonstrating women's usually greater inhibitory control in interpersonal domains (Bjorklund & Kipp, 1996; Cross, Copping & Campbell, 2011). However, the relationship between women's reduced inhibition and their greater use of aggression towards intimate partners has not yet been examined.

This questionnaire-based study incorporated context-specific ('state') measures of the variables which were measured as traits in the study reported in Chapter 3. This correspondence between variables was intended to allow some comparison of sex differences on measures of fear, inhibitory control and social representations when no target is specified (Chapter 3) and when the target is an intimate partner (this study). The main focus of the study was the extent to which women's (anticipated) lower levels of fear and inhibitory control (relative to those found on more general measures) were associated with perpetation of aggression towards intimate partners. Although the main focus was the relationship between inhibitory variables and women's perpetration of partner aggression, of secondary interest was the extent to which men's (anticipated) higher levels of these variables

were associated with a reduction in aggression when the target is an intimate partner.

The measures employed in this study are described briefly below. Further details regarding choice, development and psychometric properties of these measures are provided in Section 6.2.2. General inhibitory control was measured using the IIRS (Inhibition in Intimate Relationships Scale), the development of which is described in the previous chapter. Fear was operationalised as fear of retaliation and fear of desertion (as consequences of using aggression toward an intimate partner), and was measured using two newly-developed items. Partner retaliation and desertion are both potential consequences of aggression which would pose a threat to women's inclusive fitness in the ancestral environment through potential physical harm (retaliation), and loss of resources, investment and protection (desertion). In the study reported in Chapter 3, it was harm avoidance which yielded the greatest sex difference, and was also the most powerful mediator of the sex difference in aggression. If (as argued in Section 4.9.3) women do not fear the consequences of using aggression towards their male partners, low fear would be expected to emerge as a powerful predictor of women's aggression.

Whilst the specific control of anger did not emerge as a mediator of the relationship between sex and aggression in Chapter 3, it was of primary importance in predicting aggression. The close proximity in which intimate partners usually live, in combination with evolved conflicts of interest between the sexes, may result in more frequent anger-provoking situations in intimate relationships than is the case in other social relationships. Potentially, therefore, a reduction in women's ability to control anger towards intimate partners might explain their more aggressive behaviour. Anger control was measured using a modified version of the two Anger

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Control subscales of the State-Trait Anger Expression Inventory 2 (STAXI 2; Spielberger, 1999), employed in Chapter 3. The Anger Expression-In subscale was also retained to provide a measure of anger experienced.

Social representations of aggression were also measured in the present study so that it was possible to examine whether the usual sex differences in the experience of aggression varied from those reported in Chapters 2 and 3, when the target of aggression is an intimate partner. Women's usually greater expressivity has been explained in terms of an accurate phenomenological 'read-out': typically women inhibit their aggression more effectively, and therefore express aggression behaviourally at a higher level of emotional arousal (Alexander, Allen, Brooks, Cole & Campbell, 2004 Driscoll, Zinkivskay, Evans & Campbell, 2006). However, if women experience reduced inhibition and increased frequency of aggression towards intimate partners, their experience of aggression may be less expressive and more instrumental. Women's reports of instrumental motives for partner-directed aggression indicate that this may be the case (see Section 4.5.2). Social representations were measured using a modified version of the Ten Item Revised Short Expagg (Muncer & Campbell, 2004; Driscoll, Campbell & Muncer, 2005).

Aggression was measured using modified versions of the Physical Assault and Psychological Aggression subscales of the Revised Conflict Tactics Scales (CTS2; Straus, Hamby, Boney-McCoy & Sugarman, 1996). It was intended that perpetration of partner aggression as measured by these two subscales would constitute the criterion variables in regression analyses (conducted separately for men and women), and the remaining study variables would be entered as predictors. Whilst the Physical Assault and Psychological Aggression subscales of the CTS measure different aspects, both can be considered common features of partner-

directed aggression. The two subscales are related (Murphy & O'Leary, 1989; Straus et al., 1996; Hines & Saudino, 2003; Molidor, 1995), and Berkowitz (1993) has argued that verbal forms of aggression increase the probability of physical aggression (Conflict Escalation Theory). Psychological Aggression, as measured by the CTS2, is comprised of a number of verbal and non-verbal acts. It has received far less attention in the literature. However, Hines and Saudino (2003) reported a sex difference in the female direction in a college sample, and this finding is supported by research using the Psychological Maltreatment Inventory (Molidor, 1995).

Men's and women's perpetration of partner aggression are not isolated phenomena, but dynamically interact. The CTS2 allows measurement of both perpetration and victimisation by asking respondents to report on their partner's use of each aggressive act as well as their own. Both measures were included in the present study for two reasons. Firstly, the study employed a community sample to allow measurement of CCV. CCV is characterised by its largely mutual nature; measuring both perpetration and victimisation would allow confirmation of the assumption that the aggression measured was largely mutual. Secondly, because perpetration and victimisation tend to be strongly positively correlated, an apparent relationship between perpetration and inhibitory variables may in fact be a relationship with victimisation. It was therefore important to assess the independent relationship of perpetration and victimisation to the remaining study variables.

6.1.1: Hypotheses

In line with many studies which have used the CTS and CTS2, no significant sex difference was expected on the Physical Assault subscale; therefore no hypothesis was formulated. In line with Hines and Saudino (2003) it was anticipated

that women would perpetrate more Psychological Aggression towards their partners than men, and this pattern was expected to be evident in reports of both women's perpetration and men's victimisation (Hypothesis 1). It was expected that both forms of aggression would be highly mutual, resulting in high intercorrelations between respondent's reports of perpetration and victimisation (Hypothesis 2). In line with the findings reported in Chapter 5, it was expected that men would score higher on all IIRS subscales, reporting higher levels of inhibition than women (Hypothesis 3) (correspondingly, it was expected that the usual pattern of women's higher expressivity and men's higher instrumentality would not emerge, and that no sex difference would be evident on the Expagg subscales). Given the close proximity and potential for anger-eliciting events in intimate relationships (discussed above), desistance from aggression may require anger control. It was therefore anticipated that men (who reduce their aggression towards intimate targets) would report higher levels of anger control than women (Hypothesis 4), though no sex difference was expected in anger experienced. Consistent with Capaldi and Owen (2001), it was anticipated that women's usually greater fear would not be evident when using aggression towards an intimate partner, and therefore no hypothesis was formulated regarding sex differences on either of the fear items.

The main focus of the study was to examine the magnitude and direction of relationships between perpetration of partner aggression and the predictor variables for the two sexes. It was expected that female-perpetrated physical assault would be associated with lower levels of fear and inhibitory control, lower levels of anger control, higher levels of experienced anger, and a more instrumental (and less

expressive) experience of aggression (Hypothesis 5)[3]. Due to the relative lack of research on psychological aggression, predictions were less specific. However, given its relationship to physical assault, a similar pattern was expected (Hypothesis 6). For men, it was expected that aggression would be unrelated to fear and inhibitory variables. It was argued (Section 4.9.1) that the influence of powerful social norms may cause men to inhibit aggression towards women. Therefore, when aggression does occur, it may result not from a general lack of inhibitory control, but from anger-eliciting circumstances. It was therefore expected that male-perpetrated partner aggression would be associated with higher levels of experienced anger (Hypothesis 7).

6.2: Method

6.2.1: Participants

To maximise the likelihood of a representative community sample, one thousand questionnaires were delivered by hand to homes across a range of socioeconomic areas in Tyne and Wear, County Durham and Cleveland. Stamped addressed envelopes were provided for respondents to return completed questionnaires. One hundred and forty five questionnaires were returned. Two participants' data were removed due to a high proportion of missing data (for example, no responses for any STAXI and Expagg items). A further participant was removed since the pattern of responses suggested they had not taken the study seriously. Therefore, one hundred and forty two questionnaires were retained for analysis. Of these, 101 (71.1 per cent) were women and only 41 (28.9 per cent)

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[3] It should be noted that although the IIRS contains four subscales, it was not anticipated that all four would be associated with aggression. A number of domains were measured to allow identification of those which might be associated with aggression.

were men. The age range was from 17 to 80, with a mean age of 39.51 (SD = 13.25). Length of relationship ranged from 6 months to 54 years, with a mean of 14.99 years (SD = 12.60). The majority (119, 83.8 per cent) of participants were married or cohabiting and 23 participants (16.2 per cent) were not. Eighty-one participants (57 per cent) had 1 or more children with their current partner, and 61 (43 per cent) did not.

The proportion of questionnaires returned from the one thousand distributed was disappointing. Whilst an adequate sample of female respondents was obtained, the male response rate was unfortunately too low to permit a regression analysis examining the psychological correlates of partner aggression perpetrated by men. As such, data from men was used only to examine hypotheses regarding sex differences, and was not incorporated into regression analyses.

6.2.2: Instruments

Measuring inhibition: Inhibition in Intimate Relationships Scale (IIRS)

The construction and composition of this measure is detailed in the previous chapter. The four subscales derived from factor analysis were included, as follows: Social Inhibition (nine items), Tactful Dishonesty (six items), Body Function Inhibition (six items) and Dissimulation (four items). For each of the 25 items, respondents were asked to think about their current day-to-day relationship with their partner and to indicate how likely they would be to engage in the behaviours described. The response options in each case were: very likely, somewhat likely, possibly, somewhat unlikely and very unlikely. The IIRS was scored so that a score of 1 indicated least inhibition and a score of 5 indicated most inhibition. Scores on each

subscale were calculated by summing and averaging the scores on the associated items.

The original response options used in the previous chapter asked respondents to rate how likely they would be to engage in each behaviour *compared to when they first met their partner*, i.e. they were asked to indicate any change in their behaviour over the course of their relationship, whether an increase or decrease in inhibition, or no change. The reason for asking respondents to indicate any change in behaviour over time was because it was possible that the degree of disinhibition would be related to length of relationship. However, disinhibition did not differ as a result of length of relationship in the previous study. In addition, it is more difficult to interpret correlations from a scale that elicits reports of change over time. Therefore, a decision was made to simply ask respondents to rate their current situation on the IIRS items. By including length of relationship as a variable, any effects on responses could still be evaluated.

Measuring Anger Expression and Anger Control: Modified STAXI-2

The STAXI-2 (Spielberger, 1999) used in the study reported in Chapter 3 was modified to make it appropriate for measuring anger control and anger experienced in intimate relationships. Respondents were asked to think about the behaviours described in the context of feeling angry or furious *with their partner* (the original questionnaire asks respondents to think about when they feel angry or furious in general (see Section 3.2.2 for reliability and validity information). Three STAXI subscales were employed in this study. Anger Control-Out (AC-O) measures "how often a person controls the outward expression of angry feelings". Anger Control-In (AC-I) measures "how often a person attempts to control angry feelings by calming

down or cooling off" (Spielberger, 1999, p.2). Higher scores indicate higher levels of anger control in each case. The Anger Expression-In (AX-I) subscale measures "how often angry feelings are experienced but not expressed" (Spielberger, 1999, p.2). The items reflect an individual's acknowledgement of anger or irritation, and higher scores indicate higher levels of experienced anger. The response options remained unchanged from the original measure. Respondents were asked to indicate how often they engaged in the behaviours described on a scale which ranged from 1 (Almost never) to 4 (Almost always). Subscales scores were calculated by summing and averaging the scores on each associated item. The subscales and their items are shown in table 6.1.

Table 6.1: Modified State-Trait Anger Expression Inventory 2 (STAXI-2)

Subscale	Item
	When angry or furious with my partner…
Anger Control-Out	I control my temper
	I am patient with my partner
	I control my urge to express my feelings
	I keep my cool
	I control my behaviour
	I can stop myself from losing my temper
	I try to be tolerant and understanding
	I control my angry feelings
Anger Control-In	I take a deep breath and relax
	I try to calm myself as soon as possible
	I try to simmer down
	I try to soothe my angry feelings
	I endeavour to become calm again
	I reduce my anger as soon as possible
	I do something relaxing to calm down
	I try to relax
Anger Expression-In	I keep things in
	I pout or sulk
	I withdraw from my partner
	I boil inside, but I don't show it
	I tend to harbour grudges that I don't tell my partner about
	I am secretly quite critical of my partner
	I am angrier than I am willing to admit
	I'm irritated a great deal more than my partner is aware of

Measuring social representations of partner-directed aggression: Modified

Expagg questionnaire

The 10-item Expagg questionnaire (Muncer & Campbell, 2004; Driscoll et al., 2005) was modified in order to measure instrumental and expressive social representations of partner-directed aggression. As detailed in Chapter 2, the ten-item version is psychometrically superior to the 16-item scale, providing a better fit as a two-factor model, with comparable internal consistency on both subscales; α = .78 for the Instrumental subscale, α = .63 for the Expressive subscale (Driscoll et al., 2005).

The instructions and items were modified for use in the context of aggression towards a partner. For example, the following Expressive item, "*In a heated argument I am most afraid of saying something terrible that I can never take back*" was simply changed to, "*In a heated argument* with my partner *I am most afraid of saying something I can never take back*". However, the following Instrumental item was eliminated since it was not appropriate in the context of partner aggression: "*If someone challenged me to a fight in public, I'd feel cowardly if I backed away*". Challenging one's own partner to a fight in public seems very unlikely. Therefore, the Expressive subscale contained five items, and the Instrumental subscale contained four items. The items and subscales are given in Table 6.2. The response options remained unchanged; respondents rated their agreement with the statements on a scale which ranged from strongly agree (5) to strongly disagree (1). The composite Expagg score (Expressive minus Instrumental) was analysed in the study reported in Chapter 3; it was argued that what best distinguishes the sexes is the relative strength of the two representations. In the present study, the separate subscale scores (rather than the composite Expagg score) were analysed: because only female data were included in the regression analysis, Expagg was not used to distinguish between the sexes, and analysing the separate contribution of expressivity and instrumentality allowed examination of the extent to which the two representations were related to women's aggression.

Table 6.2: Modified Expagg items

Item	Subscale
1. I believe that aggression is sometimes necessary to get through to my partner	Instrumental
2. During a fight with my partner, I feel out of control	Expressive
3. If I hit my partner and hurt them, I feel as if they were asking for it	Instrumental
4. After a fight with my partner I feel drained and guilty	Expressive
5. In an argument with my partner I would feel more annoyed with myself if I cried than if I hit them	Instrumental
6. In a heated argument with my partner I am most afraid of saying something terrible that I can never take back	Expressive
7. The best thing about aggression towards my partner is that it makes them get in line	Instrumental
8. I believe that my aggression towards my partner comes from losing my self-control	Expressive
9. When I get close to the point of physical aggression towards my partner, the thing I am most aware of is how upset and shaky I feel	Expressive

Measuring fear

Two items were designed to measure fear of physical harm and fear of desertion (as a consequence of an individual's own use of partner aggression), as follows: "*When I behave aggressively towards my partner, I fear that it may cause my partner to physically harm me*", and "*When I behave aggressively towards my partner, I fear that it may cause my partner to leave me*". Response options were the same as for Expagg (see above).

Measuring partner-directed aggression: The Revised Conflict Tactics Scale (CTS2: Straus, Hamby, Boney-McCoy & Sugarman, 1996)

In the literature review of sex differences in intimate partner aggression (Chapter 4), evidence was presented which demonstrates that women's perpetration is at least equal to men's for CCV. This study is concerned with examining variables associated with female perpetration of CCV. A measure was needed which was able to capture perpetration of minor and moderate acts of aggression, which are likely to

encapsulate the experience of CCV. There was no intention to measure the most severe acts of aggression since these are likely to be rare.

CTS measures provide an objective, frequency-based measure of a number of conflict tactics employed by respondents in the context of conflict in the past 12 months (although they have primarily been used to measure physical assault). The CTS focuses on specific behaviours, with attitudes and emotions deliberately omitted. Whilst this measurement of behaviour 'out of context' and with no reference to cause or consequence is a commonly cited criticism of the CTS (see Section 4.5 for a discussion), conflict theorists have indicated that the ability of the CTS to provide objective measurement of the frequency of behaviour (independent of cause or consequence) is one of its strengths (Straus, 1990).

Another important advantage of CTS measures is their ability to elicit reports of aggression. One of the greatest threats to partner aggression research is the sensitive nature of the behaviour that respondents are asked to report. The CTS provides a context of legitimisation in the instructions to participants by stating that all couples have disagreements and conflicts. The acts comprising the CTS are presented in the context of conflict, rather than crime or violence. The CTS has been shown to elicit far greater reporting of partner aggression than have surveys presented in the context of victimization or crime (Straus, 1999; see also Section 4.5.3 for a discussion). Additionally, the CTS does not appear to be compromised by socially desirable responding; Sugarman and Hotaling (1996) reported low correlations with measures of social desirability.

The original CTS measures three tactics commonly used to resolve family conflicts: Negotiation (rational discussion), Psychological Aggression (verbal and

non-verbal acts which cause harm) and Physical Assault (direct acts of aggression against a partner's person). The CTS2 additionally incorporates subscales which measure Sexual Coercion and Injury. Since the role of the CTS in the present study was to provide a measure of acts of aggression towards partners, only the Physical Assault and Psychological Aggression subscales were considered relevant. Nevertheless, the CTS2 incorporates a number of improvements to these subscales which make it more suitable than the original CTS. The CTS2 includes a greater number of items on both the Physical Assault and Psychological Aggression subscales, enhancing content validity (Straus et al., 1996). In addition, a number of items originally included in the CTS have been revised in the CTS2 to improve wording and remove ambiguity.

The CTS has good psychometric credentials. Studies have confirmed its factor structure (Newton, 2001; Barling, O'Leary, Jouriles, Vivian & MacEwen, 1987). The reliability and validity of the original CTS is well documented by a large body of evidence (see Straus et al., 1996). Straus (2005) provided reliability coefficients from forty-one studies of the CTS2. In the majority of these studies, most of the subscales yielded alpha coefficients in excess of .7 (mean = .77). However, occasionally subscales containing behaviours with low prevalence yielded coefficients below this level (for example, the Severe Psychological Aggression subscale). Test-retest coefficients suggest acceptable levels of temporal stability (Straus, 2005), though it should be noted that they are rarely reported (Straus, 2006).

In both the original CTS and the CTS2, Physical Assault was divided into Minor and Severe subscales, and this division was also applied to the Psychological Aggression subscale in the CTS2. The distinction between Minor and Severe acts is based on US legal definitions of simple and aggravated assault. However, acts

defined as severe by the CTS vary in severity and Archer's (2002) meta-analysis has demonstrated that some of the acts defined as severe by the CTS are more often perpetrated by women. The present study therefore employed a modified version of the CTS to provide a single measure of physical assault which included all items classified by the CTS as 'minor' and also the less serious acts classified as 'severe' (the most serious acts, such as use of knife or gun, were eliminated). All items from the Psychological Aggression subscale were retained; although some acts are arguably more harmful than others, they could all be considered aspects of CCV. The final selection of items reflects a measure of mild to moderate partner aggression, the reporting of which was thought brief enough to prevent fatigue, yet comprehensive enough to ensure reliability and content validity. The items comprising each subscale are shown in Table 6.3, in relation to the original formulation of the CTS. The CTS2 also asks respondents to indicate how many times their *partner* used each act of aggression towards them in the previous year. This feature was retained since it allows examination of the extent to which female perpetrated partner aggression is mutual. It also allowed derivation of 'pure' measures of perpetration and victimisation so that it was possible to examine the relationship of the remaining study variables to perpetration and victimisation separately (this analysis is explained in Section 6.3.7).

Table 6.3: Modified version of The Revised Conflict Tactics Scales (CTS2)

Item	Subscale
1. I insulted or swore at my partner	Psychological Aggression (Minor)
2. I threw something at my partner that could hurt	Physical Assault (Minor)
3. I twisted my partner's arm or hair	Physical Assault (Minor)
4. I pushed or shoved my partner	Physical Assault (Minor)
5. I called my partner fat or ugly	Psychological Aggression (Severe)
6. I punched or hit my partner with something that could hurt	Physical Assault (Severe)
7. I destroyed something belonging to my partner	Psychological Aggression (Severe)
8. I shouted or yelled at my partner	Psychological Aggression (Minor)
9. I beat up my partner	Physical Assault (Severe)
10. I grabbed my partner	Physical Assault (Minor)
11. I stomped out of the room or house or yard during a disagreement	Psychological Aggression (Minor)
12. I accused my partner of being a lousy lover	Psychological Aggression (Severe)
13. I did something to spite my partner	Psychological Aggression (Minor)
14. I threatened to hit or throw something at my partner	Psychological Aggression (Severe)
15. I kicked my partner	Physical Assault (Severe)

Response options for each item required respondents to indicate the frequency with which they had engaged in each of the behaviours towards their partner in the past year, and were as follows: Once in the past year (Category 1), two to five times in the past year (Category 2), six to ten times in the past year (Category 3), more than ten times in the past year (Category 4), not in the past year, but it did happen before (Category 5), and, this has never happened (Category 0). The same response options were used for reports of partner aggression. The CTS was scored in the usual way, by summing the midpoints of the respondent's chosen categories for the response options which contain a range of frequencies, for example, if the participant selected 2-5 times, the recorded value was 3.5. A value of 15 was recorded for category 4 (more than 10 times). A zero was recorded for category 0 (never happened) and a 1 recorded for category 1 (happened once in the past year). For category 5 (not in the past year, but did happen before), 0.5 was recorded.

6.2.3: Procedure

Questionnaires were delivered by hand in a sealed envelope to homes across the North east region and addressed "To The Occupier". Study information sheets and consent forms were included. The information sheet outlined the nature of the study and explained that individuals were eligible to participate if they were aged eighteen or over and in a heterosexual relationship. Potential respondents were advised that participation was voluntary, that they were not required to provide their name on the questionnaire, and that the information provided would be anonymous. The questionnaire booklet first asked participants to provide the following information: sex, age, length of relationship with current partner, whether or not they lived with their partner, and number of children with current partner. The measures were then included in the following order: (1) IIRS, (2) STAXI-2, (3) CTS2 (self- and partner-reports), (4) Fear items, (5) Expagg. Respondents completed the questionnaires at their leisure, and returned them in the prepaid envelope provided.

6.3: Results

6.3.1. Missing data

There were very few missing values on the IIRS, STAXI and CTS. Occasional missing values were replaced with the participant's mean item score on the subscale concerned. There were a greater number of missing values on Fear and Expagg measures. This is presumably because these measures required respondents to report on their experience and fear as a result of using aggression. Because the assault rate was low (see Section 6.3.5), respondents may have found this difficult. Nine participants did not complete the Fear items, so no score could be recorded on this measure. Where only one value was missing from an Expagg subscale, it was

replaced with the mean item score for the corresponding subscale. However, because of the small number of items on the Expagg subscales, where two or more values were missing on a particular subscale, no score was recorded. Eight participants provided so few responses that it was not possible to calculate Expagg scores.

6.3.2. Psychometric analysis

Reliability analysis was conducted on all subscales of measures used to confirm that internal consistency was adequate. Cronbach's alphas for the four IIRS subscales were as follows; Social Inhibition (9 items), α = .83, Tactful Dishonesty (6 items), α = .73 and Body Function Inhibition (6 items), α = .77. These values are all very similar to those obtained in Chapter 5. However, for the Dissimulation subscale (4 items), α = .28. Item-total statistics indicated that removal of item 11 ('*Pretend you are happy with your partner's choice of restaurant…*') increased alpha to .68. It was therefore necessary to remove this item from further analysis. It is not clear why this item was problematic. It is possibly due to the fact that it enquires about a very specific context, whereas the other items are less specific. For the STAXI subscales, each of which had 8 items, Cronbach's alphas were as follows; AX-I, α = .79, AC-O, α = .85 and AC-I, α = .85. These coefficients are comparable to (and on the whole in excess of) the coefficients reported in Chapter 3, and published coefficients (Spielberger, 1999). The modifications made to the measure for use in intimate relationships therefore did not have a detrimental effect on reliability. For the Expagg subscales, the coefficient for Expressivity (5 items, α = .74) was higher than that reported in Chapter 3 (α = .63), but for Instrumentality (4 items, α = .65) the coefficient was lower than that reported in Chapter 3 (α = .75), perhaps due to the removal of an item.

Particular attention was paid to the reliability of the CTS2 subscales since it was intended that the Minor and Severe subscales be combined for both Physical Assault and Psychological Aggression. This analysis was conducted on female data only since the low numbers of male respondents meant that male data would not subsequently be entered into regression analyses. Because regression analysis was to be conducted on female data, it was essential to ensure a coherent and internally consistent measure of women's CCV. For the combined Physical Assault subscale, $\alpha = .76$. Inspection of item-total statistics, however, suggested that item 9 ("*I beat up my partner*") was problematic. The item-total correlation for this item was .33, and its inter-item correlations ranged from .04 to .45. Although the item-total correlation is just above the acceptable threshold of .3 (Field, 2009), it was substantially lower than for other items, as were the inter-item correlations. Removal of this item resulted in an alpha coefficient of .77. This item represents the most severe act of aggression included in the measure in this study. Its relationship with the other items suggested that it was not appropriate to include it in a measure of mild to moderate aggression, and it was therefore removed from the Physical Assault subscale in subsequent analyses. The weak relationship of this item with the rest of the scale may also be due to the very few recorded acts for this item. For the combined Psychological Aggression subscale, $\alpha = .72$. This value could not be improved by the deletion of any item.

6.3.3. Effects of cohabitation and parenthood

Two potentially important differences between respondents were that some were married or cohabiting, and some were not, and some respondents had children and some did not. To determine whether there were any effects of these variables on any of the potential explanatory variables included in the study, for each sex

separate 2x2 (relationship status x parenthood) MANOVAs were conducted with the subscales of the following variables entered as the dependent variables in each case: STAXI-2, IIRS, fear, Expagg, CTS2 perpetration and CTS2 victimisation. For women, there was a significant multivariate effect of parenthood on IIRS scores, $F(4, 94) = 2.76$, $p =.032$, Pillai's Trace = .11. The effect concerned the Tactful Dishonesty subscale, where those respondents without children (mean = 14.20) scored significantly higher than those with children (mean = 12.05), $F(1, 97) = 70.58$, $p =.043$, $d = .53$. This indicates that female respondents who have no children show higher levels of inhibition towards their partner on this subscale (they are less inclined to be honest in their expressed appraisals of their partners). However, partialling out the effects of parenthood using MANCOVA made a negligible difference to the analysis of sex differences reported below. There were no other effects of parenthood or relationship status for women. There were no significant effects of parenthood or relationship status for men on any of the dependent variables.

6.3.4. Relationships between subscales and measures

Correlational analysis was conducted to examine the relationships between subscales, and to determine whether any of the measures contained subscales that were colinear. Relationships between measures were also examined. Again, this analysis was conducted on female data due to the low male response rate. Prior to constructing the table of intercorrelations, the relationship between STAXI AC-O and AC-I was examined (since they were highly colinear in the study documented in Chapter 3). Once again, these subscales were highly positively correlated ($r = .72$). Therefore, they were again summed into a single Anger Control subscale (STAXI AC). For the combined Anger Control subscale, $\alpha = .90$. This was comparable to the

coefficient reported in Chapter 3 (α = .88). Table 6.4 reports the intercorrelation matrix. Due to the number of potential correlations analysed, there is an inflated risk of Type 1 error (particularly given the limited sample size). To control for this, only correlations significant at $p < .01$ are flagged as significant. However, because (perpetration of) CTS Physical Assault and Psychological Aggression were to be used as outcome variables in regression analyses (Section 6.3.6), it was necessary to determine any possible significant relationships in order to identify potential predictor variables for the regression analysis. Therefore, for these variables only, relationships significant at $p < .05$ are also indicated.

Table 6.4: Intercorrelations of variables (female data)

	Age	LOR	SI	TD	BFI	DIS	F1	F2	PA-P	Py-P	PA-V	Py-V	AX-I	AC	E
LOR	.84***														
SI	.07	.00													
TD	.06	-.04	.46***												
BFI	.20*	.17	.12	.37***											
DIS	.08	.09	.10	.42***	.29**										
F1	.00	-.06	.24	.04	-.08	.04									
F2	-.23	-.27**	.36***	.30**	.19	.21	.50***								
PA-P	-.16	-.12	.06	-.28**	-.06	-.17	.39***	.35***							
Py-P	-.13	-.03	.15	-.28**	-.14	-.12	.41***	.27***	.56***						
PA-V	-.17	-.15	-.04	-.22	-.06	-.05	.33***	.26	.65***	.50***					
Py-V	-.14	-.01	-.02	-.25	-.17	-.15	.39***	.27	.49***	.82***	.49***				
AX-I	.02	.03	.37***	.14	.16	.13	.13	.35**	.26**	.37***	.21	.35***			
AC	.13	.07	-.11	.26**	.13	.26	-.08	-.05	-.24*	-.43***	-.16	-.31***	-.28**		
E	-.11	-.18	.06	-.06	.18	.10	.14	.46***	.32**	.23*	.19	.17	.08	-.20	
I	-.14	-.09	.02	-.19	.10	.14	.26	.38***	.45***	.52***	.35***	.44***	.19	-.25	.42***
	Age	LOR	SI	TD	BFI	DIS	F1	F2	PA-P	Py-P	PA-V	Py-V	AX-I	AC	E

Note: LOR = Length of relationship (years); SI = IIRS Social Inhibition; TD = IIRS Tactful Dishonesty; BFI = IIRS Body Function Inhibition; DIS = IIRS Dissimulation; F1 = Fear of retaliation; F2 = Fear of desertion; PA-P = CTS Physical Assault perpetration; Py-P = CTS Psychological Aggression perpetration, PA-V = CTS Physical Assault victimization, Py-V = CTS Psychological Aggression Victimisation, AX-I = STAXI Anger expression-in; AC = summed STAXI Anger Control; I = Expagg Instrumental, E = Expagg Expressive.

*p <.05, **p <.01, ***p <.001.

Age and length of relationship were predictably highly correlated, but were unrelated to any of the variables included in the study with two exceptions. Both were negatively associated with fear of desertion, possibly reflecting a belief that a very established relationship is unlikely to break up, even when real conflict occurs. Age showed a small but significant positive correlation with the Body Function Inhibition subscale of the IIRS. This may reflect a tendency for older women to be more inhibited regarding bodily functions, perhaps as a result of exposure to earlier cohort social norms.

It was expected (hypothesis 5) that women's perpetration of aggression would be negatively associated with all fear, inhibition and anger-control measures. Whilst the IIRS subscales largely showed positive intercorrelations, only the Tactful Dishonesty subscale showed any relationship to aggression. It was (as expected) negatively related to both Physical Assault and Psychological Aggression, i.e. aggression was associated with less Tactful Dishonesty. The fear measures were strongly positively correlated with one another (r(93) = .50, p <.001), but (contrary to hypothesis 5) both showed moderate (and significant) *positive* associations with both Physical Assault and Psychological Aggression. This was unexpected, and suggests that women who have greater fear of retaliation and desertion may be more likely to engage in aggression (though the direction of causation is discussed in Section 6.4.3). The summed Anger Control subscale was significantly negatively correlated with Anger Expression In. Therefore, as expected, higher levels of Anger Control appear to be associated with lower levels of anger experienced. As expected, both forms of aggression perpetration were are associated with higher levels of experienced anger (Anger Expression-In) and lower levels of anger control, but

these variables were more strongly related to Psychological Aggression than to Physical Assault.

The Expagg subscales were also significantly positively correlated (r(98) =.42, p <.001). This suggests that women can simultaneously experience aggression towards their partners as both instrumental and expressive. It is not unknown to find a positive correlation between the two Expagg subscales. Indeed, Archer and Haigh (1997) argued against a forced choice format for Expagg response options on the grounds that individuals may simultaneously experience aggression as instrumental and expressive. Both instrumentality and expressivity were positively associated with both forms of aggression, but the relationship with instrumentality was stronger in each case. This is partly consistent with hypothesis 5; it was expected that instrumentality would be positively associated with partner-directed aggression, but the positive relationship with expressivity was unexpected.

There was a strong association between women's perpetration of physical and psychological aggression (r(99) =.56, p <.001). For each CTS act, as well as reporting their own frequency of perpetration of aggression, women provided reports of their partner's use as an index of victimization. Consistent with hypothesis 2, perpetration and victimization were strongly positively correlated, though the degree of mutuality of Psychological Aggression was greater than for Physical Assault, perhaps due to greater variance in perpetration of Psychological Aggression. The CTS2 does not provide any information regarding who initiated aggression (respondent or partner), but the magnitude of the intercorrelations suggests that most aggression is to a large extent mutual. The direction of the relationships between victimization and all measures of fear and inhibitory control paralleled those reported for perpetration, but only the relationship with fear of retaliation reached

significance at *p* <.01. Whilst perpetration of physical aggression was significantly positively associated with expressivity, the relationship did not reach significance for victimization. Due to their lack of independence, however, correlations between fear and inhibitory variables and residualised measures of perpetration and victimization are examined in a supplementary analysis (Section 6.3.7, below).

6.3.5. Sex differences

Table 6.5 shows sex differences on all variables included in the study (note that average item scores are given for the IIRS and Expagg since unequal items numbers made direct comparison between subscales difficult). As noted in Section 6.3.1, cases with missing data were allowed to contribute where they could. Small differences in sample sizes across these analyses were not considered problematic; only analyses of fear and Expagg had excluded cases, and the maximum number of excluded cases in these analyses was 10. To guard against the risk of Type 1 error, six separate MANOVAs corresponding to the six domains of measurement were conducted. In each case, sex was entered as the independent groups factor and the subscales of each of the six measures (IIRS, STAXI, Fear, CTS subscales (perpetration), CTS subscales (victimization) and Expagg) were entered as multiple dependent variables in each case. Significant multivariate effects were followed by univariate independent groups ANOVAs to determine significant sex differences for the individual subscales of each measure.

Table 6.5: Means (and standard deviations), *F* and *d* values for male and female participants on all variables.

Variable (and possible range of scores)	Male		Female		*F* (sex)	*d*
IIRS Social Inhibition (1–5)	1.60	(0.63)	1.29	(0.52)	9.72**	0.55
IIRS Tactful Dishonesty (1–5)	2.65	(0.10)	2.17	(0.70)	10.68***	0.56
IIRS Body Function Inhibition (1 –5)	2.25	(0.91)	1.81	(0.80)	8.12**	0.51
IIRS Dissimulation (1–5)	2.86	(0.91)	2.65	(0.88)	1.71	0.24
STAXI AX-I (8–32)	15.00	(3.35)	15.36	(4.53)	0.21	−0.09
STAXI Anger Control (16-64)	46.51	(8.23)	40.72	(8.26)	14.35***	0.70
Fear (Physical harm) (1-5)	1.84	(1.14)	1.58	(1.13)	1.40	0.23
Fear (Desertion) (1-5)	2.32	(1.16)	1.84	(1.22)	4.27	0.40
CTS Physical Assault Perpetration (0-90)	1.01	(4.84)	1.39	(4.01)	0.22	−0.09
CTS Psychological Aggression Perpetration (0-120)	12.30	(17.30)	17.42	(17.05)	2.60	−0.30
CTS Physical Assault Victimisation (0-90)	2.48	(9.38)	1.05	(2.78)	1.94	0.21
CTS Psychological Aggression Victimisation (0-120)	14.01	(17.24)	14.59	(16.72)	0.03	−0.03
Expagg I (1-5)	1.65	(0.62)	1.83	(0.76)	1.54	−0.25
Expagg E (1-5)	2.85	(0.88)	2.88	(0.88)	0.02	−0.03
Expagg E-I (-5-5)	1.20	(1.06)	1.05	(0.89)	0.67	0.15

Note: ***$p<.001$, **$p <.01$.
Negative *d* values indicate effect sizes in the direction of higher female scores.

There was no significant multivariate effect of sex on perpetration of aggression, $F(2, 139) = 1.53$, $p = .22$, Pillai's Trace = .02. As expected, there was no sex difference for Physical Assault. Whilst greater perpetration of psychological aggression by women was anticipated (hypothesis 1), the small to moderate effect size ($d = -.30$) was in the expected direction, but did not reach significance. Table 6.7 additionally shows average scores for men and women for perpetration of each CTS item. Further MANOVAs were conducted to determine whether there were any sex differences on individual CTS acts. Again, there was no significant multivariate effect of sex on Physical Assault perpetration, $F(6, 135) = 1.51$, $p =.180$, Pillai's Trace = .06, or Psychological Aggression perpetration, $F(8, 133) = 1.11$, $p = .364$, Pillai's Trace = .06 (although the *F* ratio was significant for item 1, this is assumed to be a Type 1 error). The average item score for each subscale is also shown for the two sexes. Reported frequencies of Physical Assault were very low. The average item score for both sexes falls between response category 0 (never happened) and

response category 1 (once in the past year). There was some variation in frequency across individual items, but none were reported frequently. Reports of Psychological Aggression were higher, with the average item score falling between category 1 (happened once in the past year) and category 2 (happened 2-5 times in the past year) for both sexes.

Table 6.6: Means (and standard deviations) and *F* values for males and females on individual CTS acts

Item	Male	Female	*F* sex
Physical Assault			
2. I threw something at my partner that could hurt	0.12 (0.57)	0.16 (0.45)	0.17
3. I twisted my partner's arm or hair	0.38 (2.34)	0.03 (0.16)	2.23
4. I pushed or shoved my partner	0.27 (1.26)	0.45 (1.15)	0.69
6. I punched or hit my partner with something...	0.01 (0.08)	0.20 (0.89)	1.85
10. I grabbed my partner	0.21 (0.77)	0.46 (1.80)	0.75
15. I kicked my partner	0.02 (0.11)	0.08 (0.40)	0.88
Average score per item	0.17	0.23	
Psychological Aggression			
1. I insulted or swore at my partner	3.59 (5.19)	6.02 (6.08)	5.07*
5. I called my partner fat or ugly	0.38 (2.34)	0.36 (1.75)	0.00
7. I destroyed something belonging to my partner	0.12 (0.56)	0.10 (0.42)	0.01
8. I shouted or yelled at my partner	4.07 (5.14)	5.98 (5.91)	3.26
11. I stomped out of the room or house or yard	2.21 (4.14)	3.26 (4.33)	1.76
12. I accused my partner of being a lousy lover	0.46 (2.39)	0.18 (0.94)	2.37
13. I did something to spite my partner	0.95 (2.88)	0.89 (2.70)	0.01
14. I threatened to hit or throw something at my partner..	0.28 (1.26)	0.51 (2.19)	1.47
Average score per item	1.54	2.18	

Note: *p* <.05*

To determine whether the lack of a sex difference on CTS subscale scores masked a sex difference in the proportion of each sex committing any act (versus no acts) of aggression, assault rates (the proportion of respondents who reported committing one or more acts of aggression) were also calculated separately for both sexes. These are shown in Table 6.7, below. For both sexes, the Physical Assault rate was low. A greater proportion of women than men reported one or more acts of Physical Assault, but this difference did not reach significance, $\chi^2(1) = 2.87$, $p = .09$. The perpetration rate was higher for both sexes on Psychological Aggression, with the majority of respondents of both sexes reporting at least one act of aggression.

The proportion was slightly higher for women, but this difference was not significant, $\chi^2(1) = .65$, $p = .42$.

Table 6.7: Rates of reporting of at least one incident of Physical Assault and Psychological Aggression during the last year for men and women

Sex		Physical Assault	Psychological Aggression
Men	N	9	35
	%	22	85
Women	N	37	91
	%	37	90

Consistent with the lack of a sex difference on reports of perpetration, there was no significant multivariate effect of sex on reports of victimisation, as expected, $F(2, 139) = 1.38$, $p = .255$, Pillai's Trace = .02. However, it was notable that the magnitude of effect sizes differed from those reported for perpetration (see Table 6.5). Men's reports of their physical assault victimisation were higher ($d = 0.21$) than women's reports of their own perpetration ($d = -0.09$). Conversely, the effect size for women's reports of perpetration of psychological aggression ($d = -0.30$) was greater than men's reports of their own victimisation ($d = -0.03$).

As expected, there was no significant multivariate effect of sex on Fear scores, $F(2, 129) = 2.12$, $p = .124$, Pillai's Trace = .03. Although the sex difference did not reach significance ($p = .124$), the direction of the effect was towards greater male than female fear ($d = 0.23$ to 0.40). Univariate ANOVA did indicate a significant sex difference on fear of desertion (with men reporting greater fear), $F(1, 130) = 4.27$, $p = .041$. However, neither sex reported especially high levels of fear on either item, with the means falling well below the midpoint (3) of the scale (male means = 1.84 to 2.32, female means = 1.58 to 1.84). Both sexes reported relatively low levels

of inhibition on all subscales in the context of an intimate relationship, and in line with the findings reported in Chapter 5, this was expected. There was a significant multivariate effect of sex on IIRS scores, $F(4, 137) = 4.63$, $p = .002$, Pillai's Trace = .12. Consistent with hypothesis 3, men scored significantly higher (i.e. reported greater inhibition) than women on all IIRS subscales, with the exception of Dissimulation (here, mean differences were in the expected direction, but did not reach significance). There was a significant multivariate effect of sex on STAXI subscales scores, $F(2, 139) = 7.37$, $p = .001$, Pillai's Trace = .10. As expected, there was no significant multivariate effect of sex on Expagg scores, $F(2, 133) = .80$, $p = .450$, Pillai's Trace = .01. However, the small to moderate effect size for instrumentality ($d = -0.25$) was in the female direction. Both sexes scored significantly higher on the Expressive subscale than on the Instrumental subscale, $F(1, 134) = 152.50$, $p < .001$. There was no significant difference on the Anger Expression-In subscale ($F(1, 140) = 0.21$, $p = .650$), but men scored significantly higher on Anger Control ($F(1, 140) = 14.35$, $p < .001$). These results are consistent with hypothesis 4.

6.3.6. Regression analyses

Regression analyses were conducted on female data only (due to the low male response rate) to determine the extent to which the potential explanatory variables included in the study predicted women's perpetration of partner aggression (to test hypotheses 5 and 6). However, the distributions for the CTS measures were over-dispersed and markedly skewed, with a large number of zero scores. Following Archer, Fernandez-Fuertes and Van Lal Thanzami (2010), negative binomial regression (Gardner, Mulvey & Shaw, 1995) was employed as the most appropriate regression method.

Although the intention was to analyse predictors of women's perpetration of Physical Assault and Psychological Aggression separately, their high intercorrelation ($r = .56$) indicated a lack of independence. Therefore, initially they were summed to provide a measure of total perpetration of aggression, which was analysed as the criterion variable in a negative binomial regression analysis (via Generalised Linear Models in SPSS). However, although Physical Assault and Psychological Aggression are highly correlated, they appear conceptually distinct. Therefore, they were subsequently analysed as separate criterion variables in negative binomial regression analyses. Because negative binomial regression cannot be conducted on non-integer scores, values which included decimals were rounded up to the nearest whole number. Due to the small sample size and use of a conservative regression method, only variables which showed significant zero-order correlations with the aggression measures were entered as predictors, to allow examination of their relative importance. The variables which showed significant correlations did not differ across the three outcome measures of perpetration (CTS Total score, CTS Physical Assault and CTS Psychological Aggression), and were: IIRS Tactful Dishonesty, fear of retaliation, fear of desertion, STAXI Anger Control, STAXI Anger Expression-In, Expagg Instrumentality and Expagg Expressivity. The coefficients associated with each analysis are given in Table 6.8, below. Note that victimization was not entered into the regression model due to its lack of independence from perpetration, but it is considered in the supplementary analysis based on residualised correlations (Section 6.3.7).

Table 6.8: Negative binomial regression of CTS total aggression, Physical Assault and Psychological Aggression perpetration for women.

Parameter	df	B	SE	Wald 95% CI	X^2	p
Total aggression						
Intercept	1	3.18	0.96	1.30 / 5.07	10.93	.001**
Tactful Dishonesty	1	−0.06	0.03	−0.12 / 0.00	3.83	.050*
Fear (retaliation)	1	0.17	0.12	−0.06 / 0.40	2.04	.154
Fear (desertion)	1	0.06	0.14	−0.21 / 0.33	0.21	.647
Anger Control	1	−0.03	0.02	−0.06 / 0.00	4.61	.032*
Anger Expression-In	1	0.07	0.03	0.02 / 0.12	6.83	.009**
Instrumentality	1	0.08	0.04	−0.01 / 0.17	3.31	.069
Expressivity	1	−0.03	0.03	−0.08 / 0.03	0.88	.348
Physical Assault						
Intercept	1	1.09	1.57	−1.99 / 4.18	0.48	.488
Tactful Dishonesty	1	−0.17	0.05	−0.27 / -0.08	12.40	<.001***
Fear (retaliation)	1	0.16	0.15	−0.14 / 0.46	1.06	.302
Fear (desertion)	1	0.35	0.18	0.00 / 0.70	3.76	.053
Anger Control	1	−0.00	0.03	−0.09 / 0.01	2.26	.133
Anger Expression-In	1	0.03	0.04	−0.05 / 0.12	0.61	.434
Instrumentality	1	0.10	0.06	−0.02 / 0.23	2.61	.106
Expressivity	1	0.00	0.05	−0.09 / 0.10	0.01	.925
Psychological Aggression						
Intercept	1	3.13	0.96	1.24 / 5.01	10.55	.001**
Tactful Dishonesty	1	−0.05	0.03	−0.11 / 0.01	2.78	.096
Fear (retaliation)	1	0.16	0.12	−0.07 / 0.40	1.91	.167
Fear (desertion)	1	0.04	0.14	−0.23 / 0.31	0.08	.783
Anger Control	1	−0.03	0.02	−0.06 / 0.00	4.72	.030*
Anger Expression-In	1	0.07	0.03	0.02 / 0.12	6.79	.009**
Instrumentality	1	0.08	0.04	−0.01 / 0.17	3.25	.071
Expressivity	1	−0.03	0.03	−0.09 / 0.03	0.96	.328

Note: ***p <.001, **p<.01, *p<.05.

Women's reports of overall aggression towards their partners were associated with lower levels of inhibition as measured by the Tactful Dishonesty subscale of the IIRS, lower levels of Anger Control and higher levels of experienced anger (Anger Expression-In). When Physical Assault was considered separately, lower inhibition on the Tactful Dishonesty subscale emerged as the only significant predictor. When Psychological Aggression was considered separately, only lower Anger Control and higher levels of anger experienced emerged as significant predictors. For each of these analyses, the goodness-of-fit statistic was less than 1, and therefore adequate

(deviance = .90 for analysis of combined scores, for Physical Assault, .96, and for Psychological Aggression, .91). These results provide mixed support for hypotheses 7 and 8. The prominent role of lower levels of Tactful Dishonesty in predicting Physical Assault was as expected.

6.3.7: Analysis of victimization and perpetration using residualised correlations

High correlations were observed between women's reports of their own perpetration and victimization (r = .65 for Physical Assault, and r = .82 for Psychological Aggression). The correlations with the remaining predictor variables were therefore very similar for perpetration and victimization. Following Raine et al. (2006) and Archer et al. (2010), residualised measures of perpetration and victimization were created to allow independent assessment of their relationships to other variables. To obtain a 'pure' measure of perpetration, victimization was regressed onto perpetration and standardized residuals (the variance in perpetration not associated with victimization) were saved. To obtain a 'pure' measure of victimization, perpetration was regressed onto victimization, and the standardized residuals were saved (i.e. the variance in victimization not associated with perpetration). Standardised residuals were created for perpetration and victimisation of Physical Assault and Psychological Aggression. Zero-order correlations between residualised scores of perpetration and victimization with the remaining study variables are given in Table 6.9.

Table 6.9: Zero-order correlations between residualised perpetration and victimization scores and remaining study variables for women.

Measure	Physical Assault Perpetration	Physical Assault Victimization	Psychological Aggression Perpetration	Psychological Aggression Victimization
Age	−.12	.05	−.03	−.05
Length of relationship	−.08	.02	−.04	.02
Social Inhibition	.09	−.12	.28**	−.24*
Tactful Dishonesty	−.24*	.15	−.13	−.03
Body Function Inhibition	−.04	.01	.00	−.09
Dissimulation	−.19	.17	.01	−.09
Fear (retaliation)	.33***	−.20	.14	.08
Fear (desertion)	.31**	−.21*	.07	.08
Anger Expression-In	.22*	−.14	.13	.08
Anger Control	−.22*	.16	−.29**	.08
Instrumentality	.39***	−.26**	.25*	.03
Expressivity	.31**	−.24*	.16	−.04

Note: ***p <.001, **p <.01, *p <.05.

Archer et al. (2010) note that it is usual for the strength of correlations to be reduced in this analysis, and this is the case here. For perpetration of Physical Assault however, there were no differences in the variables with which it is significantly associated when compared to those reported in Section 6.3.4, where victimisation was not partialed out. It is also clear that all psychological variables measured are much more strongly associated with the respondent's own perpetration of aggression than with their victimisation. For Physical Assault therefore, a reasonable degree of confidence can be placed in stating that the relationships identified do hold for perpetration, and do not result from its underlying relationship with victimisation

For perpetration of Psychological Aggression, however, there were some differences to the relationships reported in Section 6.3.4. Relationships with fear, Expressivity and Anger Expression-In were non-significant, and the significant negative relationship with Tactful Dishonesty was replaced with a significant positive relationship with Social Inhibition, indicating that higher levels of inhibitory control on

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this subscale are associated with more perpetration of Psychological Aggression. The results of the earlier regression analysis for Psychological Aggression, therefore, should be treated with some caution.

6.4: Discussion

6.4.1. Frequency of aggression and mutuality

Reports of physical assault were low for both sexes; most respondents reported resorting to acts of physical aggression rarely or not at all. The acts of physical assault most commonly reported were pushing, shoving and grabbing. There was a high level of reported mutuality of physical aggression. These estimates are of course based on the respondent's own reports of their partner's behaviour, but these findings are in line with existing research which suggests that CCV is often mutual (see Archer, 2000). However, this data does not provide information regarding which partner initiated the aggression, nor the reason for it. Psychological aggression was much more common than physical assault, with the mean CTS response category being two to five times in the past year. The most commonly reported acts were 'insulted or swore' and 'shouted or yelled', followed by 'stomping out'. Other acts were relatively rare. Reported mutuality of psychological aggression was extremely high. Women's self-reports of their own physical assault and psychological aggression were moderately positively correlated, consistent with previous research (Hines & Saudino, 2003; Molidor, 1995).

6.4.2. Sex differences

Sex differences were broadly consistent with hypotheses. The lack of a sex difference on the CTS Physical Assault subscale replicated the findings of many

studies which have used the CTS (see Archer, 2000, for a meta-analysis). Women

did report greater use of psychological aggression; the effect size was small to

moderate but was non-significant. Other studies have reported women's greater

perpetration of psychological aggression towards partners (Hines & Saudino, 2003;

Molidor, 1995).

The pattern of sex differences in this study broadly supports the view that

women's greater frequency of aggression in intimate relationships relative to other

contexts is paralleled by a general reversal of sex differences on measures of fear,

inhibition, anger control and social representations. Although scores on the fear

items were in the direction of greater male fear, they were non-significant and the

effect sizes were small (fear of physical harm) to moderate (fear of desertion).

Reports of fear in response to aggression were low for both sexes, however,

indicating that neither sex is particularly fearful of their partner's response to

aggression. In the study reported in Chapter 3, fear was measured as the trait of

harm avoidance, which showed the greatest sex difference (d =-0.77) of the

variables included in the study, echoing the conclusions of Cross et al. (2011). In

contrast, in the specific context of intimate relationships, women did not report

greater fear than men; most women do not fear that their partner will retaliate or

desert them if they are aggressive.

Replicating the results of the study reported in Chapter 5, both sexes reported

low levels of inhibition on the IIRS subscales, and women's scores were again

significantly lower than men's on the Social Inhibition, Tactful Dishonesty, and Body

Function Inhibition subscales. Effect sizes were again moderate. Men did score

higher on the Dissimulation subscale, but this difference was not significant, and the

effect size was small. These findings again contrast with findings for trait inhibition

reported in Chapter 3 where there was a significant moderate effect in the female direction on the Control subscale of the MPQ. The present findings also contrast with those of Bjorklund and Kipp (1996), who reported greater female inhibitory control across a number of domains of social inhibition. This suggests that, despite their greater inhibitory ability in interpersonal domains, women engage in lower levels of restraint of behaviour towards their partners than men.

There was no sex difference on the STAXI Anger Expression-In measure, indicating that men and women do not vary in levels of anger experienced. This is comparable to anger measured in other contexts, where sex differences have not been found (Archer, 2004; Archer & Mehdikhani, 2003). The results are also comparable to the findings reported in Chapter 3, although reports of experienced anger by both sexes were actually slightly lower in the current study in which the target was specified as an intimate partner. Given the close physical proximity in which intimate partners generally live, and the potential for conflict, this was surprising. The summed Anger Control subscale measures how often individuals control the expression of anger, and women's lower scores suggest that they are less willing or able to control their anger towards their partners than are men. Men's greater control of anger in this context contrasts with the findings reported in Chapter 3, where no sex difference was found in non-partner settings.

The lack of a sex difference on either of the Expagg subscales contrasts with clear sex differences found in studies where the opponent is unspecified (Campbell & Muncer, 1987), and with the findings reported in Chapter 3 (where the usual pattern of higher male instrumentality and higher female expressivity was reported). The lack of a sex difference in the context of partner aggression results from a reversal of the usual tendency for men to score higher than women on the

Instrumental subscale (there was a medium effect size in the male direction for instrumentality in Chapter 3, but the non-significant effect size reported here is in the female direction). Similarly, Archer and Haigh (1999) found no sex difference on instrumentality in relation to partner aggression. In the present study, the pattern of scores on the two subscales was very similar for men and women.

6.4.3: Variables associated with women's perpetration and victimization

The main focus of this study was to test hypotheses regarding variables associated with women's self-reported aggression toward intimate partners. (Unfortunately, the low male response rate meant that it was not possible to examine hypotheses regarding the variables associated with male aggression.) It was predicted that women's self-reported partner aggression would be associated with lower levels of inhibitory control, anger control and fear of the consequences of aggression, and with higher levels of experienced anger. A positive relationship with instrumentality was also expected. There was mixed support for these hypothesised relationships. The negative binomial regression model indicated that female perpetrated physical assault is best explained by lower levels of Tactful Dishonesty. Whilst non-significant in the regression model, *higher* levels of fear of desertion were associated with greater physical assault. Psychological aggression was best explained by low levels of anger control and high levels of experienced anger. However, the subsequent analysis of residualised measures suggested that the relationship between Psychological Aggression and high anger may not hold when the relationship with victimisation is controlled. The difference in the predictive models for physical assault and psychological aggression does indicate that whilst they are highly correlated ($r = .56$), they are conceptually distinct.

Fear

Campbell's (1999, 2002) theory proposes that women's lesser involvement in direct aggression results from their greater fear of physical harm, and this was supported in the study reported in Chapter 3, where harm avoidance emerged as the primary mediator of sex differences in aggression. Faced with explaining women's greater perpetration of aggression towards intimate partners, it was reasoned that a context-specific reduction in fear might underlie this. This proposal was supported by evidence demonstrating the strength of social norms prohibitive of male perpetration of partner aggression (e.g. Archer, 2000, 2009; Felson, 2000), and also by evidence which indicates that women do not fear their partners (e.g. Fiebert & Gonzales, 1997; Brahan, 2000; Capaldi & Owen, 2001). Consistent with this, this study finds no sex difference in fear of the consequences of aggression perpetration (operationalised as fear of retaliation and fear of desertion), and effect sizes are in the direction of greater male fear for both items. However, the relationship of these two measures of fear to aggression was contrary to the hypothesis; both fear measures were moderately (and significantly) *positively* correlated with perpetration of physical assault and psychological aggression (though the analysis of residualised measures cast doubt on the association with psychological aggression).

A number of authors have argued that women's use of aggression towards partners is primarily motivated by self-defence (e.g. Walker, 1979; Saunders, 1988). The present finding that women's use of aggression is positively associated with fear of the consequences certainly appears consistent with the theory that aggression is an act of self-defence. The extent to which aggression was mutual also appears consistent with a self-defence explanation; women may be responding aggressively to victimisation. However, analysis of the relationships between fear and residualised

('pure') measures of perpetration and victimisation does not support a self-defence explanation. This analysis indicated that women's fear was more strongly associated with perpetration of physical assault than victimisation: Women's fear of retaliation was significantly positively correlated with their own perpetration of physical assault ($r = .33$) and so was fear of desertion ($r = .31$), but victimisation was not positively associated with fear.

The stronger relationship with perpetration than victimisation suggests a different explanation for the positive relationship with fear. It is possible that women who frequently use aggression towards their partners fear retaliation or desertion in response to continued provocation in the form of their own 'bad' behaviour. Because this study did not enquire about context or who initiated aggression, it is not possible to provide a definitive test of these alternative accounts here. However, the stronger relationship of fear to perpetration (than victimisation) does not favour a self-defence explanation. An alternative explanation is that the stronger relationship of fear to perpetration could arise as a result of women aggressing pre-emptively (because they are afraid). Whilst this possibility should be considered in future research, it is not clear how the acts of aggression measured by the CTS would act as a deterrent if women 'strike the first blow'; it seems more likely that this would provoke a violent response.

In considering alternative explanations for the relationship with fear, it is worth considering its role in the context of other variables related to physical assault. The prominent role of disinhibition on the Tactful Dishonesty subscale, and the stronger relationship between perpetration of aggression and instrumentality (rather than expressivity) indicates that women using higher levels of aggression are generally disinhibited in their behaviour towards their partners (note that the IIRS enquires

about behaviour towards partners in general, not in the context of aggression). The stronger relationship of aggression to instrumentality indicates that women's aggression towards their partners may be controlling and even coercive. These relationships are discussed more fully below. However, the key point here is that this profile does not appear consistent with a self-defence explanation. The view that women do not engage in partner aggression as a means of self-defence is also supported by a number of studies which find that women often initiate aggression (Bland & Orn; Capaldi, Kim & Short, 1997, Stets & Straus, 1990; 1992), and that their primary motivation is not self-defensive and is often coercive (Fiebert & Gonzales, 1997; Follingstad, Wright, Lloyd & Sebastian, 1991).

Graham-Kevan and Archer (2005) examined the relationship between women's use of partner aggression and fear of their partner. They measured fear using a single item (respondents were asked to indicate how frequently they had felt in danger of being physically hurt in conflicts with their partner). Consistent with the present study, Graham-Kevan and Archer found fear to be positively correlated with perpetration of aggression (measured using the CTS). However, in their regression model, women's victimization and self-reports of their own controlling behaviours were predictive of greater frequency of aggression, while the (significant) contribution of fear was negative. The authors conclude that in college samples (which they employed in their study) women's use of aggression does not appear to be in response to fear for their safety. Although the present study employed a community (rather than a college) sample, the difference in findings is more likely explicable in terms of the combination of variables entered into the regression models (since the zero-order correlations between aggression and fear were positive in both studies).

Inhibitory control

In developing the IIRS, a number of facets of inhibitory control were included so that it was possible (in this study) to identify domains on which disinhibition might be associated with aggression. It was not a surprise to find, therefore, that some of the subscales were unrelated to aggression (although all but the Dissimulation subscale yielded sex differences indicative of lower inhibitory control in women than men). The absence of relationships with the Social Inhibition and Body Function Inhibition subscales indicates that, although women are significantly more disinhibited than men on these facets, feeling at ease in the presence of a partner and being unconcerned about bodily functions do not appear useful for distinguishing aggressors in a community sample. The Tactful Dishonesty subscale, however, was significantly associated with physical aggression. This subscale measures a lack of inhibitory control in relation to the expression of honest appraisals, and therefore appears to index disinhibition of socioaffective impulses. MacDonald (2008) and Cross et al. (2011) argued that women's advantage may be particularly evident on these 'hot' forms of effortful control. Similarly, Bjorklund and Kipp (1996) provided evidence of a female advantage in inhibitory control of social behaviour. Women's apparent lack of affective impulse control in relation to partners (and its relationship to aggression) is therefore particularly striking. The role of the Dissimulation subscale is unclear and the problems with internal consistency and reduced number of items make it difficult to draw firm conclusions.

Analysis of residualised correlations indicates that lower levels of inhibition on the Tactful Dishonesty subscale are associated with perpetration of physical assault (but not with victimisation when the effect of perpetration is partialed out). Disinhibition on this subscale was the only significant predictor of physical assault

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perpetration in the regression model. Whilst other studies have demonstrated a relationship between low self-control and partner aggression in both sexes (e.g. Archer at al., 2010), such studies have used standard measures of general self-control, and have not measured inhibition in relation to an intimate partner. These studies therefore identify self-control as a relevant individual difference variable. The present study provides evidence that an aspect of inhibitory control found to be superior in women in other contexts (Bjorklund & Kipp, 1996) appears to be reduced in intimate relationships, and is strongly predictive of assault. Whilst Tactful Dishonesty was significantly associated with physical assault, correlations with psychological aggression were lower, and it did not emerge in the regression model. The less common and more serious nature of physical assault may mean that perpetration requires disinhibiton, whereas psychological aggression may not.

Anger and anger control

Low levels of anger control were associated with perpetration of both forms of aggression (but not with 'pure' victimisation, according to the residualised correlations). High levels of experienced anger were associated with pure perpetration but not victimisation. However, the regression model indicates that anger and anger control do not play a significant role in predicting physical assault perpetration once the role of Tactful Dishonesty is accounted for. Anger and anger control did, however, emerge as the only significant predictors of psychological aggression, indicating that women who use high levels of psychological aggression experience high levels of anger in relation to their partners, and engage in less anger control (though, as noted above, the relationship of psychological aggression to experienced anger should be treated with some caution).

A positive relationship between aggression and experienced anger potentially indicated a role for provocation. The magnitude of sex differences in aggression has been shown to diminish with increasing provocation (Bettencourt & Miller, 1996); therefore, women's greater use of aggression towards partners might simply result from a higher degree of provocation relative to other targets of aggression. Whilst provocation was not measured directly, higher levels of provocation should be manifest in higher scores for the experience of anger. On the contrary, both sexes reported experiencing less anger in relation to intimate partners than they did when no target was specified in Chapter 3. Nevertheless, those who do report higher levels of aggression may represent a subset of women who are highly provoked (and angry). Therefore, future research could examine whether women who engage in partner aggression are responding to provocation.

Social representations

Both instrumentality and expressivity were associated with physical assault, but the relationship with instrumentality was stronger (though it was not significant in either regression model). Whilst women's experience of partner aggression was more expressive than instrumental on average, this may reflect the finding that most women in the sample were not particularly aggressive. Those women who perpetrate higher levels of aggression appear to be characterised by greater instrumentality. This is consistent with previous research which finds that instrumentality is associated with more frequent aggression in both sexes (e.g. Archer & Graham-Kevan, 2003; Archer & Haigh, 1997), and with the 'readout' theory (Alexander et al., 2004; Driscoll et al., 2005) which proposes that disinhibition of aggression results in a more instrumental experience.

The relationship between instrumentality and aggression indicates that women's use of partner aggression may be coercive. This is consistent with the findings of Graham-Kevan and Archer (2005) who found that controlling behaviours were predictive of partner aggression in their female sample. It is also consistent with existing research which has examined motives. Fiebert and Gonzales (1997) identified the need to get a partner's attention as the key motive in women's use of partner aggression. Carrado, George, Loxam, Jones and Templar (1996) reported that the most commonly cited motive was 'to get through to my partner', and Follingstad, Lloyd, Wright and Sebastian (1991) found that women commonly endorsed the instrumental motive of 'to get control of the other person', and 'punishment for previous behaviour'.

Control has frequently been implicated in accounts of male perpetrated partner aggression. In Johnson's (1999) typology, control motives were central to the profile of the intimate terrorist, but were thought to be unrelated to CCV. Likewise, conflict theorists have generally de-emphasised the role of control in CCV, focusing on conflicts of interest as the source of aggression. More recently however, the role of control has been implicated in perpetration of partner-directed aggression by both sexes in community samples. Graham-Kevan and Archer (2008) found that the relationship between control and violence was not exclusively found in selected samples. Graham-Kevan and Archer (2009) found that men and women used similar amounts of controlling behaviours towards partners, and controlling behaviours were predictive of aggression in both sexes. Similarly, Graham-Kevan and Archer (2005) found that controlling behaviours were predictive of female perpetrated physical assault of partners. Johnson (2006) extended his typology, specifying two forms of CCV; in situational couple violence, one partner alone is violent, but not controlling,

and in mutual violent control, both partners are violent and controlling. Johnson argued that both forms show sex symmetry, thus acknowledging that women's aggression towards partners may be associated with control in community samples. Control was not the focus of this present study, and it must be acknowledged that controlling behaviours were not measured directly, unlike in Graham-Kevan and Archer's work. Nevertheless, the relationship of experienced instrumentality to perpetration here does suggest that aggression may be used by women to pursue their own agenda in an intimate relationship, rather than a loss of control, which appears to characterize women's aggressive encounters with other targets.

Both feminist and evolutionary theorists have emphasized the role of control in male partner-directed aggression. Feminists have argued that male partner aggression is a means of exerting patriarchal control over women (Dobash & Dobash, 1979) and evolutionary theorists (Daly & Wilson, 1998; Wilson & Daly, 1992a, 1996, 1998; Buss & Shackleford, 1997; Buss & Duntley, 2011) emphasise male proprietary motives designed to protect against the risk of cuckoldry. The findings of this study do not shed light on the motives behind female partner aggression, but from a fitness perspective, women may use aggression for the purpose of mate retention, mate guarding, and to ensure investment. Further research should investigate the goals of female partner aggression in relation to fitness benefits. Buss and Duntley (2011) provide a useful theoretical context for this. They locate partner aggression within the context of sexual conflict theory (Parker, 1979. 2006), which predicts that sexual conflicts will occur when there is a discrepancy between the optimal fitness benefits for the two sexes. When this occurs, it creates a selection pressure favouring behaviours which coerce opposite-sex partners to behave in ways which confer maximum fitness benefits to oneself,

and a kind of arms race ensues at the behavioural level. Buss and Duntley (2011) argue that humans have evolved a number of means (including aggression) of ensuring that the benefits of long-term mating are obtained, and are not outweighed by the heavy costs. Their account is focussed on the adaptive benefits (and costs) of men's partner violence. However, such a context-dependent cost-benefit analysis should be extended to indentifying the sexual conflicts which have presented the greatest adaptive problems to women, and associated circumstances which may predispose women to using aggression.

6.4.4: Limitations

There are several limitations to the present study. Operationalisation of fear of the consequences of aggression as two single items perhaps defined fear too narrowly. This concern was noted by Graham-Kevan and Archer (2005) in reference to their single item measure of fear. Future research might usefully consider other fearful consequences not included in this study. Capaldi and Owen (2001) suggested that there may be a number of potentially fear-inducing consequences of aggression other than physical retaliation, such as verbal and psychological aggression. It is also crucial for future research to establish whether fear is a precursor to, or a consequence of aggression. Whilst the stronger relationship of fear to perpetration (than victimisation) in the present study appears consistent with the view that fear is a consequence of women's aggression, the data do not allow definite conclusions to be drawn.

The wording of the fear items also warrants further consideration in light of the findings. Respondents in this study were asked to respond to the following item in relation to fear of retaliation: "*When I behave aggressively towards my partner, I fear*

that it may cause my partner to physically harm me". Of course it is never possible to be sure how respondents interpret the wording of items. However, it may be that the extent to which experienced *fear* was the focus of the question was not emphasized sufficiently. Respondents may have interpreted the item as asking them to indicate whether or not retaliation was *likely*, rather than the extent to which they were actually fearful of it. Future research should emphasise that respondents are being asked to indicate the extent to which they felt frightened and feared significant harm.

The present study finds preliminary support for the proposal that women's use of physical aggression towards partners is related to disinhibition of behaviour as measured by the Tactful Dishonesty subscale. The development of the IIRS was guided by the need to identify aspects of inhibitory control which might underlie partner aggression. The role of the Tactful Dishonesty subscale indicates that disinhibition of affective aspects of social behaviour towards intimate partners may be the most important form of disinhibition. Further refinement of measures of socioaffective disinhibiton in relation to intimate partners may therefore be beneficial. Given the problems with the Dissimulation subscale, further development of a measure of the tendency to simulate emotions may also be beneficial.

Whilst many studies of partner violence rely on an undergraduate sample, I felt it was important to obtain a representative community sample of adult respondents in established relationships, since the phenomenon studied (sex parity in CCV) is evident is this population. Despite efforts to obtain a larger sample size, the response rate was low, particularly for men. The low sample size may have compromised statistical power, and it prevented examination of the psychological correlates of male partner aggression. Additionally, there may be important differences in the personality characteristics of respondents and non-respondents.

Respondents are likely to be higher in conscientiousness and lower in boredom susceptibility than non-respondents, for example. Respondents may therefore not be entirely representative of the target population. It is known that men in the UK score more highly on measures of boredom susceptibility than women (Zuckerman, Eysenck & Eysenck, 1978), and this may explain the low male response rate. If this is the case, then male respondents may be particularly unrepresentative of the target population. Higher levels of conscientiousness and lower susceptibility to boredom could be associated with better inhibitory control, and could potentially obscure sex differences in the population.

A further issue associated with the nature of the sample concerns the comparisons made with the findings reported in Chapter 3. The instruments employed in the study reported in this chapter were intended to provide target specific measures corresponding to those used in a more general context (Chapter 3), where no target was specified. The purpose of this was to allow some comparison of sex differences on measures of fear, inhibitory control and social representations when no target is specified (Chapter 3) and when the target is an intimate partner (this study). Therefore, throughout this discussion, differences in findings across these two studies have been highlighted. Whilst these differences *may* be attributable to target effects, it must be noted that there are differences between the samples employed in these two studies which may contribute to differences in findings. The most notable difference between samples is the age of participants; in the study reported here, the age range was 17 to 80 (mean = 39.51). In comparison, in the study reported in Chapter 3 the age range was 13 to 24 (mean = 16.85). Aggression peaks in adolescence and early adulthood (Campbell, 1994), and may be instrumental to competition for mates (see Section 1.6). The results

derived from the older sample of respondents in the study of partner aggression may represent a normative decrease in aggression (and variables associated with aggression).

Although the incorporation of women's reports of their partner's aggression was a strength of the study (because it allowed examination of the 'pure' measures of perpetration and victimisation), obtaining reports of the behaviour of both partners from only one member of a dyad is problematic because respondents are likely to under-report their own perpetration (Archer, 1999). In this study, men's reports of physical assault victimisation were greater than women's reports of perpetration, perhaps suggesting under-reporting by women. However, by contrast, women's reports of perpetration of psychological aggression were greater than men's reports of victimisation. Ideally, data should be collected from both partners, though in practice, this is likely to be difficult.

The results of the analysis of residualised measures made it difficult to draw firm conclusions regarding the variables associated with psychological aggression, since the relationships of some study variables with perpetration were different when the effect of victimisation was controlled. This casts some doubt on the validity of the relationships initially reported (though reassuringly, this was not the case for physical assault).

Further theoretical implications of the findings reported here are discussed in the subsequent chapter, and are considered more fully in relation to the findings reported in study 3.

A final note regarding an important ethical issue. Data collection took the form of posting questionnaires through the doors of unknown potential respondents. The

advantages of this were; 1) it allowed targeting of a community sample, and 2) anonymity was maximised, and it was hoped that this would contribute to truthful reporting. However, subsequent to the study, I considered an ethical problem with this form of data collection. Because the recipient of the questionnaires is completely unknown to the researcher, it is possible that questionnaires could be posted to a victim (or perpetrator) of serious domestic violence. The recipient may perceive that they have been personally targeted. A perpetrator could interpret this as a sign that the victim has informed authorities, and this could trigger violence. At the very least therefore, researchers adopting such a method should make it very clear that recipients have not been personally targeted. However, a problem remains; if a perpetrator discovers that a victim has completed a questionnaire which involves reporting victimisation, they may react angrily, even if it is clear that the household was not specifically targeted. Such ethical concerns may be more effectively addressed by collecting data in person, and not in the respondent's home.

Chapter 7: General Discussion

7.1: Summary of findings

This thesis has examined Campbell's (1999, 2002, 2006) theory which proposed that sex differences in direct aggression are mediated by women's greater fear and inhibitory control. The first half of this thesis considered these potential mediators as traits and their ability to explain women's lower involvement in aggression was examined. A review of the literature of sex differences in perpetration of partner-directed aggression (Chapter 4) supported the claims of family conflict theorists that sex symmetry is evident in community samples. Women's greater willingness to engage in aggression towards intimate partners (relative to other targets) presented a theoretical challenge to Campbell's (1999) proposal that women avoid aggression due to distal selection pressures favouring fear of physical harm as a result of the high cost to offspring of maternal injury or death. It was proposed that women's increased use of aggression towards intimate partners might result from a context-specific reduction in fear and inhibitory control. The latter half of this thesis examined this proposal. Additionally, the proposal that social representations of aggression represent an accurate phenomenological 'readout' of the experience of aggression for the two sexes was also examined. In the subsections below, the findings in relation to women's general desistance from aggression are summarised, and subsequently compared with the findings from intimate relationships. This is followed by discussion of theoretical and measurement implications for appetitive and avoidant theories of sex differences in aggression. Finally, the limitations associated with the findings presented in this thesis are discussed, alongside some suggestions for future research.

This thesis finds support for Campbell's (1999, 2002, 2006) proposal that sex differences in direct aggression are predicated on women's greater fear of physical harm and superior inhibitory control. The relationship between sex and trait aggression was mediated primarily by harm avoidance, but also by general inhibitory control. Sexually differentiated 'optimal' levels of these traits appear to be strongly associated with sex differences in aggression. However, their relative explanatory power was contrary to expectations. Because inhibitory control of aggression occurs even when there is no apparent risk of physical harm, it was anticipated that women's superior inhibitory control (itself a result of girls' greater fear) would emerge as the primary mediator of sex differences. It was suggested that the more prominent role of harm avoidance may indicate that women's greater fear causes them to avoid situations where conflict may occur, to the extent that their superior inhibitory control only becomes relevant when conflict avoidance fails. Women's greater fear may therefore act directly to reduce involvement in aggression (by promoting withdrawal from situations which pose a potential threat of physical harm) and also indirectly via the development of superior inhibitory control (which may promote restraint over behaviour when avoidance of conflict or other risky situations is not possible).

Whilst providing support for the mediating role of fear and inhibitory control, the findings also indicate that anger control and negative affect do not mediate sex differences. The ability to control anger did emerge as a highly significant negative predictor of aggression, and therefore appears to be a key individual difference variable associated with aggressive behaviour. However, the two sexes did not report differences in the control of anger. Negative affect was examined since criminological researchers have posited a key explanatory role for a sex difference in

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this trait favouring men. Negative affect does not appear to mediate the relationship between sex and aggression. Research which has found an effect may have done so as a result of incorporation of the Aggression subscale into the higher order factor of Negative Emotionality on the MPQ, thus rendering the findings confounded.

This thesis also finds support for the proposal that sex differences in social representations of aggression represent the accurate phenomenological experience of aggression for the two sexes (Alexander, Allen, Brooks, Cole & Campbell, 2004). Preference for a relatively more expressive experience of aggression was associated with greater inhibitory control, and was a significant mediator of sex differences in aggression. Women's experience of aggression as an expressive outburst and a loss of control was therefore directly associated with their lesser aggression.

7.1.2. Comparison with findings from the study of intimate relationships

Correspondence of variables between Chapter 3 (where no target was specified) and Chapter 6 (where the target was an intimate partner) allowed examination of the extent to which sex differences in fear, inhibitory control, and social representations fluctuate in parallel with sex symmetry in perpetration of aggression. Consistent with a large body of research using the CTS in community samples, there was no significant sex difference in perpetration, but consistent with the findings of Archer's (2000) meta-analysis, effect sizes did favour women. When respondents completed measures of fear, anger control and inhibition *in relation to their behaviour towards intimate partners*, there were marked changes to the sex differences reported in Chapter 3 (where no target was specified). When respondents completed context-specific measures of their experience and behaviour in intimate relationships, there was no sex difference on fear of the consequences of

aggression, and a reversal of sex differences in inhibition and anger control, with moderate effect sizes favouring men on both of these variables. These findings indicate that women generally do not fear their partners, and are relatively disinhibited.

This findings reported in Chapter 6 provide preliminary support for the proposal that women's greater use of aggression towards intimate partners may be explicable in terms of a context-specific reduction in inhibitory control of social behaviour; women's physical aggression was associated with greater disinhibition on the Tactful Dishonesty subscale of the IIRS (which measures the tendency to express honest appraisals of a partner). It was suggested that sexually selected 'optimal' trait levels of inhibitory control are not inflexible, but are responsive to cultural and situational variations in the ratio of costs and benefits. There is evidence of a sex difference in perceived costs and benefits of partner-directed aggression; Archer, Fernandez-Fuertes and Van Lal Thanzami (2010) found that women perceived significantly more benefits and men perceived significantly more costs. Perceived benefits (but not costs) were also predictive of aggression by both sexes, in interaction with low self-control. The sex difference in the ratio of costs to benefits may promote a reversal of the usual pattern of sex differences in aggression.

The role of inhibitory and impelling forces to partner violence has been incorporated in Finkel's (2007) model. Finkel argues that experiencing a 'violet impulse' towards an intimate partner is neither unusual nor pathological, but what distinguishes individuals who act on such impulses is the absence of inhibitory forces. If strong impeeling forces are present, but inhibition is weak, then violence is likely to occur. Finkel argues that a complete understanding of partner violence requires study of both impelling and inhibitory processes. Low self-control is

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specified as a dispositional risk factor for weak inhibition, but the model does not consider sex differences in self-control; the findings from this thesis suggest that sex may be an important predictor of self-control in relation to intimate partners.

The role of fear, however, remains uncertain. Whilst (overall) women reported little fear of retaliation or desertion as a consequence of their partner-directed aggression, the relationship between fear and aggression was positive rather than negative. Although this raises the possibility of a self-defence explanation, it was argued that the stronger relationship of fear to perpetration (than victimisation) rendered this unlikely, and fear may be a consequence of (rather than a precursor to) women's aggression towards partners. However, the data provided here cannot provide a definitive test of these two alternative accounts, and further research is needed to investigate the relationship between fear, inhibition and partner aggression.

Sex differences in reports of the experience of aggression also differed markedly when respondents were asked to report their experience of aggression towards an intimate partner. Here, there was no sex difference on either instrumentality or expressivity indicating that sex symmetry in the experience of aggression parallels sex symmetry in perpetration. This provides further support for the claim that social representations of aggression are directly related to the frequency with which aggression occurs, and therefore may represent an accurate 'read-out' of the experience of aggression. Instrumentality was positively associated with women's perpetration of partner aggression. This finding is consistent with research reviewed in Section 4.5.2, which identified women's instrumental motives, and with research which has identified a relationship between controlling behaviours and partner-directed aggression in both sexes (Graham-Kevan & Archer, 2008).

However it was noted that (for female participants) perpetration of physical aggression showed a moderate positive relationship with both instrumentality and expressivity. This suggests that women experience aggression simultaneously as a loss of control, and as a means of control over their partners. This finding highlights the difficulty in assigning a single motive to an act of aggression. Bushman and Anderson (2001) raise a similar point in relation to the hostile (affective, impulsive) versus instrumental (premeditated) aggression dichotomy; they argue that aggressors may have mixed motives, comprising both anger and planning aspects. The strength of the relationships of both Expagg subscales with physical aggression indicates that female perpetrated partner violence may encompass both impulsive and instrumental components.

The role of control in intimate partner violence has been linked to a constellation of personality traits known as Borderline Personality Organisation (BPO) (Dutton, 1994). BPO is characterised by impulsivity, anger and an unstable sense of self. Borderlines have unstable interpersonal relationships, which are marked by intensity, demandingness and dependency (Gunderson, 1984). BPO is associated with self and partner reports of spousal abuse by men (Dutton, 1994; Dutton & Starzomski, 1993). Men with BPO often have an anxious-avoidant attachment style (Dutton, Saunders, Starzomski & Bartholemew, 1994). Resulting frustration and fear of loss may trigger aggressive behaviour as a means of exerting control over the relationship. Indeed, Dutton and Starzomski (1993) found that men's scores on the Dominance and Isolation subscale of the Psychological Maltreatment of Women Inventory were strongly associated with all subscales of the Self-Report Instrument for Borderline Personality Organisation. Although research on the relationship between BPO and partner violence has mainly focussed on male

perpetrators, BPO may also underlie female perpetration of controlling aggression. Walsh et al. (2010) found that female batterers also show higher levels of Borderline Personality Disorder (BPD). However, it should be noted that this study employed a psychiatric sample, and further research is needed to demonstrate a relationship between subclinical BPO (rather than BPD) and female perpetration of partner violence.

The role of instrumentality and control in women's perpetration of partner aggression has important implications for domestic violence interventions. Domestic violence policy and interventions largely adopt the feminist view that partner aggression is perpetrated by men, and is a product of patriarchal values. Women's Aid is a UK charity which supports female victims of domestic violence. The Women's Aid website endorses the prevailing feminist view of domestic violence. Whilst it acknowledges that men can suffer victimisation, the emphasis is on male perpetration in the context of control and patriarchal values. This is evident in the following statement describing the causes of domestic violence: "Domestic violence against women by men is 'caused' by the misuse of power and control within a context of male privilege. Male privilege operates on an individual and societal level to maintain a situation of male dominance, where men have power over women and children" (http://www.womensaid.org.uk/domestic-violence-articles.asp?section=00010001002200410001&itemid=1275&itemTitle=What+is+the+cause+of+domestic+violence, accessed 23 November, 2011). Straus (2011) noted that current US government policy requires all boys to learn that violence towards women is unacceptable. Similarly in the therapeutic field, Eisikovits and Bailey (2011) describe the influence of feminist theory on the 'curriculum' for male batterer programs; it includes "the socio-cultural basis for men's violence against women –

patriarchy; the various types of abuse and methods men use to gain power and control..." (p, 342). However, intervention programs do not address proximal aspects of women's violence towards partners. Given the relationship between control, instrumentality and perpetration of partner-aggression in both sexes, it may be appropriate to address the role of control in treatment programs for women.

7.1.3: Implications for appetitive and avoidant approaches to understanding sex differences in aggression: Theoretical and measurement issues.

Theories of sex differences in aggression differ in terms of the relative explanatory roles of women's restraint (or punishment sensitivity) and men's impulsivity (or reward sensitivity) (Cross, Copping & Campbell, 2011). Wilson and Daly (1985) place the key selection pressure driving sex differences in aggression in the evolutionary history of men; they argue that men's greater fitness variance has favoured an *appetitive* taste for risk manifest in *impulsivity*. Campbell emphasises women's greater *avoidance* of risk manifest in *inhibition*. The accounts of Wilson and Daly (1985) and of Campbell (1999, 2006) are complementary in that they describe key selection pressures which have acted on men and women to shape their behaviour in sex-typed ways. This appears to present a theoretical impasse, with evidence supporting the role of both appetitive motivations in men and avoidant motivations in women. Campbell's account draws on research regarding the importance of maternal investment and survival in establishing the fitness benefits of harm avoidance and inhibitory control for women (Section 1.6.6), and this thesis provides clear support for the role of harm avoidance and inhibitory control as mediators of aggression in non-intimate contexts. In support of Wilson and Daly's account, clearly men's high fitness variance and the importance of status in mate acquisition are indicative of the fitness benefits associated with male risk-seeking.

Wilson and Daly are able to draw on evidence which indicates clear sex differences in risk-seeking (Byrnes, Miller & Schafer, 1999; Cross et al., 2011, LaGarange & Silverman, 1999; Nakhaie, Silverman & LaGrange, 2000; Tittle, Ward & Grasmick, 2003). Research using the low self-control scale has found both the risk-seeking and impulsivity subscales to be predictive of aggression (Grasmick, Tittle, Bursik & Arneklev, 1993; LaGrange & Silverman, 1999; Piquero & Rosay, 1998).

There are some indications from recent research, however, which suggest that the relative explanatory power of women's sensitivity to harm may be greater than men's appetite for risk. Consistent with two other studies (Moffitt, Caspi, Rutter & Silva, 2001; Cross et al., 2011) this thesis finds an effect size for women's greater harm avoidance in excess of 0.7. In contrast, whilst Cross et al. reported a clear effect in favour of men on aggregated measures of risk- and sensation-seeking, the effect size was moderate (d = 0.41). The Thrill and Adventure subscale of Zuckerman's sensation seeking scale could be considered to measure reversed Harm Avoidance since it differs only in that it offers an appetitive choice between two alternative acts, whereas the MPQ Harm Avoidance measure asks respondents to indicate which of two activities they would least like to do. However, the appetitive measure of risk-seeking yields a smaller sex difference (d = 0.41; Cross et al., 2011).

Whilst the male advantage on risk-seeking (though smaller than the female advantage for harm avoidance) appears to provide evidence of appetitive motivation in men, Cross et al. suggested that sex differences on measures of risk- and sensation-seeking may be predicated on women's greater sensitivity to punishment (for which they report an effect size of d = -0.33) rather than men's sensitivity to reward (for which they found no sex difference). Thus, sex differences in risk-seeking

may themselves result from women's greater fear of harm rather than men's appetite for risk.

Just as theories of sex differences in aggression emphasise either avoidant or appetitive motivations, conceptualisations and measures of inhibition invoke the distinction between appetitive processes (impulsivity) and inhibitory processes (self-control, effortful control, inhibition). However, these terms (and associated measures) are often used interchangeably, perhaps reflecting the assumption that low impulsivity is equal to inhibitory control (see Section 3.1.2). However, sex differences on measures of inhibitory control and impulsivity are not equivalent. Cross et al. (2011) did not find a clear male advantage on general impulsivity inventories, reporting an overall effect size of $d = 0.08$. However, most of the measures included in this meta-analysis were oriented towards impulsivity rather than inhibitory control. In this thesis, a measure was selected which was oriented towards inhibitory control, and this yielded a small to moderate effect favouring women. Whilst measures of impulsivity have also been shown to be predictive of aggression (as noted above), the stronger sex difference on inhibitory control (and its role in mediating sex differences in aggression in this study) provides further support for the argument that the relationship between sex and aggression may be more strongly associated with inhibitory processes in women, resulting from their greater sensitivity to harm. The variation in sex differences across measures of inhibitory control and impulsivity has clear implications for the necessity of careful choice of measurement instruments. It is not uncommon for research which claims to examine the role of inhibitory control to operationalise it using measures which are oriented towards impulsivity.

A further issue to consider when measuring inhibitory control is the context in which items are presented. Broadly, measures of inhibitory control (and impulsivity) assess cognitive inhibition (executive function) or control of socioaffective responses (effortful control). MacDonald (2008) refers to these as 'cool' and 'hot' forms of inhibition respectively. Measures of 'cool' executive function abilities do not show consistent sex differences, and when IQ is controlled, they are not strongly associated with aggression and crime (see Section 1.7.4). Sex differences (favouring women) occur most strongly on effortful control of social behaviour (Bjorklund & Kipp, 1996; Cross et al., 2011). Cross et al. note that a number of impulsivity inventories present items out of context. The authors illustrate this argument with reference to the item, "I am an impulsive person", variants of which are common to a number of inventories. They argue that such items do not indicate whether they refer to an affective context (such as a love affair) or a non-affective context (such as a game of chess). Therefore, researchers should clearly operationalise their independent variable as inhibitory control or impulsivity, and additionally, the context should be clearly articulated. The selection of variables and measurement instruments is likely to affect conclusions drawn regarding the relationships between sex, inhibition and aggression.

7.1.4: Limitations and future research

There are a number of limitations associated with the research conducted. Where future research could address these limitations, suggestions are made. Further suggestions for future research which may extend the findings reported here are also proposed.

This thesis has focussed on potential psychological mediators of sex differences in aggression. Women's greater fear and inhibitory control are argued to result from distal selection pressures associated with inclusive fitness losses incurred as a result of maternal death or injury. Whilst this thesis finds support for the proposed mediators in Campbell's (2006) model, it does not provide direct support for the nature of the distal selection pressure. Another potential selection pressure favouring avoidance of harm is the impact of injury or disfigurement on mate acquisition and retention, given the value placed on female beauty by men (Buss, 1989). The role of motherhood could be examined; if women's greater fear of harm results from the importance of reproductive investment, it may be life history sensitive and should be particularly evident in women with young children.

There was no sex difference on the self-reported direct aggression frequency measure in Chapter 3, and so the analyses in this study were reliant on a trait measure of aggression. Whilst the expected sex differences were found for trait aggression and hypotheses regarding relationships with other variables were largely supported, it should be noted that the conclusions drawn refer to aggressive tendencies rather than specific behaviours. It would therefore be beneficial to attempt replication of the findings for aggressive behaviour, perhaps utilising an act-based frequency measure similar to the CTS, rather than a single item measure. It would also be beneficial to specify targets as non-intimate to exclude the possibility of women reporting aggression towards intimate partners.

The study of general aggression (reported in Chapter 3) was based on an adolescent sample, whereas the research on aggression in intimate relationships utilised a community sample with a much higher mean age. Whilst these different samples were suited to the aims of those studies, differences in the findings from

these samples have been used to draw preliminary conclusions regarding the extent to which sex differences in fear, inhibition and social representations are altered when the target is an intimate partner. It is possible that differences in findings could to some extent reflect differences in sample characteristics. Future research should focus on the extent to which fear, inhibition, social representations and aggression vary 'in tandem' in relation to different targets. This would avoid the problems of comparing samples drawn from different populations. However, in asking participants to report behaviour in relation to different targets, it is important to avoid confounding relationship to target and target sex. Additionally, the nature of the relationship to the target should be clearly specified with the aim of controlling for degree of intimacy. Intimacy has been identified as a predictor of violence in the stalking literature (for example, Meloy, Davis & Lovette, 2001). Therefore, failure to control for degree of intimacy may introduce a 'third variable' problem.

Such an approach has been employed in studying sex differences in aggression towards different targets (Cross, Tee & Campbell, 2011). A recent study (Davidovic, Bell, Ferguson, Gorski & Campbell, 2011) used this approach to examine the effects of relationship to target and target sex on impelling and inhibitory forces to intimate aggression. In this study, men reported lower inhibition and higher impulsion towards same-sex friends than to opposite-sex friends or partners, who did not differ (i.e. a target-sex effect). Women showed a similar target-sex effect for inhibition (reporting lower inhibition towards male targets, regardless of relationship). The authors interpret this finding in terms of the disinhibitory effects of chivalry norms on women's behaviour. However, women reported greater impelling forces towards intimate partners (a target-relationship effect). This finding raises the possibility that women's greater use of aggression towards intimate partners may arise not only

from reduced inhibitory control, but also as a result of greater provocation by intimate partners. Increased provocation is known to decrease the magnitude of sex differences in aggression (Bettencourt & Miller, 1996). The potential role of provocation is therefore worthy of further study. In the study reported in Chapter 6, the experience of anger was measured, and there was no sex difference on this measure. Additionally, the scores on this measure were lower for both sexes compared to those reported in Chapter 3, where no target was specified. This indicates that intimate relationships are not especially provocative of either sex. However, this assumes that the reported experience of anger is an accurate index of provocation. Furthermore, anger is not the only emotion which may serve to provoke aggression. Provocation can result from a variety of aversive emotions (such as anxiety, distress and jealousy) and cognitions (for example, perceived threat of harm or loss). The role of provocation should be examined using more specialised instruments.

Like much research on sex differences in aggression and partner aggression, the findings reported here are limited to western society. Sex differences in perpetration of domestic violence are known to differ in other cultures; greater male perpetration is associated with lower gender empowerment and more collectivist cultures (Archer, 2006). Archer argued that western society represents the exception rather than the norm in this respect. Future research could consider how sex differences and inter-relationships between fear, inhibition and aggression vary in line with national-level variations in gender role empowerment and collectivism. If women's greater use of aggression towards partners is a product of reduced fear and inhibitory control arising from chivalry norms in western society, women residing in societies where male chivalry is not normative would be expected to report higher

levels of fear and inhibitory control than women in western societies, and these variables should be associated with reduced perpetration of aggression. Women's experience of partner-directed aggression would also be expected to be more expressive than in western societies.

The reliance on self-report data must be acknowledged. The issue of under-reporting has been raised in particular in relation to intimate partner violence, where social desirability and shame may affect responses. Given the extent of norms prohibiting violence against women, this may influence men's reports to a greater extent. A recent review (Chan, 2011) found that under-reporting was evident in both sexes, but was more characteristic of men. However, this tendency was most evident when data was collected in person, by interview. In the present study, data collection in relation to intimate partner aggression involved no direct contact between researcher and respondent. Respondents were not required to provide their name, and anonymity was assured. This is likely to minimise under-reporting. Additionally, men's reports of aggression were used only to confirm sex differences, and were not entered into predictive models.

One strength of the study of aggression in intimate relationships was that victimisation data was obtained, and this allowed confirmation that fear and inhibitory variables were more strongly associated with perpetration than victimisation. However, reports of both perpetration and victimisation were obtained from only one member of the dyad (in this case, only the reports from women were analysed). Obtaining data from both members of a dyad would be preferable since this would allow analysis of the extent of agreement regarding perpetration and victimisation. If agreement is high, a greater degree of confidence can be placed in conclusions

regarding the relationships between perpetration and victimisation with the remaining study variables.

There are some limitations associated with the measurement instruments employed in the study of intimate relationships. The issues surrounding the single-item measures of fear of retaliation and desertion were discussed in Section 6.4.4. The positive relationship of fear to perpetration of aggression is largely inconsistent with previous research, but it remains unclear whether fear is a precursor to or a consequence of aggression. Future research should examine the relationship between women's use of aggression and the extent to which they fear harm as a result of a male partner's disposition, rather than as a consequence of their own behaviour (which is the form of fear that was addressed in this thesis).

The newly developed IIRS was used to measure inhibitory control of behaviour towards an intimate partner. A number of items were deliberately included to identify relevant domains of measurement (which might be associated with aggression). The primary role of the disinhibition on the Tactful Dishonesty subscale in predicting physical assault indicates that lack of control over the expression of negative appraisals is an important domain of inhibitory control. It would be worth examining further the role of control of emotional expression. This was measured by the Dissimulation subscale, but the small number of items and psychometric problems associated with this subscale meant that its role was unclear. Future work could further develop measures of social inhibition in these domains.

Use of the Expagg questionnaire to measure the experience of aggression towards intimate partners raises a potential problem in light of the low assault rate. Expagg requires respondents to indicate their feelings at the time of using

aggression. If respondents felt that some of the questions did not apply to them, they were asked to indicate what they thought they would feel. Presumably therefore, a number of respondents were making hypothetical judgements, or perhaps basing their responses on experiences of verbal or psychological aggression only. Hypothetical judgements may differ from real experiences. Archer and Haigh (1999) found that respondents who based responses on real (rather than hypothetical) situations reported greater instrumentality, but there were no differences for expressivity. The authors suggest that higher instrumentality reported by those participants using real (rather than hypothetical) judgements may reflect the greater likelihood of highly instrumental participants having used aggression. A further possibility which they consider is that participants who base reports on real aggression view their behaviour more positively than those who simply imagine using aggression. If a number of the female respondents were making hypothetical judgements, their experience may be more instrumental than the findings suggest.

This thesis finds support for the proposal that sex differences in social representations of aggression represent an accurate 'read-out' of the experience of aggression. However, these findings are based on self-reports of fear, inhibitory control, and social representations. Future research could utilise measures of physiological arousal (such as heart rate, skin conductance, blood pressure and cortisol levels) during the experience of aggression, perhaps using virtual worlds. If women do experience aggression as a loss of control (rather than a means of control over others) they should show elevated physiological arousal. This methodology could also be used to assess differences in the experience of aggression towards different targets.

The suggestions for further research above arise out of the limitations associated with the findings of this thesis. This chapter concludes with some suggestions for extending this work.

Although the results reported in this thesis indicate a primary explanatory role for fear of harm, it was suggested that inhibitory control may be the key variable mediating sex differences in aggression when conflict situations are unavoidable. Future research could therefore examine the extent to which women's greater inhibitory control explains desistance from aggression in conflict situations.

It was argued in Section 7.1.3 (above) that sex differences in aggression may be predicated on women's fear of harm rather than men's taste for risk. This argument was based on the finding that sex differences are greater for measures of harm avoidance than taste for risk. There is evidence for the role of both variables in mediating sex differences in aggression; Zuckerman and Kuhlman (2000) found that sex differences in impulsive sensation seeking completely mediated sex differences on a range of risky behaviours. It would therefore be beneficial to jointly examine the relative explanatory power or harm avoidance and risk-seeking in a regression model. Based on the strength of sex differences, the explanatory power of risk-seeking would be expected to be reduced when examined in conjunction with harm avoidance. The argument for the primary role of harm avoidance was also based on the finding that sex differences in sensitivity to punishment favour of women, but there is no sex difference in sensitivity to reward (Cross et al., 2011). Future research could directly examine the relative explanatory power of sensitivity to punishment and reward to the relationship between sex and aggression.

The findings of this thesis could be extended to understanding sex differences in risky behaviours more generally. Whilst Campbell's model is focussed on aggression, the underlying principles (greater selection pressures on women favouring fear of harm due to the costs for offspring) are applicable to understanding sex differences in other behaviours associated with the risk of physical harm. Explanations of aggression and other forms of risk-taking have tended to focus on explaining why the behaviour occurs. The primary role of harm avoidance indicates an important general point; it is desistance from a behaviour associated with reward that requires explanation. Campbell's model may be more useful in providing an account of sex differences in risk-taking than the prevailing theories which emphasise male taste for risk.

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