

Theories, Research and Misconceptions about Female Aggression

Read the newspapers or watch TV and we view a world that is clearly violent. In many places, news agencies report on conflict, war, ethnic cleansing and torture. Every week it seems that there is another young man stabbed to death on the streets of a major city, and sportsmen or celebrities are in court accused of monstrous sexual assaults. What the majority of these news stories have in common is that they are about men and male aggression. There is an unvoiced popular belief that this violence is male, or originated by men. If this seems a strange thing to point out, try to imagine how these events would be reported if the perpetrators were female.

Introduction

Aggression is defined as intra-species behaviour carried out with the intent to cause pain or harm (Tremblay, Hartup, & Archer, 2005). This definition covers the forms of aggression identified as aggression between nations or states, adopted by the United Nations General Assembly in 1974, but it also applies to the interpersonal violence that affects our everyday lives. The behaviour can be physical, mental or verbal, and should not be confused with assertiveness or anger. Aggression can also be classified as hostile (usually regarded as having an emotional or retaliatory context) or instrumental (predatory or goal oriented). Dependent on the theoretical position, a definition of aggression can vary from the above. For example,

Buss and Perry (1992) suggest that we can separate out the acts of verbal and physical aggression and define them as the motor components of behaviour that involve harm to others. Hostile aggression is regarded as spontaneous, motivated by anger, in comparison to instrumental aggression, which is deliberate, planned and targeted towards the attainment of a goal (Ramirez, 2009). This dichotomous definition is questioned by some, as the reactive emotional goal may be to inflict pain on another, but is a handy description that distinguishes some types of behaviour or motivations from others. This dichotomy is commonly encountered when describing aggression in women. According to Barratt et al. (1999), aggression can be classified in terms of the cause of the motivation, i.e., it can be premeditated (proactive), impulsive (reactive) or medically (biologically) based. The common element in all the arguments is that they are behaviourally based, but some also include the terms 'anger' and 'hostility' interchangeably with 'aggression', which appear to be emotional (internal) in nature and hence not directly observable. This complexity is also reflected in the different forms of measurement for aggression (Suris et al., 2004).

This lack of definitional clarity is possibly due to the range of theoretical positions underlying all of the research in aggression. This range can be loosely defined as psychological theories (from psychodynamic positions to cognitive and behavioural models to social origins of behaviour, and societal factors inherent in aggression) and biological perspectives (including evolutionary theories, genetic causes, chemical contributions and neurological outcomes). This chapter introduces these positions and relates them to the study of female aggression.

Aggression and Women

It is accepted that men are more likely to express their aggression in ways that are physically violent, and that women will behave in indirect ways, being less capable of exerting the same physical force. This somewhat simplistic viewpoint is reflected in every major theoretical perspective on aggression; comparative, evolutionary, biological, psychological and social models all reiterate that men/males are the aggressors. Women are viewed as only using aggression in passive, submissive or emotional ways. This book sets out to examine this position and to explore theories and research

about female aggression, its motives and outcomes, possibly exposing a few myths on the way.

Physical aggression among and by girls and women has become more prevalent. This is evident in women's sports, media aimed at or including women, and the criminal and juvenile justice systems (e.g., UK Home Office, 2012; US Bureau of Justice Statistics, 2014). Psychological theories provide a basis for examining a society that values aggression and the consequences of that (erroneous) placement of worth. If society that accepts male aggression and violence becomes accepting of female aggression, then rising rates of female-perpetrated violence must be the consequence. Conversely, women's violence and aggression may be leaving the domestic sphere, where it has been relatively invisible, and entering the public arena.

Female aggression is a fact of life, but one that is only lately being addressed by mainstream social and behavioural sciences. There is a wealth of animal research that examines female aggression, but applying these findings to human behaviour or emotional response is difficult at best. Studies on rodents, or red-fronted lemurs, or even our genetically closest primates concentrate on female aggression as the result of events that concern animals, such as competition for mates or food, or the protection of offspring. Such research must also be careful to curtail any interpretation that could open itself to criticism of anthropomorphizing behaviour. When we do find aggression studies on humans, it is almost as if the peculiar lens of comparative psychology must be applied here, as researchers seem happy to compare female behaviour to that exhibited in the male, rather than as behaviour in its own right. The literature on the topic seems to view aggression by women or girls as either a pale copy of male aggression, or specific to certain situations, such as alcohol abuse or domestic violence. There is also a tacit assumption that female aggression has the same motivations and form of expression as male aggression. There is little acknowledgement in the literature that viewing female aggression as poorly expressed imitative behaviour of male aggression minimizes and trivializes women's behaviour, anger, perspectives and viewpoints. In 2005, Richardson reviewed thirty years of research on gender differences in aggressive behaviour. She found that the assumption that females were not aggressive could not be supported, as studies did, in effect, demonstrate the opposite. Women in laboratory studies did respond to provocation and could not be described as passive. The conclusion is that the major point of

difference is not in the form of aggression, but the relationship between aggressors, or aggressor and victim.

Incidents of violence in which women are the victims has reached high proportions, not least because it is now more likely to be reported to, and followed up by, police. However, there is evidence to suggest that reports of the violence and its prevalence are given in sexualized terms (rape or sexual assault, or assault on the woman as object of hate) or in relation to intimate partner violence. Sexual or domestic violence is not the only aggression that women receive, but reports give the impression that it is. For example, in a ten-country study linking women's health and violence against women conducted by the World Health Organization (2010), the statistics are presented in terms of reported physical or sexual violence by a husband or partner (ranging between 15% and 71%, dependent on country) and non-consensual sex. There is little acknowledgement of the female recipient of violence that is not linked to rape/sexual assault or wife beating (domestic or intimate partner violence). It is as if these are the only types of victimization that women experience. Similarly, in the United States, the Centers for Disease Control estimate more than five million women suffer intimate-partner victimizations annually, with around 1,300 of these resulting in the death of the woman. Such figures are horrific, but also serve to hide other forms of violence, and give the impression that women are always passive recipients. Neither of the two above studies acknowledges that women can be perpetrators of the same aggression. In fact, research has established that intimate partner violence is bi-directional and that such aggression is more highly correlated with substance abuse than with either ethnicity or gender (Sullivan et al., 2009). This also is true when considering all other forms and level of violence. Olson and Lloyd (2005) suggest that less severe or 'minor' cases of aggression, including those within intimate relationships, are relatively equal across men and women. A possible source of understanding why female aggression is seen as less prevalent than male aggression might be the definition of aggression and the conflating of types of violence. In Olsen and Lloyd's study, women reported they had initiated aggression in 54 per cent of the events they discussed, although there was a confused or confusing view of what 'starting aggression' meant. Some women defined this as getting angry, or thought asking their partner to talk about issues of conflict was a form of aggression, and an initiation of conflict in itself. Moreover, 63 per cent of conflicts contained only verbal aggression linked

to the dynamics of conflict and communication in the relationship. Thus, these women define aggression as a complex issue, beyond (and before) the striking of blows. Women in this study also identified a range of motives for aggression, with 'rule' violation by the male partner and their own desire to gain attention or the male's compliance as the most likely reasons, together with psychological factors. This complex set of motives for initiating aggression is supported by a study by Hettrich and O'Leary (2007), in which 32 per cent of their sample of female college students who were in a relationship admitted they used physical aggression against their partners. Additionally, they reported that they used it more than their male partners, with anger at partners and poor communication being cited as reasons. However, they also reported that their male partners as more sexually coercive than they were and they were more dissatisfied with their relationships than the women who did not report using or experiencing violence within them. Hence, women appear to use aggression in particular ways within relationships, including as a way of expressing dissatisfaction or anger rather than simply as a means to harm another. These findings, however, still do not consider female aggression outside the immediate familial setting. Perhaps a consideration of criminal activity that involves aggressive acts might shed some light on this.

Violent Crime and Women

Aggression and violence are inseparable from crime, and the fear of crime influences a great deal of our behaviour and perception of others. It also influences research and practice in criminal psychology and other allied disciplines, and hence policy within justice systems. Women do commit crimes, and always have. However, there is a particular phenomenon surrounding conviction of female offenders, referred to as Chivalric Justice (Iacovetta & Valverde, 2002). This includes the circumstances of women receiving lesser sentences than men for the same kinds of crime. For example, the issue of sole female child molester generates responses of disbelief rather than the revulsion produced by male paedophiles (Gavin, 2010). Such an offender is also less likely to receive a custodial sentence than her male counterpart. This chivalric position is reflected in media reporting of crime by women. Grabe and Kamhawi (2006) observed what they noted as a patriarchal chivalry in news coverage of crime carried out by

women alone, but that the reporting is much harsher when women collaborate with men; they term the last the Bonnie and Clyde effect.

The complementary reaction to female offenders is one expressed in the 'evil woman hypothesis', the view that women who offend outside normative gender roles are doubly deviant (Mellor & Deering, 2010). This is particularly evident when considering women who participate in sexual murder with a male partner (Gavin, 2010). Moors Murderer Myra Hindley, for example, is seen as much more 'evil' and culpable than Ian Brady, as she was, after all, a woman, and women do not kill children.

In most places around the world, at least those in which we can view statistics with confidence, crime rates are falling in proportion to population figures, seen clearly in the report of agencies such as the UK Home Office (2012) and the US Bureau of Justice Statistics (2014). The only crime that appears to be growing is violent crime perpetrated by female offenders, although many postulate that this is a result of changes in reporting and arresting behaviour rather than any increase in female violence per se (Schwartz, Steffensmeier, & Feldmeyer, 2009). Similarly, there is a possibility that the perceived change in offences and arrest rates are an artefact of policy changes that reflect cultural changes in the perception of gender roles and gendered behaviour. There is still an overwhelming difference in the number of incidents attributed to men/boys and women/girls, but the increase in observed female violence does bear scrutiny. Moore (2007) contends that the ways in which young male and female offenders exhibit aggression are very similar, and that this is bound up with constantly changing views of masculinity and femininity. This is particularly important to address in the light of the falling-off in the rate of male-perpetrated violent crime, which is attributed to policies targeting this behaviour. This would suggest that female aggression needs a different focus in research and practice to that addressing male behaviour. There is evidence to suggest that, whilst parental aggression, antisocial peers and academic problems can be associated with aggressive behaviour in youths of both sexes, there are considerable differences in social and psychological factors related to aggression by women. These include levels of mental illness (usually depression) and physical or sexual victimization (Leschied, Cummings, Van Brunschot, Cunningham, & Saunders, 2000). Further distinguishing factors may be due to differences in impulsivity or the readiness to take risks (Campbell & Muncer, 2009). Studies that examine these issues suggest that, if the pertinent variables are subtracted from the analysis, disparity in

aggression and resultant behaviour is not simply due to sex differences. Moreover, the significant sex differences in rates of depression may be due to oversimplified diagnostic criteria, and 'male-typed' depression being overlooked because the distinguishing features are not included as critical factors (Möller-Leimkühler & Yücel, 2010). Hence, mental illness may not be the distinguishing sex-linked factor it appears to be in violent crime, but other issues may need to be accounted for. Readiness and willingness to participate in risky or criminal behaviour might be a core issue in the likelihood of aggressive behaviour from males and females. For example, Russell and Baenninger (1996) concluded that personal characteristics, such as irritability and religiosity, contribute more than sex to the reported likelihood to commit undetected murder. Therefore, interventions designed to prevent violence in young women and girls should take these questions into account in addition to those associated with male violence.

Further issues surround the definition of gender difference itself, together with other social and individual factors that affect it. Richardson and Hammock (2007) concluded that gender role is the better predictor of aggression than gender, and the effect becomes less distinctive when the type of aggression (direct versus indirect) is taken into account. This might be accounted for by differential paths of socialization of boys and girls, and the development of social skills in respect of socially accepted gender role expression. For example, Gavin and Hockey (2010) demonstrated that young men with one or more offences in their history are more likely to make an aggressive response in situations where the socially accepted behaviour would be conciliatory. It has yet to be established how the ways in which women process such problems might differ. In addition, Farrington (2005) examined a large range of individual and socially derived risk factors that might lead to the development of delinquency in boys, including violence. As yet, no such study on the impact of developmental or psychological factors has been undertaken on women or girls, despite the awareness of increasing crime rates for women/girls, and the challenge to readily accepted assumption of gender differences in crime, arrest and conviction (Farrington, Loeber, & Welsh, 2010).

It is clear, therefore, that the ways in which female aggression is observed need to be different to the ways in which male aggression is addressed. It is also clear that this topic is only just beginning to be tackled by feminist, social, psychological and medical interpretations of the human discourse. If we examine the various theories of aggression, it is difficult to determine

how each addresses female aggression and violence, if at all. The presumption that male behaviour equates to all human behaviour continues to exist within aggression theory and research.

Theories of Aggression

Theories based on biological difference

If female aggressive behaviour, and its motivations and prevalence are truly different to male aggression, then biological models that address differences between the sexes should be compellingly convincing. For example, the theories of evolutionary biology and psychology posit a position in which the differential evolution of men and women is due to natural selection for the continuation of genetic material. Additionally, biological differences between the sexes suggest that aggression is simply not an advantageous behaviour for women, as they are more at risk of being hurt. However, things are just not that simple.

Evolution Evolutionary biology is a theory of the development of characteristics of different species in response to specific environmental needs. Darwinist evolutionary theory suggests that there are four basic mechanisms by which evolutionary change occurs: mutation, migration, genetic drift and natural selection. Mutation is a natural or induced change in genetic material that is passed to offspring. Migration is the movement of individuals from one population to another. Genetic drift is the chance survival of certain characteristics from one generation to the next. Natural selection is the ability of individual with an advantageous mutation to survive to produce offspring. These mechanisms alter the frequency of different genes in a population, which results in descendants with modification, i.e., the transmission of genetic material producing particular traits from parent to offspring, known as heredity. If genes can mutate, producing variations in the characteristic they control that are favourable to the organism, the mutation is reproduced, and hence genetic material survives via natural selection. Hence, there is a differential reproduction of genetic variations in a population resulting in individuals whose fitness is greater, having more offspring than individuals of lesser fitness. This means there is a change in gene frequencies within the population over time.

This biological theory of evolution and selection has its counterparts within psychology. Evolutionary psychology attempts to explain psychological traits as evolutionary adaptations, that is, as the functional products of natural or sexual selection. The argument is that much of human behaviour is generated by evolutionary adaptations that combat problems in human environments. For example, the mental capacities for acquiring language are almost universal, but humans do not inherit the capacity for reading and writing. Natural selection, in both biological and psychological terms, suggests that organisms are in competition with other members of their species, for food, territory and sexual mates. Humans, psychologically speaking, also have the universal disposition for cooperation and empathy, amongst other things, hence evolutionary psychology is an extension of the theory that encompasses the human capacity to experience and act on emotion. Evolutionary theory can therefore explain aggression because it is universally experienced and has not been adapted out of human responses. Violence may be useful because it can increase chances of gaining resources, survival and reproductive success. These can be behaviours such as the higher likelihood of male animals to protect mates when females are in short supply (Cashdan, 1996). According to this position, natural selection does not simply shape the behaviour, but also determines what the nature of the response will be. Thus gender-based violence is explained, as females, being weaker, require protection from males other than the mate. However, if females are protected, and males receive reward (in terms of reproductive success) for doing so, why are females aggressive? Indeed, why are females becoming more, not less, visibly aggressive and violent? This is not explained in traditional theories of evolutionary biology or psychology. A major criticism of evolutionary theories is that they are very much androcentric, that is, they consider all reasons for adaptation and selection from the male point of view. There are alternative theories of evolution, those that consider a different set of reasons for why we arrived at the position we have. These will be considered in detail in the next chapter.

If traditional evolutionary theories are not a complete explanation for female aggression and its difference to male aggressive behaviour, then might there be more persuasive arguments from other related biological positions? Integral to the idea of evolutionary survival is the transmission of genetic material, thereby suggesting that the explanation for aggression may be within the genes themselves.

Genetics Biology's 'magic bullet' of the twentieth and twenty-first centuries was the surge in understanding genetics and the increasing use of DNA analysis. As such, the unlocking of the genetic code seemed to offer the possibility of identifying a violent or a criminal gene. It has been noted that the overwhelming majority of (violent) crimes are perpetrated by men, at least those that are detected. Most people have 46 chromosomes, and a person's sex is determined by the X and Y chromosomes. Genetic women usually have two X chromosomes and genetic men have an XY pair. In a condition known as 47: XYY syndrome, occurring in around 1/1000 male births (Torniero et al., 2011), males are born with an additional Y chromosome, i.e., XYY, and this has led some to think that such men are 'extra-masculine' and more prone to sexual aggression. However, these individuals are not necessarily linked to higher levels of aggression or violent crime (Jones, 2006). XYY syndrome may provide the circumstances for aggressive behaviour, but it is more likely that social circumstances in combination with the anomaly determine how behaviour manifests itself. What interest in this syndrome does highlight is the idea that aggressive and/or violent behaviour is the province of the 'masculine' individuals, and the more masculine, the more aggressive. It also strengthens the argument that aggression has a biological cause.

Other genetic characteristics can be examined in terms of the transmission of criminality and/or aggressive tendencies. Empirical studies of identical twins with identical genetic characteristics, or children within a family but not biologically related, such as those adopted into the family, are an excellent way to search for any evidence for the relationship between genes and behaviour. In this way, any biological contribution or social, environmental influences can be investigated. The traditional twin study is an experiment provided by nature; there are identical (monozygotic MZ) twins and fraternal (dizygotic DZ) twins, with differing levels of similarity in genetic material. DZ twins have no more similarity than any other siblings, but are born at the same time; therefore, it is assumed they experience the same things as they mature. MZ pairs share identical genetic material, if all characteristics are due to genetic influence, then we can expect to see twice as much similarity in the MZ twins as the DZ twins. Deviations from the similarity are then assumed to be due to environmental influences. Research clearly shows that violent children often come from violent families, suggesting the existence of some form of familial transmission of aggression. These comparisons do show that consistency

between behavioural aspects of an individual is significantly higher in identical twins. Although this is compelling evidence, however, it does not rule it out the social influences because there is a high likelihood of similar treatment in familial and social environments, particularly of identical twins – they are the same age, go to the same school; parents often dress them identically and so on. A much more persuasive argument would be derived if identical twins reared apart demonstrated the same level of identical behaviour seen in those brought up together. The rarity of this situation means using a case study approach, but with enough cases, a database of information can be compiled to such an extent that rigorous research questions are tested. The largest study of this kind is the Minnesota study of twins reared apart (MISTRA) started in 1979 (Bouchard et al., 1990). This intensive study determined that at least 70 per cent of the variance in IQ was due to genetic factors, i.e., twins have very similar levels of IQ whether separated or together, and there is a high probability that they will have similar IQs in comparison to their separated siblings. There was also a significant level of similarity in a wide range of other anthropometric and psycho-physiological factors, and psychological and social behaviours, to the same levels of similarity seen in monozygotic twins reared together. What has not been clearly established, however, is whether this extends to criminal and offending behaviours. However, there is an interesting possibility that it might relate to other forms of aggression, such as that directed inwards, as in the case of suicide. In 2003, Brent et al. reported on a study to examine whether there was familial transmission of suicide and whether this was related to impulsive aggression. They found that the children of suicide attempters showed a higher risk of suicide attempt, with an earlier age onset than those in families with no history of suicide attempts. A history of impulsive aggression was the most powerful predictor of early age of suicide attempt. This study did not examine twins as the sample did not contain them, but it demonstrates that a familial examination of aggression is fruitful.

The contrasting examination is of children who are genetically dissimilar but were brought up in the same parental and familiar environment. Studies of children who were adopted at birth (or very young) means that the occurrence of any characteristics can be compared between adopted and biological parents. Genetic influences on the characteristic can be inferred from any similarity between child and biological parent and the environmental influences from similarity between adoptee and adoptive parent.

For adopted children and any criminal tendencies, Beaver (2011) reports that adopted children with at least one biological parent who had been arrested, especially for violent offences, are more likely to enter the juvenile justice system multiple times than adoptees whose biological parents have not been arrested. This suggests that the criminality of the biological parent is more likely to predict the child's delinquent behaviour than that of the adoptive parent, although Klahr, McGue, Iacono and Burt (2011) assert that a conflictive adoptive environment may also contribute.

There are criticisms of twin and adoption studies. Firstly, there is an assumption of equal environments across families; secondly, the representativeness of samples is questionable (Rutter, 2005). Assuming equal environments means assuming that any influence will remain constant, i.e., that identical and fraternal twins, or other siblings, share identical environments as well as biological characteristics. This assumption cannot be made, particularly in terms of behavioural characteristics. In addition, it has been demonstrated that multiple births carry more risk of obstetric problems; children whose mothers suffer birth complications are routinely excluded from studies that are not exceptionally longitudinal in nature. Similarly, twins often exhibit mild delays in language development; these pairs are again excluded. Problems with adoption studies are of a similar nature, in that adoptive families are selected using very strict criteria and represent a very small sample of the home environment in which children are raised (Moffit, 2005).

The genetics of aggression provides a convincing line of reasoning, but it is only a partial explanation. Genetic make-up determines not just physical and possibly psychological make-up; the influence extends to the biochemistry of sex.

The biochemistry of aggression Testosterone is an androgen, a hormone that has major involvement in the development of sexual characteristics and organs in male animals, but also has effects on female development and behaviour. In both males and females, testosterone is produced by the adrenal glands, with some released from the ovaries in females. The release is much slower in females, while in men it is made by Leydig cells in the testis, and is secreted into the bloodstream in spurts, which means that levels can change significantly within minutes. Testosterone has clear masculinizing and anabolic effects in both sexes, but the high level in men appears to affect aggression, a possible reason for the difference in level and

type of aggression from each sex. Animal experiments demonstrate that castration reduces aggression in male mice, for example (Wagner, Beuving, & Hutchinson, 1980), but does not eliminate it. Such findings lead to the conclusion that high levels of testosterone are necessary but not sufficient to trigger aggression. Castrated animals, rated as non-aggressive before removal of the testes, cannot be made aggressive by injections of testosterone, whereas initially aggressive-rated mice do return to prior levels of aggression.

As always, animal studies can be criticized for their limited application in humans. Human data is derived from non-experimental studies, which also have their problems due to the lack of direct observation. Studies on hormone levels in male and female prisoners do seem to suggest that testosterone does encourage social dominance, competitiveness and impulsiveness, all of which facilitate aggressive behaviour.

There are two hypotheses about the effect of testosterone. The basal model suggests that testosterone causes changes in dominance behaviour, whereas the reciprocal model posits the idea that testosterone changes as dominance changes. This clearly has implications for a sex difference model of aggression. If females are submissive and hence low in aggression due to low ranking in hierarchies, then the basal model would suggest it may be a result of lack of testosterone, or the lack of ability to quickly release it into the blood stream at crucial moments. However, if individual women are raised in dominance, according to the reciprocal model, their testosterone levels should be rising too. No conclusive data has been found to suggest either model is correct, as injecting non-aggressive but ambitious women with testosterone would not be viewed as an ethical study.

In addition to endogenous hormones, the study of the influence of neurotransmitters on aggression also follows an animal-model paradigm. Neurotransmitters are chemicals that allow the transmission of signals between neurones. The chemicals are released into the synaptic cleft, the gap between neurones. The molecules can then bind to receptor proteins within the postsynaptic cell, which causes a change in the electrical state of the cell. This change in electrical state can either excite the cell, passing along the chemical message, or inhibit it. Excess molecules are taken back up by the presynaptic cell and reprocessed. One neurotransmitter of particular interest in aggression is serotonin (also called 5-hydroxytryptamine, or 5-HT). The neurones in the brain that release serotonin are found in small dense collections called Raphe nuclei in the medulla, pons and

midbrain. Serotonergic neurones have axons that project to many different parts of the brain; therefore serotonin affects many different behaviours. 5-HT receptors mediate both excitatory and inhibitory neurotransmission. Animal models show that increases in the availability of serotonin reduces aggression. This increase is facilitated by increasing the activity at neurotransmitter sites with drugs such as 5-HT agonists (drugs that stimulate the action); this has been shown to reduce several different types of aggression (Nelson & Trainor, 2007). There are several types of drugs that inhibit the 5-HT receptors. Inhibiting the reuptake of serotonin allows higher levels in the system; the famous Prozac is one such drug that acts in this way. A second class of drugs are known as monoamine oxidase inhibitors or MAO inhibitors. Monoamine oxidase (MAO) is an enzyme that causes serotonin, dopamine and noradrenaline inactivation. MAO inhibitors prevent inactivation of monoamines within a neuron, causing excess neurotransmitter to diffuse into the synaptic space. Brunner et al. (1993) conducted a study on a large extended family, finding a mutation in the structural gene for MAO that appeared to be associated with aggressive behaviour among the males. They were reported to have selective MAO deficiency, again with an association with impulsive aggression, at least within circumstances of socio-emotional hypersensitivity (Eisenberger et al., 2007). However, there were no such deficiencies or aggressive behaviour reported in the female members of the family.

The final class of drugs are those that interfere with the ability of synaptic vesicles to store monoamines, again displacing serotonin. Such drugs include amphetamines. Animal experimentation shows clearly that 5-HT inhibitors do reduce some forms of aggression, or prevent its escalation (Takahashi, Quadros, de Almeida, & Miczek, 2011), although de Boer and Koolhaas (2005) did question the simple linkage between such serotonin increase and the reduction in all forms of aggression. There are suggestions that the more likely action is on certain forms of female aggression such as defensive and offensive postpartum aggression for the protection of offspring against male intruders, at least in rodents (da Veiga, Miczek, Lucion, & de Almeida, 2011).

Extending these findings to humans is again not very clear, but it is known that there are reduced concentrations of 5-HT and 5-HIAA (a metabolite of 5-HT) in the brains of suicide victims, particularly those involving violent suicide methods, suggesting a link between suicidal and dominance/homicidal-related behaviours. If this linkage appears tenuous,

it may be illuminated by the 2005 finding of Dumais et al. that a violent form of suicide was an indicator of a lifetime of aggression and impulsivity. However, these results only seem to explain male violent suicide. Whilst hanging is the favoured form of suicide for both sexes, male suicides are much more likely to use firearms, particularly in Switzerland (Värnik et al., 2008), whereas women will use a much less violent and messy method. The question remains as to why reduced concentrations of 5-HT would lead to violent suicide in men and not in women, leading to the supposition that there are many more factors acting here than simply the opportunity to access and use serotonin and its biological pathways.

Nelson and Trainor (2007) suggest that aggression is the result of impaired recognition of social cues and enhanced impulsivity, and that these are mediated by biological signals at the molecular level. This hypothesis is credible, but difficult to test. Further findings make the issue even more complex. The release of the hormone prolactin from the pituitary gland is controlled by serotonin, and its levels in the bloodstream can be used to determine changes in serotonin levels. The action of the 5-HT agonists is to allow serotonin to be released, increasing the level of prolactin. However, there is no linear relationship between the dose of a drug and the amount of prolactin across individuals, showing a highly variable response to either the drug or the serotonin levels. In 1996, Coccaro, Berman, Kavoussi and Hauger showed that violent male patients, given fenfluramine, showed negative correlation between measures of irritability and impulsive aggression (on the Buss-Durkee Hostility Inventory) and prolactin concentration. Those with high levels of aggression showed an attenuated response to fenfluramine, suggesting that they had reduced serotonergic activity, consistent with low serotonin activity being associated with increased aggressive and impulsive behaviours. It is as yet unknown if such findings be extrapolated to violent women. We cannot know, as no studies have been carried out, but once again the assumption is that the reduced serotonin may have a different effect on women.

Other biochemical models are those linking ingested chemicals and their effects on the body and emotions. One of the world's most popular and widely available drugs is, of course, alcohol, which can increase aggression due to a disinhibitory effect. But few studies have demonstrated that alcohol increases aggression in women, and those that do concentrate on the aggression in interpersonal or domestic settings. However, in these studies, it has been shown that the aggression-inducing effect of alcohol is

less pronounced in women (Giancola et al., 2009). Light may be cast on this finding when the issue of physical size and the effect of alcohol on aggression are examined. In 2010, DeWall et al. established that larger/heavier men were more likely to become aggressive after ingesting alcohol. They suggested that this is not necessarily a physical difference, but more to do with a cognitive acceptance of larger men as more aggressive anyway, and who should be avoided when they are drunk. In other words, larger physical size permits men (but not women) to think that they can inflict costs on others if they find themselves in conflictive situations. This in turn increases the likelihood that they will escalate to aggression, together with a feeling of self-importance and entitlement to special treatment, which, when threatened, results in aggression. Support for this position comes from Vandello, Ransom, Hettinger and Askew (2009), who demonstrated that men misperceived aggression as more expected or socially desirable, possibly a learned gender behaviour. Additionally, men perceive aggression as attractive to women. All of these misperceptions were highly correlated with lower self-esteem and a weaker gender identification. The conclusion may be drawn that male aggression is related to perceived social inadequacies, an area of research that has yet to be explored fully.

These findings do have implications for the way in which female aggression is manifested, and why it might be different to, rather than simply less than, that exhibited by males. The effect of testosterone is an important issue, and clearly shows different actions in men and women, but the other issues should be taken into account along with it. For example, high levels of depression are seen disproportionately in women (Gavin, 2010) with the difference in rates starting around puberty. The effects of depression can be reduced, or at least masked, by SSRIs such as fluoxetine (Prozac). However, if low serotonin leads to higher levels of aggression in males, why does it lead to depression in females? Perhaps some forms of interaction between the body's biochemical and neurochemical status is implicated.

Neurochemical transmission in the body is an important factor to address, but broader questions of neurology also need to be considered.

The neurology of aggression One of the major regions of the brain that contributes to the modulation of aggression is the limbic system, consisting of the hippocampus, amygdala, septal area, nucleus accumbens, ventral striatum and parts of the prefrontal and anterior cingulate cortices.

Siegel and Victoroff (2009) showed evidence that aggression stimulated by defence against a threat (real or perceived) is associated with activity in the sympathetic nervous system. This leads to impulsivity and has little cortical involvement. Predatory attack behaviour, on the other hand, that which is planned, has high cortical involvement. It requires activation of the lateral hypothalamus, in contrast to defence, which shows activation of the medial hypothalamus and midbrain. Both forms of aggression are, however, controlled by components of the limbic system, which requires sensory inputs from the cerebral cortex and monoaminergic inputs from the brainstem reticular formation.

The prefrontal cortex has been identified as the area that inhibits antisocial behaviour, with this area being up to 15 per cent smaller in people who have abnormally aggressive responses to stimuli (Raine, Lenz, Bihle, Lacasse, & Colletti, 2000). A seminal study by Bard and Mountcastle (1948) showed that cats with lesions in the hypothalamus appeared to have suffered a break in the link between the subcortical structures and the cortical areas needed for inhibition, and the cats showed difficulty controlling attack behaviour. Later studies (e.g., Flynn & Wasman, 1960) found that electrical stimulation of the lateral hypothalamus elicits predatory aggression in cats, whereas stimulation of the medial hypothalamus elicited attack behaviour. More modern, human studies are not as clear-cut. For example, removal or excision of the amygdala will reduce violent behaviour, but it has a flattening effect on all emotions. Conversely, temporal lobe epilepsy involving the amygdala can lead to more violent behaviour, not less. This seemingly anomalous action can be clarified by looking at the amygdala's involvement in other emotions. The central nucleus of the amygdala receives sensory information associated with fear response (LeDoux, 1994) because it receives input from the thalamus, the hippocampus and the cortex. However, as the thalamus transmits to the amygdala without the cortex being involved, it is a very rapid communication, without cognitive interferences. This means that any stimulus that induces fear can be responded to very quickly, without thinking about it. The second pathway involved here is the transmission from thalamus to cortex to amygdala. This is slower, but it is at this point that cognitive appraisal of the stimuli takes place. Hence, the quick pathways allow for the response to the stimuli to be set in motion quickly, but the cortex will decide on the actual behaviour, with the hippocampus involvement being the addition of memory. So, when a tiger leaps, the body gets ready to run, but the cortex returns the

message ‘we are in the zoo and there is very thick glass in the way.’ It is clear, therefore, that in addition to internal biochemical or neural processes, there are external and cognitive factors to be taken into account regarding aggression.

Environmental factors

Arousal There have been various attempts to show a link between physical arousal and aggression. Again, the findings are not clear-cut. It is thought that there is a correlation between viewing violent media, which leads to greater autonomic arousal, and that higher levels of aggression will follow. This has been shown to not be the case, even when the media is highly immersive (Goodson, Pearson, & Gavin, 2010). The Excitation-Transfer Theory suggests that high physical arousal (either exercising or viewing pornographic material, etc.) leads to high aggression because the arousal is misattributed to the provocation, not the arousing stimulus.

Heat There are documented links between increasing temperature and increasing levels of violence. Police officers are told to expect higher incidence rates and even riots in the hotter seasons (Anderson, Anderson, Dorr, DeNeve, & Flanagan, 2000). This effect has been demonstrated in laboratory studies, with subjects increasing aggressive acts (giving electric shocks to others) with increasing temperature, but in extreme heat the number of acts decreased. This is not supported by violent crime incidence statistics, however, as Anderson and Bushman (2002) found that incident rates increased with no decrease in extreme temperature.

Crowding A higher density of people leads to higher levels of violence, but only when the crowding is with those not expected to be in close proximity, such as would be acceptable in families. Personal space issues are thought to be the trigger here, and these do exhibit clear cultural and gender differences. Noise is also highly correlated with overcrowding. Noise is unwanted sound, and it can lead to negative effects, in some cases aggressive effects. It can be classed as intrusive and have detrimental effects on health, as well as provoking hostility (Gavin, 2006).

Sleep Heat, noise and other environmental factors can have severe effect on sleep patterns, and there are various research findings that relate sleep

patterns to disorders, including those involving antisocial behaviour. Lindberg et al. (2008) found that this was associated with decreased amounts of slow-wave sleep (SWS), the stage of sleep that has the most effect on physical well-being. However, the most aggressive male patients had increased SWS, which may indicate specific brain pathology or a delay in the normal development of sleep patterns. Later studies showed this was the same for female homicidal offenders with antisocial personality disorder. This seems to suggest that there is a fundamental difficulty in the development of sleep patterns which is gender-neutral, and which prevents the SWS stage from working effectively.

Biological models do provide some information on the issues of aggression and the different ways in which male and female aggression is expressed. It is clearly a very complex set of issues and it is unlikely that biology provides the overarching theory to address this. More holistic models may provide these key additional points.

Psychological models

Psychological models of aggression provide a broader perspective than biology alone. If women's aggression is different to men's, then biology plays some part, but the complexity of responses to aggressive-producing stimuli is not necessarily only biological. As seen above, the internal justification of large men to act aggressively when drunk means there are psychological factors both social and cognitive to take into account.

Cognition and aggression Cognitive psychology suggests that we respond to our environment in ways that are learned, and this behaviour then becomes part of our everyday repertoire and directs the ways in which we remember and make decisions. There are three major positions within cognitive psychology that attempt to apply this perspective to aggression.

Cognitive neo-association theory suggests that encountering negative events on a routine basis produces and encourages thoughts, expressive motor reactions, memories and physiological reactions linked with emotive response that are productive either of fight or flight. These negative events include frustration, loud noises, uncomfortable temperatures and other noxious experiences/stimuli. In addition to the association of the stimuli with negative experience, memory acts to link the emotion to behaviour that

results, so that future response is also predicated (Collins & Loftus, 1975). Cognitive neo-association theory suggests that when the memory of a learned association between a negative stimulus and resultant emotion and behaviour is activated, this triggers activation in related concepts. So having learned that a loud bang can mean gunshots, the idea of shots triggers the memories of specific responses to guns. Cognitive neo-association theory also includes higher-order cognitive processes, such as the appraisal of a situation and attributions of beliefs. In other words, people may make an appraisal of emotions experienced and consider the consequences of action.

Alternatively, social learning theory posits that aggressive reactions are learned in the same way as any other complex social behaviour, through experience and/or observation and imitation. This behaviour is then either positively reinforced, meaning it will persist, or negatively reinforced and will be extinguished. In the early studies of aggression in children, Bandura and colleagues clearly demonstrated that children will learn to be aggressive and even destructive from adult role models, and that this effect was independent of the sex of the children or their adult models. It seems strange then that later research did not follow up on this, and the majority of these studies were male focused only. Any studies including girls, or focusing on them, concluded that aggression in female children was relational in nature. There have been studies that demonstrate aggression in girls, particularly those such as that of Crick (1995) who suggested that children use aggression as a means to socially damage peers, but that boys used physical aggression to damage a male peer's relational image, while girls used relational aggression to the same ends. If the aspect of physicality is removed, then many conclude that few differences exist between the frequency of aggression in boys and girls (Bowie, 2007). This does not explain the rising frequency of the use of physical aggression in girls reported in official statistics. In the light of these figures, Cohen, Hsueh, Russell and Ray (2006) emphasize the importance of examining the broader social context of aggression. The framework of the social learning theory (SLT) may offer this context. Early social learning models suggested that all individuals have the capability for aggression, but that there must be an opportunity to learn it, together with internal and external situations that reinforce and maintain it. Observation of aggression and imitating it is the source of learning, with the models being family, peers, and so on (direct modelling), community models, such as those within a neighbourhood, and media sources. Once the behaviour is learnt, individuals will expand on

a repertoire of behaviours and act out aggression in innovative ways, but which are related to the source. An important issue within Bandura's work was media, which are more pervasive now than in the 1970s. Bandura suggested that the violent and aggressive forms of (American) media to which children have access are an important aspect of developing and learning aggression. This is due not only to media providing a source of learning, but also because media act to reduce natural restraint of aggression and decreases sensitivity to violence. Moise and Huesmann (1996) found a relationship between viewing violent media and physical aggression in girls, as this increased when they identified with a violent female character. Furthermore, Smith and Thomas (2000) reported that girls were aware of the negative effect that television had on their peers; although this may be representative of a third-person effect (Gavin, 2001), it also implies that it could have a negative effect on every individual. Aggressive female characters are becoming more popular in children's television and films (Bent, Porter, & Gavin, 2014), as well as those shows aimed at adolescents and adults. Studies on the effect of violent media are still inconclusive, but the number of hours spent viewing television and so on is much higher than it has ever been, and boys and girls are exposed to the same level of aggression, violence and 'evil', although it has been found that girls read more than boys (Smith & Thomas, 2000). If exposure is similar, then the resulting tendency to aggression may be the same but simply expressed differently. An interesting difference might lie in the way in which aggressive female role models affect the individual. Greenwood (2007) showed that identification with and/or idealization (wishful identification) of a favourite female action hero was associated with aggressive tendencies in young women. However, behavioural identification (perceived similarity) was not associated with behavioural or affective aggression and was inversely related to relational aggression. Werner and Crick (2004) suggest that, traditionally, aggressive responses in girls were of the relational kind, in which gossip and back-stabbing was the norm, but that the tendency for girls to use physical violence is increasing. Research also suggests that feelings of anger potentially leading to aggression are correlated with feelings of alienation, such as loneliness, isolation and peer rejection (Smith & Thomas, 2000), and this means that girls who are aggressive tend to escalate to physical violence more readily when feeling rejected. If girls place higher value on their relationships than boys do, then negative aspects of those relationships can lead to delinquent behaviours

(Henderson & King, 1998). This is particularly evident in those who are less socially adept, as Björkqvist, Österman, and Kaukiainen (2000) found a significant correlation between social intelligence and the ability to resolve conflict by negotiation rather than aggression. This is further compounded by the inability to interpret social cues correctly (Bowie, 2007).

A further alternative comes from script theory. Scripts are collections of related concepts in memory, which involve links, and action strategies. Huesmann (1998) suggested that observing violence in the media leads to the learning of aggressive scripts. Scripts are sets of highly associated concepts that involve goals and action plans (Schank & Abelson, 1977), which form a unitary component in semantic memory. They become well rehearsed and form expectations and intentions involving important social behaviours. As scripts define situations and guide behaviour, in that an individual selects a script that relates to the event and assumes a role within it, it is learnt and utilized later, with the link becoming even stronger because multiple rehearsals create additional links to other concepts in memory, thus increasing the number of paths by which it can be activated. Observing others' behaviour is a secondary form of rehearsal and this also strengthens the links. Therefore, according to Anderson and Bushman (2002), children who watch violent media acquire knowledge of aggressive scripts, and linking to memory strengthens these associations. This link has yet to be fully documented, but there is evidence to suggest (Gavin & Hockey, 2010) that young men do have internalized scripts that are aggressive in nature, even though they understand the resultant behaviour may not be the most socially desirable choice. It remains unclear if young women also have similar aggressive internalized scripts. As mentioned above in the effect of environmental factors, the excitation transfer theory is also concerned with how physiological arousal is dispelled. If that arousal is excitation leading to anger, then it may extend beyond the time in which the stimulus is available. Hence, the anger and subsequent aggression may be misdirected.

In addition, the social interaction theory (Tedeschi & Felson, 1994) proposes that aggression has social influences that are reinforced by high reward and high self-esteem. Acting aggressively can result in tangible reward, and hence will never be negatively reinforced. Aggressive behaviour is thus seen as socially influenced behaviour in that someone uses coercive actions to produce some change in another's behaviour. This can mean obtaining something of value (theft or robbery), acts of retribution or to gain desired

social and self identities. This suggests that the aggressor is making conscious decisions directed by the expected rewards and costs; hence, the motivations are the attainment of higher-level goals.

This leaves us with a very complex position in trying to understand aggression, that there is an internalized set of behaviours expressed in highly personalized ways dependent on experience. Anderson and Bushman (2002) attempted to condense all the above positions into a general aggression model (GAM) which they proposed brings a unifying framework to the study of aggression. They suggest that such a model has value in that it can explain more issues within aggression, as no one person or group has a single motive for acting aggressively, and hence the development of interventions will be more effective.

GAM incorporates much of the work on cognition in terms of how internalized states and knowledge develop from experience and learning. However, the model presents ways in which subtypes of knowledge are important. These subtypes are: perceptual schemata, which are used to identify phenomena encountered by an individual (objects or acts); and person schemata, the beliefs about phenomena encountered, including people and behavioural scripts, the information about behaviour. The model is also novel as it includes the influence of emotion on cognition, as the knowledge structures also contain what they term 'experiential affect nodes'. If a node relating to, for example, anger is activated, this emotion is experienced, compared to internal knowledge about the event, and the appropriate behavioural script is then activated.

This model, based in cognitive psychological theories of learning, memory and decision-making, is open to the possibility of obtaining empirical evidence. Some areas have already been studied, such as the internalized aggressive scripts of young men (Gavin & Hockey, 2010) or Björkqvist et al.'s (2000) examination of social intelligence and conflict resolution. However, the major point of cognitive psychology is still that it is reliant on the supposition of an internalized state that cannot be observed. Experimental psychology cannot hope to examine that any more easily than theoretical positions that are wholly based upon the unobservable parts of the mind.

Psychodynamics and aggression Psychodynamic theory has subsumed some of the components of a theoretical position in physics known as thermodynamics. The law of thermodynamics are theoretical, but accepted

as rules by which the world operates. Thermodynamics rules are applied to the exchange of energy and the way that this exchanges acts upon the systems containing it. Hence, a closed system, containing anything but a vacuum, when acted upon by energy perhaps in the form of heat, changes its state to one of high energy, and this energy must be expended or exchanged in some way. This is applied to psychological systems (or human minds) by considering the concept of psychic energy, or psychological energy, first suggested by Von Brucke in 1874. He suggested that humans (and indeed all living things) are energy systems that need to conform to the conservation of energy. One of von Brucke's students was Sigmund Freud who developed this idea further. Freud argued that both the first and second laws of thermodynamics apply to mental processes, and that there was a mental energy that functioned within these laws, with the id being the source of the psychic energy powering the psychological system. Therefore, if the human mind is a system in which there is psychological energy of some form, it must be reactive to the pressure of external energy in the same way as any other system. External forces can be positive or negative, and this leads us to the frustration-aggression hypothesis (Berkowitz, 1989; Dollard, Miller, Doob, Mowrer, & Sears, 1939), a component of psychodynamic theory.

Frustration-aggression Frustration is the state that occurs when circumstances interfere with a goal, and as such is an external source of negative energy, according to psychodynamic theory, and acts upon the mind in a particular way. Frustration can lead to aggression and can be caused by several different things. For example, relative deprivation theory suggests that if an individual thinks that s/he is not receiving the rewards s/he deserves, frustration can result. Alternatively, cue-arousal theory would argue that frustration leads to anger, not always expressed in aggressive acts. Such theoretical positions are termed social cognition, and social psychology also has explanations to offer. For example, sense of identity and self can be lost in a large group. Individuals take on the identity of the group; hence, a mob can be more aggressive than any of its members. This is known as de-individuation, and a group can behave in more aggressive and violent ways that any of its members would if alone. During August 2011, the United Kingdom saw evidence of this when a peaceful vigil for a young man shot by police officers whilst under covert surveillance turned into rioting and looting in Tottenham, London, followed by groups looting in

other cities across the country. Much of this was reported as ‘mob mentality’ but there were two distinct behaviours. The first was the rioting, the facing-down of police in riot gear, throwing stones and other missiles, burning vehicles. Almost exclusively male in content, these mobs were violent towards the representation of authority. The second was the looting, in which women were quite visibly active. This is a less violent, although still illegal activity. Does this represent a dichotomy and a different sense of purpose in the violence of the two genders? This has yet to be explored, although media sources are reporting and questioning the behaviours (Castella & McClatchey for the BBC, 2011). As the BBC reported on its own press videos, rioters covered their faces and behaved recklessly, setting fire to buildings and cars, including police vehicles. Some even set fire to homes in which people were sleeping. The other behaviour was seen when newspapers printed pictures of people, their faces for the most part uncovered, walking out of shops with expensive electrical goods or clothes in their hands. They posed for pictures and posted them on social networking sites. Unfortunately for them, the police downloaded these too. As Pitts (2009) points out, there is an issue of numbers here, as one man cannot make a riot on his own. There is a point when the crowd realizes it is in control, not the authorities, represented here by the police. The second issue of looting, he suggests, provides a sense of power to people who do not have any. This of course suggests that the looting is being carried out by people who are somehow disenfranchised, but the pictures do not necessarily bear this supposition out.

Nevertheless, frustration-aggression theories are convincing. The suggestion is that people behave aggressively towards others when goals are impeded. The frustration-aggression model is based on the physical laws mentioned above; these are applied to hydraulics where pressure means that something has to be vented. Hence, building frustration and hostility must have an outlet. Carlsmith, Wilson and Gilbert (2008) suggested the idea that venting aggression relieves frustration. In other words, revenge has a clear utility for the health of the person seeking it. In reality, it does not, and we arrive once again at the conclusion that interpersonal aggression is a complex social phenomenon that is not really explained by one theoretical position.

Psychodynamic theories do offer alternatives to the strictly biological or cognitive position. Freudian psychology suggests the issue of aggression as instinct, a primary drive that Freud termed destructive and which he named

Thanatos. This is in conflict with the drive for life and survival (Eros). In addition to this conflict, displacement means that self-destructive energy is directed outwards, and self-aggressive drives are turned into aggressive acts against others. This tendency for aggression is mediated by catharsis, in which watching violent events or engaging in mild displays of anger diminishes the aggressive urge.

Psychodynamic positions are interesting, but also contain somewhat intangible elements that are difficult for scientific minds to accept. They are very difficult to examine in any rigorous manner. Popper (1959) pointed out that nothing could, even in principle, falsify psychoanalytic/psychodynamic theories, and suggested that they have more in common with primitive myths than with genuine science. Perhaps that is a little too far; psychodynamic theory, and its application in psychiatry and psychoanalysis, has as its chief source of strength, and the principal basis on which its claim to scientific status is grounded, a capability to accommodate and explain every form of human behaviour. This, in scientific terms, is its critical weakness, for it cannot be genuinely predictive. Nevertheless, psychoanalysis works when applied in various settings, so it has utility even if it is, as some claim, unscientific, so psychodynamic theory must have some value, even if its core elements cannot be examined via experimentation. Therefore, the question remains of how to evaluate theories of aggression in terms of utility of learning about it in order to minimize its effects.

Measuring aggression

This chapter started with a set of arguments about what aggression actually is. This confusion or, at best, lack of agreement makes studying aggression a minefield of controversies, and also makes the measurement and treatment of it problematic. The choice of definition and theoretical perspective naturally influences any policy or clinical decisions to be made. It also counteracts any study of the aggression of women, as many measures of aggression do not take into account any social, psychological or biological influence of gender.

Methods of studying and measuring aggression occupy a large range. Each type of measurement also carries a particular process by which it is administered and calculated. These range from self-reports, which rely on the respondent's memory, honesty and ability to reflect on past behaviour,

to laboratory measures, which can only hope to capture the present behaviour, to observation by an independent source, which can be biased by the observers' use of report mechanisms. Additionally, all of these measures and methods include time frames, replying the idea that personality and behavioural characteristics are immutable and transcend time, which is debatable. It is worth examining, however, some of the more commonly used measurements of aggression, as many of these will appear in the research about aggression.

Self-report measures Several questionnaires on hostility and aggression have been developed for clinical use. The Aggression Questionnaire (Buss & Perry, 1992), the Buss–Durkee Hostility Inventory (Buss & Durkee, 1957) and the Cook–Medley Hostility Scale (Cook & Medley, 1954) are probably the most popular and enduring. All questionnaires that ask about difficult behaviours or feelings can suffer from social desirability, and these are no exceptions, relying as they do on self-rating of something that is antisocial. There is a complication here, however, as those for whom social approval is less desirable may be the most hostile, and hence a measure to reduce such bias may be counterproductive.

Observer ratings Observer scales, in which episodes or acts of aggressive behaviour are recorded, include the Overt Aggression Scale (OAS; Yudofsky, Silver, Jackson, Endicott, & Williams, 1986), Social Dysfunction and Aggression Scale (SDAS; Wistedt et al., 1990), and Staff Observation Aggression Scale (SOAS; Palmstierna & Wistedt, 1987). As the last implies, these are again all for use in clinical settings, but may be affected by an observer's exposure to aggression.

Projective tests Projective assessment also includes some aggression measures, usually included after the tests have been developed and approved, and established in clonal experimental settings. For example, Wanamaker and Reznikoff (1989) used several pictures of the Thematic Apperception Test (TAT) to assess aggression levels. However, McCrae and Costa (1989) question the reliability and validity of such techniques.

Laboratory measures Instruments designed to be used in controlled settings are varied, from EEG to cognitive measures.

They can also include direct measures of physiological activity, such as assays for blood levels of various biochemical agents mentioned above. As

with all laboratory settings, these measures are subject to questions of ecological validity.

Interview measures Some clinical tools include interviews, some of which are unstructured in nature and open to a good deal of bias if used by inexperienced interviewers. The alternative is a tool such as the Structured Clinical Interview for the DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 1997), which, as its name suggests, allows for very little exploration of side issues. Also used are the Abusive Violence Scale (Hendrix & Schumm, 1990), Intermittent Explosive Disorders Module (Coccaro, 1998), Life History of Aggression (Coccaro, Berman, & Kavoussi, 1997) and Suicide and Aggression Scale (Korn et al., 1992).

As already outlined, these tests are usually employed with clinical populations and there is an issue of generalizability across other types of sample, as the scoring level may be too high in the latter. Additionally, those using them in clinical settings need to be assured that the test can predict the potential for risk and dangerousness. In order to incorporate all of these issues, it is difficult to see how the measurement of aggression (and its concomitant concepts of hostility and violence risk, etc.) can be carried out in women, particularly in non-clinical populations. The issue exercising the minds of policy makers today is the rise in violence in women outside of any question of psychopathology; this is the rise in delinquency and the issue of underlying aggressive tendencies in general, not in the psychiatric hospital, but in the streets of our cities.

The following chapters will discuss various aspects of women's aggression in the light of these theoretical positions.