AN EVOLUTIONARY PERSPECTIVE OF HUMAN FEMALE RAPE

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PhD

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November 2002

ABSTRACT

This thesis assessed whether rape is an adaptive mating strategy, which was naturally selected for in our ancestral past. It investigated a number of constructs, namely: fertility value; victim-offender relationship; socio-economic status; rape proclivity; actual sexual aggression; and sociosexual orientation. There were two types of studies: studies 1-3 involved archival data, e.g. the use of criminal statistics, and studies 4-7 assessed participant data, e.g. rape attitudes. Study 1 found that fertility value (FV) was related to rape prevalence, as was reproductive value (RV). In addition, offenders with a non-reproductive sexual preference tended to rape a victim with a low FV, and offenders who committed a secondary offence tended to rape a victim with high FV. Study 2 found that there was a smaller number of offences committed against strangers and partners, and a larger number committed against step-relatives and acquaintances. More rapes were committed by low status than high status men, even when the base rate was accounted for. Study 3, showed that there was a relationship between the population gender ratio and rape prevalence. However, the covariable population density was positively related to rape prevalence. Study 4 found that there was more disapproval of a depicted rape committed by a low status offender. A low status offender who raped a victim with low RV attracted more disapproval. Study 5 showed that marital rape was disapproved of more than both stranger and acquaintance rape. Individuals with a short-term mating strategy disapproved of rape more than those with a long-term strategy, and a long-term strategist disapproved of a marital rape less than a short-term strategist. Study 6 found that those who possessed a promiscuous ideology perceived their future life to be limited, in particular the likelihood of being happily married. There was no relationship found between perceived future life and sexual aggression. In study 7, it was found that those who had a more unrestricted sociosexual orientation were more likely to have asymmetrical bodily traits (e.g. ear height, finger length), and that the right hand 2D:4D digit ratio (a measure of prenatal testosterone) was significantly related to actual sexual aggression. Overall, there was partial support for rape as an adaptive mechanism, but the studies were also consistent with a by-product explanation of rape.

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ACKNOWLEDGEMENTS

I would like to thank my supervisor John Archer for his guidance and comments on the thesis. In addition, I would like to thank Paul Pollard and Liz Connors for their help with the thesis. I would also like to thank friends and family who have supported me through this process, in particular Sheila Vaughan and Dan Venables.

PART 1: LITERATURE REVIEW

LITERATURE REVIEW

Rape is a contentious research area, where often there are a variety of definitions used. For instance, sexual assault can vary on a continuum ranging from molestation to forced sexual intercourse. Rape can be defined as either oral, anal or vaginal intercourse, it is therefore important to discuss these and identify which is being studied.

Rape is often perceived as a 20th century phenomenon: however, it would appear from research that rape has been prevalent for centuries. Early reports emerge from ancient civilisations and continue well into modern times. In order to place rape in its modern perspective, a discussion of the history of rape is included.

Research has often been conducted on convicted rape offenders. This provides an insight into the type of person who commits rape and then is convicted. However more important is research conducted on offenders who are not convicted. This is usually assessed by the participant's rape proclivity. This research can indicate precursors to rape offending and the difference in characteristics between those who are convicted and those who are not. One way to differentiate rape offenders is by the victim-offender relationship. Past research has focused on stranger rape, however research that is more recent has considered acquaintance and date rape. Research indicates that rape in general is considered unacceptable, but marital rape still does not necessarily receive this condemnation. It is therefore important to discuss convicted and non-convicted offenders. In addition, it is important to include the differences in victim-offender relationships, of both actual offenders and perceived offenders.

Sexual aggression has been studied in animals. As rape refers to non-consensual intercourse, in the animal literature this behaviour is called forced copulation. Forced copulation occurs in insects, fishes, birds, and non-primate mammals. Most notably though forced copulation occurs in primates, with it being most prolific in orang-utans. A

discussion on the animal literature has been included in order to understand the occurrence of sexual aggression across species.

The causes of rape have been studied through a number of perspectives. Social learning theory views it as the product of our culture, whilst feminist theory attributes it to the sheer dominance of men over women. Biologists have searched for the gene or combinations of genes to explain it, and evolutionary psychologists suggest that the behaviour may have evolved as an adaptation, if it was reproductively successful in our ancestral past, or as a by-product of other adaptive mechanisms. An adaptive hypothesis would predict that victims would be young and offenders would of a low status. To understand rape from an evolutionary perspective the effect of rape on victims is also discussed, in particular the effect of assault, victim-offender relationship and age of victim. The age of females is directly related to their fertility and reproductive value (these refer to the ability to reproduce offspring), it is important to discuss these, as they are relevant to the adaptive hypothesis. Following on from this is a discussion on socio-economic status and how this affects opinions of rape offenders and how it affects conviction rates. Gender ratios have been found to affect the structure and behaviour of a society, for example do low status men who cannot compete then use rape as a reproductive strategy. Men with inadequate genes may be considered low status; it may be that biological indicators such as fluctuating asymmetry and 2D:4D digit ratio are related to rape proclivity. Life history theory suggests that an individual's life history pattern would affect their behaviour, which might explain why some men rape strangers and other men rape women known to them.

1) Definitions of Rape

One of the problems with rape research is that the word rape is often equated with sexual coercion and sexual aggression. This can be misleading as these expressions can include a larger variety of acts. An important requirement of research in this area is that there is a clear definition stated, but it often does not occur.

Chambers' Concise Dictionary (Schwarz, 1991) defines rape as "*unlawful sexual intercourse (by force or, technically, with a minor) with another person without that person's consent; violation, despoliation.*" Sexual is defined as "*of, by, having or characteristic of sex, one sex or other, or organs of sex*". Coercion is defined as "*restraint; government by force*". Finally, aggression is defined as "*a first act of hostility or injury; the use of armed force by a state against the sovereignty, territorial integrity or political independence of another state; self-assertiveness, either as a good characteristic or as a sign of emotional instability*". It can be seen that neither sexual coercion nor sexual aggression equate with rape. Rape is a highly specific act, whereas sexual coercion and sexual aggression play a major part in rape, it is possible to experience sexual coercion and aggression without an act of rape occurring.

One way to define rape would be to consider the offence in legal terms. The law pertaining to sexual offences in England and Wales is held within the Sexual Offences (Amendment) Act 1976. The Sexual Offences Act 1956 stated, "*It is an offence for a man to rape a woman*". This simplification led to the exclusion of rape within marriage and rape of male victims. The Criminal Justice and Public Order Act 1994 redefined section one. This now states that "*a man commits rape if he has sexual intercourse with a person (whether vaginal or anal) who at the time of the intercourse does not consent to it; and at the time he knows that the person does not consent to the intercourse or is reckless as to whether that person consents to it.*" Section 44 states that "*whether on the trial of any offence under this Act, it is necessary to prove sexual intercourse it shall not be necessary to prove the completion of the intercourse by the emission of seed, but the intercourse shall be deemed complete upon proof of penetration only.*" Prior to 1994 rape was not possible within marriage as it was deemed to be unlawful sexual intercourse, which could not occur within marriage, as the act of marriage was seen as consent. This has now been removed from the 1956 Act (Smith & Hogan, 1996). It seems, therefore, that the critical factor for rape is penetration without consent, regardless of levels of violence or any other sexual assaults.

The law in the United States varies from state to state, which increases the confusion with the definition of rape. The Federal Bureau of Investigation defines it as "*the carnal knowledge of a female forcibly and against her will*" (Estrich, 1987). This is a general

definition, which would need clarification in the courts. Perhaps this is acceptable to the feminist movement who feel that a broad definition is necessary. but for research a more stringent definition is needed. Reforms have been made to address this problem. The Moral Penal Code defines rape as *"sexual intercourse where the man compels (a woman) to submit by force or by threat of imminent death, serious bodily injury, extreme pain, or kidnapping, to be inflicted on anyone"* (Estrich, 1987). This of course still excluded the possibility of men being the victims of rape. Many states have now attempted to change this, for example, Harney & Muehlenhard (1991) cite the definition given by Ohio State. *"vaginal intercourse between male and female, and anal intercourse, fellatio, and cunnilingus between persons regardless of sex. When 1) the offender purposely compels the other person to submit by force or threat of force; 2) for the purpose of preventing resistance the offender substantially impairs the other person's judgement or control by administering any drug or intoxicant to the other person (Ohio Revised Code, 1980)".* Although these definitions take into account the horrific and traumatising effect of any sexual assault, this perhaps is not a sufficient reason to expand the definition of rape.

Definitions determined by researchers have been noted by Muehlenhard, Powch, Phelps, & Giusti (1992). They report that some researchers regard rape as penile-vaginal intercourse whilst others broaden the definition to include any form of non-consensual sexual activity. They suggest that the traditional definition of rape puts limitations on women and offers an advantage to men. They also suggest that a limited definition does not necessarily determine if a sexual assault has taken place or not. They also criticised researchers as to whether they allowed participants to classify the act as rape or not. Donat & D'Emilio (1992) have noted that in the United States there are laws which include a range of rape offences, first degree rape is forced sexual intercourse under aggravated circumstances. second degree rape is forced sexual intercourse, and third degree rape is non-consensual intercourse or intercourse with threat to self or property. These have led to a higher conviction rate but they may belittle the effect of rape on women by assuming that a non-violent rape is psychologically less damaging.

2) History of Rape

Rape is often perceived as a modern crime, due to the more public awareness of it that was created by the feminist movement in the 1970s. However, historians have noted that the crime of rape has been prevalent for much longer. One problem with analysing the history of crime is that written records are often sparse and their authenticity is sometimes questionable.

Carter (1984) examined rape in medieval England between 1218 and 1275. He noted that rape between 1180 and 1189 was a felony punishable by death but that by the 13th century it had been degraded to a lesser crime. Rape was defined as illegal intercourse with any woman. Offenders were often fined rather than any physical punishment, but some were outlawed. The severity of the punishment was determined by the local community (the jury), if there was limited evidence (i.e. no blood stained clothing) then they would be hesitant to inflict corporal punishment and the crime would result in a fine being imposed.

Carter (1985) noted that in the 13th century if a woman was a virgin then the punishment should have been death whereas if she was already defiled then the punishment should have been less. Most offenders in the 13th century were from a different village to the victim and were in the servile class. In order for a woman to report the crime of rape in the 13th century, there was an extremely long process. Carter (1985) noted how first the victim had to raise the hue and cry, then go to neighbouring townships and relate the experience to 'men of good repute,' then explain the crime to the hundred reeve, the king's serjeant, the coroners and the sheriff, then she had to make an appeal to the county court, then the appeal had to be copied for the coroner's rolls and finally the appeal had to be repeated to the general eyre. It can be seen that the process was not an easy one and was often humiliating, which meant reporting of the crime was often quite low. In addition, Carter (1985) found that almost half of the victims were themselves arrested, usually accused of false allegations (n=145). In only 21% of cases were the offenders found guilty, of those 79% were punished. Only 1% of the total cases were rape-murders, rape and robbery were

committed together in 9% of cases. Therefore, rape in medieval England seems to resemble modern conviction rates and problems with the process.

Clark (1987) considered rape in the 18th and 19th centuries in England. She noted that rape was defined as the theft of a woman's virtue, which led to the assumption that rape was only committed against women who were less respectable. Clark (1987) found that most rapists of that time were of a lower status, she noted that this was in line with the distribution of the classes within England at that time. Most rapes were committed by a stranger or an acquaintance. This analysis is interesting as it supports the medieval data that the lower classes were more likely to be offenders. The prevalence of acquaintance rape suggests that this type of rape was more prevalent than anticipated by modern studies, which suggest that stranger rape is the most common. During the colonial period in the US the rape cases, which were most likely to come to court, were those where the offender had raped someone from a higher class or if the victim was married (Donat & D'Emilio, 1997).

Rape is now reportedly more prevalent in modern society. Studies consider both convicted samples and surveys of sexual aggression. Prevalence rates for modern society suggest that rape is one of the most common crimes that a female may experience. In a survey of 400 women at a health centre over 25% reported either an attempted or a completed rape (Walch & Broadhead, 1992). Another study of a general practice found that 13% of women reported either an attempted or a completed rape (Mazza, Dennerstein & Ryan, 1996). Coyle, Van Horn & Wolan (1996) found that 41% of women reported that they had been raped. A study of Australian students found that 1% of females reported unwanted sexual intercourse after the threat of physical force (Patton & Mannison, 1995). It was found, in a study by Lottes & Weinberg (1996), that 15% of US female students reported forced sexual intercourse while 4% of Swedish students did. Newton-Taylor, DeWit & Gliksman (1998) found that 2% of their Canadian student sample reported a date rape. A Chinese survey found 7% of students had been raped or experienced an attempted rape (Xu, Xie & Chen, 1998). Forty-six percent of a navy recruit sample had experienced an attempted or completed rape (Merrill, Hervig, Newell, Gold, Milner, Rosswork, Koss & Thornton, 1998). A study of Ethiopian students found that 5% of females reported a completed rape and 10% reported an attempted rape (Mulugeta, Kassaye & Berhane, 1998). A German sample of adolescents found that 7% reported rape and 11% reported attempted

rape (Krahe, 1998). Attempted rape and completed rape were found to both be 2% in a British sample (Percy & Mayhew, 1997). It would seem that rape in modern times is prevalent and estimates range from 2-41%.

Rape is now viewed as an integral part of society where it is referred to in the media frequently. Soap operas, which are supposed to reflect life, deal with the issue of rape more frequently than in the last 20 years (Greenberg & Woods, 1999). However they can also still perpetuate myths where the victim is portrayed to fall in love with her assailant, which is similar to the medieval studies which suggested that some women made an accusation of rape in order to marry into a higher class (Clark, 1987). Of course, some soap stories do deal with date rape in a sensitive manner.

3) Types of Rape Offender

Rape can be classified in terms of the mentality of the offender. Clinicians have identified different types of rapists. Groth & Hobson (1997) have suggested three types: anger, power, and sadistic rapists. Polaschek, Ward, & Hudson (1997) proposed five categories, which can help to identify rapists from other offenders. These are developmental antecedents, sexual arousal patterns, mental disorder, sexual recidivism, and offence specificity. Another way to consider rape offenders is to examine those who have been convicted and the rape proclivity of non-convicted samples.

3.1) Convicted Rape Offenders

As mentioned, several studies have attempted to describe the personality characteristics of convicted rapists. Research has found a difference between the use of criminal fantasy by predatory and opportunist sex offenders. Deu & Edelmann (1997) described two types of incarcerated sex offenders (these included rape, paedophilia, sexual assault and incest), i.e.

the predator and opportunist. To be a predatory sex offender the patient had to have committed the offence more than once, preplanned the offences, committed the offences according to their plan and chosen their victims prior to the offence. This is similar to Groth & Hobson's (1997) power rapist. The opportunist sex offender had only committed one known sex offence, did not appear to preplan it, committed the offence in a disorganised manner, and had not chosen their victim. This is similar to Groth & Hobson's (1997) anger rapist. Deu & Edelmann (1997) found that the predatory sex offenders were more organised, planned, and elaborate in their criminal fantasies than either the opportunist sex offenders or control groups. It would seem therefore that these are appropriate criteria to make an assessment of predatory sex offenders. This could in turn be used to identify predatory rapists. When attempting to categorise sex offenders Schlank (1995) has found at least seven different types using the Multiphasic Sex inventory. These groups did not differ with regard to the victim gender or age. This is interesting as most clinical studies differentiate between rapists and child molesters, and often miss out those offenders who incorporate both crimes into their repertoire.

Incarcerated sex offenders have been assessed on psychopathy scales. Serin, Malcolm, Khanna & Barbaree (1994) found a positive relationship between psychopathy and deviant sexual arousal, which was most pronounced for extra-familial child molesters, somewhat for rapists and not occurring for incest offenders. In addition, the rapists had demonstrated more psychopathy than the child molesters. The researchers proposed that both these variables are important when considering the risk of recidivism. One cause of these differences might be the background of the offender: a study by Leonard (1991) found that serial rapists experienced slightly more family violence than serial robbers.

An examination of the socially desirable responding of convicted rapists in relation to the characteristics of their offence found that greater victim injury was correlated with lower impression management and denial scores (Kroner & Weekes, 1996). The authors suggest that those who experience high impression management have a reduced need to use violence.

The problem with considering incarcerated or convicted offenders is that it only assesses a small proportion of actual offenders. Surveys indicate that a larger proportion of women

are raped than what is estimated by reported statistics (e.g. Russell, 1984). The characteristic assessment of convicted offenders may be redundant if most offenders are not convicted. The 'typical' offender is more likely to demonstrate traits, which are more subtle, compared to their convicted counterpart.

3.2) Non-Convicted Rape Offenders

Pollard (1994) has noted that the typical rapist is an acquaintance with no criminal background and who has not been reported to the police. There are two main methods for identifying rape prone men, self-reports of actual offending and hypothetical estimates of likelihood of offending. A review by Pollard (1994) has offered a summary of the variables most likely to correlate with rape proclivity. It has been proposed that rapists must lack sexual activity elsewhere, but Pollard (1994) considers this a folk theory with studies demonstrating no difference between rapists and controls in heterosexual skills. With regards to the offenders' personality, the layperson perceives them to be mentally unstable. Pollard (1994) suggests that this is another folk theory. What has been found is that those who are sexually aggressive are also more generally aggressive, antisocial, and less sympathetic to other people. Attitudes seem to be the indicative variable. Pollard (1994) has noted the most salient beliefs that correlate with rape proclivity, namely a greater belief in rape myths, traditional sex-role attitudes, greater victim blame, and attitudes supportive of interpersonal violence. He has further concluded that although the motive behind acquaintance rape would appear to be sexual access, it still involves hostile aggression, which is based on a desire to hurt.

Further research has attempted to investigate the relationship between sexually aggressive men and personality variables. Lalumiere & Quinsey (1996) conducted a study examining the risk factors associated with sexual coercion. They found in their sample of young men that the strongest risk of committing sexual coercion was psychopathy, sensation seeking, self-perceived mating success, and a history of uncommitted relationships. This seems to concur with the findings from incarcerated offenders. Other researchers have found similar results. Kosson, Kelly & White (1997) have found a relationship between men who have

committed acts of sexual aggression and psychopathic traits. These were college men who had not been reported to the police. Ouimette (1997) has also studied college men and the prevalence of psychopathology amongst them. She found that men who admitted to rape or attempted rape were more likely to exhibit a conduct disordered behaviour, alcohol abuse, and drug abuse. It seems that there is growing evidence for the proposal that non-convicted sexually aggressive men are psychopathic, which is similar to their convicted cohort. With the occurrence of psychopathic traits being prevalent among convicted offenders, it was hypothesised that more subtle elements of these traits would exhibit themselves among those who were sexually aggressive but not convicted of any offence (Hersh & Gray-Little, 1998). They found that as sexual aggression increased then so did the psychopathic traits, but the relationship was small so there must be other factors affecting the sexual aggression and some of the other variables have been found in other studies.

An early study of sexual aggression among the college population found that the incidence of sexual aggression increased as a result of the personality variables of irresponsibility, a lack of social conscience, and a belief that aggression is normal. (Rapaport & Burkhart, 1984.) A Canadian study (Lackie & de Man, 1997) found that physical aggression, sex role stereotyping, and fraternity affiliation were the best predictors of sexual aggression. According to the researchers, this suggests that sexually aggressive men are motivated by aggression rather than sexuality, supporting the feminist view of sexual aggression.

A more recent exploration into the characteristics of sexually aggressive men has attempted to examine the difference between men who actually aggress and those who imagine aggressing (Dean & Malamuth, 1997). The relevant personality characteristics were self-centredness and nurturance. Those who were self-centred were more likely to aggress when they possessed a high number of risk factors (e.g. family violence, sexual experience, non-conformity, attitudes [rape myth and acceptance of interpersonal violence], and hostile masculinity) compared to the nurturant group whose sexual aggression was relatively low and not affected by the number of risk factors. However, imagined sexual aggression was not affected by the characteristics of self-centredness or nurturance: both groups were more likely to imagine aggressing the more risk factors the individual possessed. This suggests that a large amount of imagined sexual aggression combined with a number of risk factors may highlight an individual predisposed to actual sexual aggression.

One problem with estimating the prevalence of any type of interpersonal violence is the reliance on self-report data. Hilton, Harris & Rice (1998) found that the absolute frequencies of incidences of violence (including non-sexual) experienced and committed were inconsistent for different time periods. These in turn made annual estimates of violence to vary considerably. They suggested that self-reports are affected by other unknown factors, as well as the actual events that happened.

Many rape cases have occurred in American fraternities. This could be due to the masculine environment that is perpetuated by them: Martin & Hummer (1998) investigated the organisation and membership of fraternities and concluded that it creates an atmosphere that was conducive for coercive and violent sex. These conditions included all members being men, members being of an immature age, being set in an isolated environment, emphasis of a macho culture and a stereotyped conception of women as commodities.

The use of coercive sexual strategies by college students was examined by Tyler, Hoyt & Whitbeck (1998). They found positive relationships between being sexually active, having sexually permissive attitudes, drinking alcohol, and being a victim of sexual coercion for females. There was a positive relationship between a sexually permissive attitude, attitudes towards rape and use of verbal coercion for men. They also found that affiliation with certain fraternities increased the risk of being a victim of certain types of sexual coercion and the perpetrator. Of course, it may be that the men see consent as being given once the female becomes associated with the fraternity.

It would seem that non-convicted rapists may have a psychopathic personality, but there are other variables, which contribute to men becoming sexually aggressive. Most notably aggression, lack of conscience, attitudes towards violence and in some cases group membership. Perhaps education programmes need to be directed towards eradicating certain myths and encouraging individual thinking.

3.3) Victim-Offender Relationship

Rape can be classified according to three types of victim-offender relationship, i.e. stranger – the offender is not known to the victim, acquaintance – the offender has met the victim before, or intimate – the offender is very well known to the victim, e.g. a partner or other type of relative. Rape committed by strangers most commonly results in a conviction as this is more likely to be reported to the police (Pollard, 1994).

Attitudes towards rape victims and offenders are affected by the type of relationship between the victim and offender. Shotland (1992) has suggested that within acquaintance (date) rape there are five different types:

1) The first is beginning date rape - which occurs in the first few dates;
2) The second is early date rape - this occurs after several dates;
3) The third is relational date rape - this is after the couple have been dating for some time;
4) The fourth type is rape within sexually active couples; and
5) The fifth type is rape within sexually active couples with battering.

Of course, there are also other types, which would include incest by either kin or a step-relative. In 18th century England, most rapes were committed by someone known to the victim (Clark, 1987), for example an acquaintance or someone that with whom the victim worked. It was more difficult to apprehend strangers at that time.

Studies have considered the impact of types of rapes in a variety of ways. McCormick, Maric, Seto & Barbaree (1998) found that stranger rapists received a longer sentence than those convicted of acquaintance rape, and that partner rapists received the shortest sentence length. Cowan (2000) investigated participants' opinions on the sentence length given to a rapist, she found that the closer the relationship, the shorter the sentence length given. This supports data on convicted rapists. Gartner & MacMillan (1995) found that violence by known offenders is less likely to come to the attention of the police than violence by strangers. The genetic relationship of the victim and offender was examined using an attitude study by Quinsey, Lalumiere, Queree, & McNaughton (1999). The relationships

included were cousin-cousin, uncle-niece, father-daughter, or brother-sister. It was found that the closer the genetic relationship then the more serious sexual coercion was seen.

Several studies have examined the difference between types of rape. Monson, Langhinrichsen-Rohling & Binderup (2000) found more rape supportive attributions for a marital rape with the least for stranger rape. Kormos & Brooks (1994) found that college students reported equal blame to the victim in both stranger and acquaintance situations, but prison inmates assigned more blame to the victim when the offender was a stranger than acquaintance. Simonson & Subich (1999) found that marital rape was perceived, by undergraduates, as less violent, less of a violation of the victim's rights and less psychologically damaging than stranger, acquaintance, or date rape. Kirkwood & Cecil (2001) found that rape in the marital relationship was considered to be less serious than that committed by a stranger, date, or ex-spouse. In addition, they also found that stranger rapists were given the highest sentence whereas marital rapists were given the lowest sentence.

Studies have investigated the effect that the type of rape has on the victims. According to Thornhill & Thornhill (1990b) victims of rape by a family-member were less traumatised than victims of strangers. (However, these results need to be interpreted with caution as the amount of trauma experienced was only assessed five days after the assault.) Other research has contradicted these findings. Culbertson & Dehle (2001) found that women who had been assaulted by a cohabiting, marital or acquaintance partner reported more hyper-arousal than women in a dating or sexually intimate relationship, and married/cohabiting women reported more hyperarousal than those in the acquaintance group. Married and cohabiting women reported more intrusive symptoms than those dating or sexually intimate. The acquaintance group reported more intrusive symptoms than those in a sexually intimate relationship. It would seem from this study that the more intimate the relationship, the more distress is reported, which was not found by the Thornhills (1990b). As is supported by Ullman & Siegal (1993) who found that sexual distress was more common for those attacked by intimates, whereas fear and anxiety was more common for stranger victims. In addition, the victim-offender relationship affects the perceived safety of victims after the attack (Culbertson, Vik & Kooiman, 2001). It was found that women who had been sexually assaulted by their partner reported less home-related safety than

women less closely related to their perpetrator, but those in the acquaintance group also reported less home and interpersonal safety. This is probably due to that category including friends. It would seem that the more intimate the relationship, the more distress it causes, yet it is more likely to attract a lenient sentence and it is perceived as less serious.

3.3.1) Rape by an Intimate

A rape by an intimate includes a relative, step-relative, ex-lover, and most commonly a partner. The rape of a man's wife has only recently been illegal in the UK. As the woman willingly gave herself to the man in marriage, this was deemed to include every aspect, and therefore excluded him from the possibility of being able to rape her (Peacock, 1998). The wife was perceived as chattel of the husband and thus a man could not damage his own property. Russell (1984) found that marital rape was the most prevalent, yet the most underreported. Peacock (1998) found that the average age of the marital victim in their study was 25 years. A British study (Painter & Farrington, 1998) found that in a national survey, conducted in 1989, 13% of wives had been raped by their husbands. Marital rape victims are more likely to experience repeated assaults and less likely to seek help in comparison to victims of strangers and acquaintances (Mahoney, 1999). Ewoldt, Monson & Langhinrichsen-Rohling (2000) found that a marital rape scenario elicited more rape-supportive attitudes from participants than where the couple were living separate, legally separated, divorced or strangers.

Mahoney & Williams (1998) have reviewed the literature on marital rape. They defined it as *"any unwanted sexual penetration (vaginal, anal or oral) or contact with the genitals that is the result of actual or threatened physical force or when the woman is unable to give affirmative consent"*. They list several reasons why there is an underreporting of marital rape. One is the loyalty to husband and the privacy of the family. Another is the unwillingness to accept their own victimisation, the reluctance to label the act as rape: this is perhaps the most important for research on rape. Others indicate misunderstandings about the woman's role in marriage and marital responsibilities, and sexual inexperience and uncertainty about what constitutes normal and forced sex. This suggests that there is a large proportion of women who do not realise they have been raped: they assume that either

it is a part of being married or that they 'consented' to sex, even though they were physically assaulted and threatened.

There are several characteristics of marital rape. The first one identified by Mahoney & Williams (1998) was force: this was either social coercion, interpersonal coercion, threat of physical force, or/and physical force (Finkelhor & Yllo, 1985). The second characteristic was the sexual acts perpetrated. The review demonstrated that the majority of victims experience forced vaginal intercourse, with between 25-33% reporting anal and oral intercourse. The final characteristic of the assaults was the timing and duration of them. Research has indicated that rape may occur when the marriage is ending even if there was no prior abuse, after an absence of sexual contact, if the husband is suspicious of sexual infidelity, or when the presence of alcohol increases. One differentiating feature of rape by a husband is that the wife often experiences consensual sexual relations with her husband before and/or after the sexual assaults. Mahoney & Williams (1998) regard this as evidence that marital rape is an exhibition of force rather than sex. Although it may be that the offender wanted to have sex when his wife did not, this would then indicate a sexual component of marital rape. Researchers have attempted to classify marital rape:

1) Battering rape involves physical battering and verbal abuse;
2) Non-battering rape/force-only has less physical assault, with arguments focusing on sexual issues; and
3) Obsessive rape incorporating bizarre obsessions such as pornography or fetishes (Finkelhor & Yllo, 1985).

Marital rape in Western societies occurs between a man and woman who have chosen to marry but then violence becomes a part of the relationship. However, the abduction of a young bride is still prevalent in modern Ethiopia. Young females are kidnapped, repeatedly raped, and then forced to marry their abductor. Getahun (2001) found that abducted women were more likely to be victims of abortion, marital instability, rape, and domestic violence. The average age of an abducted 'woman' was 13 years with a range of 7-20 years. The practice of abduction itself often involves the rape of the victim who then must marry the abductor as he has usually stolen her virginity and she would then not be able to marry anyone else. It seems that abduction practices are prevalent in modern society, even though they are often perceived as something from history.

4) Rape and Sexual Aggression in Non-Human Animals

Rape is often a behaviour that is only attributed to humans. However there are a large number of examples of sexual aggression in the animal literature. These are usually referred to as forced copulation, as in order to commit rape then it has to be demonstrated that the female did not consent. This is not possible in animal species so the phrase forced copulation is used instead.

The term forced copulation is used more often as it defines a sexual act that is perceived by the observer as forced. It also avoids anthropomorphising the act. Palmer (1989) suggests that many studies of non-human rape use inappropriate definitions. He proposes that rape is *"copulation involving either the individual's resistance to the best of his/her ability, or the reasonable likelihood that such resistance would result in death or bodily harm to the victim or others whom he/she commonly protects"*. According to this definition, rape does occur in several species.

Ellis (1998) presented photographic evidence of criminal behaviour exhibited by animals. He notes that the evolutionary literature on rape and sexual assault has made five arguments:

1) Rape offenders are primarily male;
2) Forced copulation, which is similar to rape, occurs in many other species, with males being the main perpetrator[1];
3) The sex difference in using forceful strategies is dependent on males being able to reproduce more quickly than females. Males may attempt to deceive by appearing committed so females become more suspicious. Males then become more devious and may use force. The female retaliates by calling on relatives. This is an example provided by Ellis (1998) of how the sex differences may have contributed to the evolution of forced copulation;

[1] Ellis (1998) notes that in all species, voluntary copulations are more frequent, but the most frequent forced copulations tend to be in birds that are also monogamous. Ellis (1998) suggested that monogamy and rape probably co-evolved.

4) Males who use force as well as other methods may well increase their reproductive success, compared to those who only use one strategy. However Ellis (1998) notes that the research reports a slightly lower chance of pregnancy through rape than voluntary copulation; and
5) If there are genes that aid rape then these will have become prevalent until adverse conditions reduce their reproduction.

Although it is not possible to infer reasons for human behaviour from the animal literature, a comparison is important to a discussion on rape. The animal literature can be divided into different groups, e.g. insects, fishes, birds, non-primate mammals, and non-human primates.

4.1) Insects

One particular example of an adaptation for rape has been reported by Thornhill & Thornhill (1987). They suggest that the scorpionfly has the choice of three methods for mating. The first involves nuptial feeding where the male presents food for the female while they copulate, the second involves the male offering the female his own salivary secretion, and the third method is forced copulation where the male holds the female with his genital claspers. The behaviour demonstrated by the female illustrates the differences in the mating strategies. When offered food she willingly copulates but when held she resists and attempts to escape. The Thornhills (1987) found that in forced copulations only 50% of sperm is transferred. They conclude that forced copulation would have evolved in resource-based polygynous mating systems, as female mate choice is based on resources and males striving for resources will then produce losers who may then rape. Thornhill (1980) suggests that males should be most strongly selected to rape in species where males provide resources important for female reproduction, as there will be males who cannot provide resources and so may resort to rape.

Cordero (1999) found that forced tandems were the most common method used by damselflies. After, males would guard the female. This was in a population where there

were more females than males, i.e. a low gender ratio. Human studies have shown that when there is a low gender ratio, women are viewed more as sex objects and men are less likely to commit to a relationship (Guttentag & Secord, 1983). It would seem that a promiscuous sexual orientation is common in low gender ratio environments. This may explain why forced copulation is common among damselflies where there is an abundance of females. Of course the social culture of humans is different to damselflies, however similar biological mechanisms may be operating, and may be exhibited more in insects, which may explain why most of their copulations are forced.

Sexual aggression is common among certain insects e.g. scorpionflies and damselflies. Although human sexual aggression cannot be generalised from the insects' behaviour, it can provide a starting point for hypotheses, which can then be empirically studied in humans. For example if human society is resource based then perhaps males who do not have access to resources will use sexual aggression as a strategy to obtain a mate, i.e. a low status male (see section 5.4.4 for a discussion on status).

4.2) Fishes

Forced copulation has been studied in fishes. Farr (1980) found that in a study of guppies, males placed with unreceptive females, were more likely to attempt a forced copulation, whereas males placed with receptive females were less likely to attempt a rape. He suggests that sexual behaviour patterns are chosen with respect to the probability of a successful mating at a given time. The use of forced copulation in guppies has been shown to be dependent on the environment in which they are born (Evans & Magurran, 1999). It was found that when males were born into male-biased groups then they participated in a higher number of forced copulations (high gender ratio) and fewer courtship displays, whereas those born into female-biased groups demonstrated the opposite behaviour. This suggests that sexual aggression in guppies is dependent upon the gender ratio. These findings are contrary to those found for damselflies (Cordero, 1999), where forced copulation increased when there was a low gender ratio.

In the one-sided livebearer, Bisazza, Manfredi & Pilastro (2000) have noted that mating is coercive: males approach females from behind and try to copulate with them. Large males were significantly more successful than small males. With an equal gender ratio the advantage disappeared as each male followed a different female. When given the choice, females preferred large males and remained close to them. This is not seen in non-deprived females; the authors suggest that struggling by the female may be a way in which the female assesses the physicality of the male.

It would seem that in these examples of fish the gender ratio of the population plays a significant part in the demonstration of sexual aggression. For example, there is an increase in forced copulation when there is a high gender ratio but in another species when the gender ratio was equal, the advantage disappeared. These examples demonstrate that forced copulation in fish cannot be predicted from a certain set of conditions. Rather the conditions which produce forced copulations may vary for each species. This is similar to Mealey's (1999) discussion on life history patterns (see section 5.4.9 for a discussion of life history theory) of humans. She suggests that different types of rape are generated from different life histories of the offenders. For instance, one type of offender may result from genetic differences in personality whilst another may have had their personality shaped by the early environment.

4.3) Birds

A number of bird species, for example mallards, have exhibited forced copulation. Cunningham & Birkhead (1998) have noted that in certain bird species (for example, the European starling) female-female aggression affects the mating strategy used by the male. When females were aggressive the male accepted the monogamous mating, less aggressive females were part of a polygynous trio. The researchers attempted to explain the reasons for female mate choice. They suggest that extra copulations by females may be beneficial as either they gain immediate resources and protection from the male, or they may gain indirectly with genetic quality. When the choice is being considered then an estimation of the costs and benefits is made, some copulations may be too costly for the female. They

note that within each gender different tactics may emerge to obtain the same result. This means that for a particular tactic there may be different costs and benefits for each individual. It may be that female strategies affect the use of forced copulation, for example, when females were not aggressive.

Forced copulation has been found to be prevalent in purple martins, green-winged teal, and the lesser scaup. A form of 'gang rape' occurs in purple martins (Brown, 1978). Usually 2-6 males chase a female and then attempt to copulate with her. The female's mate attempts to drive off the attackers. These chases are often violent with fighting among the gang members. In green-winged teal (McKinney & Stolen, 1982), it was found that males assessed the reproductive condition of females and would selectively attempt to copulate with them when they were in the laying or pre-laying condition. In addition, they found that females who experienced a forced copulation were then copulated with by their mate forcefully. This is similar to the finding of Barash (1977) in mallards. Forced copulation has been found to be prevalent in the lesser scaup (Afton, 1985). Forced copulation has evolved as a fertilisation strategy as males directed attempts toward females who were fertilisable. The actual and attempted forced copulations observed were the highest for any wild waterfowl species.

Mallards pair bond but forced copulation is common. When a female has been forcefully copulated with, her mate can both defend her and chase the attackers away or he can copulate with her immediately following the attack. Barash (1977) found that the outcome would depend on the costs and benefits of the situation. When there is a single attacker the mate is more likely to chase him away than if there were several attackers. The mate is more likely to forcefully copulate with the female if there was a successful copulation by the attacker than if not and they are more likely to copulate with their mate within 10 minutes of the original attack. According to Barash (1977), forced copulation by the mate, after an attack, is a reproductive strategy of mallards when they cannot successfully chase the attackers away. This copulation by the mate will increase sperm competition and so may increase the reproductive success of the mate.

Forced copulations in mallards may occur at certain times in order to decrease sperm competition (Cheng, Burns & McKinney, 1983). Forced copulation in mallards occurs in

the morning after females have left the nests after egg laying. Cheng *et al* (1983) found that an insemination occurring 6 hours after a previous one led to more reproduction from the second insemination. There was also a higher percentage of fertilised eggs if the forced copulation took place less than 1 hour after egg laying, than if it took place more than an hour after egg laying. The authors concluded that forced copulation in the morning increases the reproductive success of the male.

Forced copulation has been observed in the lesser snow goose (Mineau & Cooke, 1981). The researchers suggested that in a long-lived species such as these the yearly chance of a male obtaining reproductive success might not be high in order for the behaviour to become predominant in the species. They propose that forced copulation is part of the overall reproductive strategy of the male lesser snow goose. Extra-pair copulations in the lesser snow and Ross' geese all appear to be forced (Dunn, Afton, Gloutney & Alisauskas, 1999). However extra-pair paternity is low, the authors concluded that forced copulations are a relatively inefficient reproductive tactic as most reproductive success is accrued to the mated male. Although they may result in a reproductive advantage for some males as a small percentage of offspring do result from the forced copulations (2-5%).

It would seem that forced copulations are prevalent among birds particularly waterfowl. The majority of forced copulations in waterfowl occur as an extra-pair copulation, which would suggest that there was an excess of males in the population (a high gender ratio). In guppies there was also more forced copulation in a high gender ratio environment (Evans & Magurran, 1999) whereas there were more forced copulation in a low gender ratio for damselflies (Cordero, 1999). It would seem that the gender ratio affects the occurrence of forced copulations in these species. Guttentag & Secord (1983) suggested that in a high gender ratio society of humans, females are guarded by their mates and the rape of a married woman is severely punished. Mallards also guard their mates and attempt to prevent a forced copulation. This may be the result of the environment's gender ratio.

4.4) Non-Primate Mammals

Forced copulation has been observed in non-primate mammals, e.g. dogs and zebras. Ghosh, Choudhuri & Pal (1984) found that in stray dogs, dominant and physically powerful males forcibly mount females. These forced copulations occurred more with novice females than those who were sexually experienced. This may be because females who were more sexually experienced possessed more counter-strategies and could successfully deter a forceful male, for example by being aggressive towards him.

In captive plains zebra, forced copulation has been proposed as the cause of abortions (Pluhacek & Bartos, 2000). Here male stallions were introduced to a new herd and abortions occurred in the females. The authors suggest that one possible cause of the abortion was forced copulation. Evidence for induced abortion by forced copulation in horses comes from Berger (1983). He found that in wild horses 80% of abortions were due to forced copulation. This suggests that forced copulation is a reproductive strategy as the female is then ready to conceive the new male's offspring.

The introduction of new males into a herd may have similarities to step-parenting in humans. Step-children are more at risk of homicide than biological children (Daly & Wilson, 1988) and the rape of partners is more prevalent when there is domestic violence (Mahoney & Williams, 1998). This would suggest that the function of forced copulation in horses is different to that in humans. One function in horses is to induce abortion, whereas in human partnerships the main function of rape is to control the partner, this coincides with other mate-guarding methods.

4.5) Primates

Smuts & Smuts (1993) define sexual coercion as use by a male of force, or threat of force, that will then increase the chance that a female will mate with him, and that she is less likely to mate with other males. In species where there is polygyny there is more likely to be more sexual coercion than where there is monogamy or polyandry because of the male-

male competition. The Smuts (1993) gave examples of male sexual coercion in rhesus monkeys, orang-utans, chimpanzees, gorillas, and spider monkeys. Smuts & Smuts (1993) suggested that the significance of sexual coercion has not been widely recognised and it should be considered as the third form of sexual selection.

Sexual coercion in animal societies has been examined by Clutton-Brock & Parker (1995). They noted three forms of sexual coercion:

1) Forced copulation - the physical restraint of a female while the male copulates with her;
2) Harassment - repeated attempts to copulate by males has costs to the females, which results in the females mating immediately; and
3) Intimidation - the punishment of females who refuse to mate.

Forced copulation has been demonstrated in a number of different species where the male would pursue the female. Clutton-Brock & Parker (1995) identify forced copulation in orang-utans, birds, and insects. Forced copulation creates sexual conflict and thus the beginning of an evolutionary arms race. Harassment can induce costs to both genders, namely loss of feeding time, energy expenditure and risk of predation. Where males are larger than the females, it will have a greater effect on the females. They provide many examples of animals where punishment is part of the mating regime, notably, deer, baboons, chimpanzees, and some birds. In both macaque and gorilla populations that were aggressive, the females learned to present themselves for copulation to the more aggressive males, which then reduced the physical attacks on them. It seems that harassment can lead to the development of dominant males providing protection for exclusive copulation rights, females preferring to mate with aggressive males when they cannot escape, the formation of female coalitions, and sexual dimorphism between males and females.

Nadler (1988) reported sexual aggression in chimpanzees, orang-utans, and gorillas. He noted that sexual aggression is rare among mature great apes, but it does occur. He suggested that some degree of male aggression is inherent in the typical mating pattern of chimpanzees. Gorillas, where sexual aggression is rare, use an aggressive form of display occasionally, where the female then presents for copulation. Nadler (1988) suggested that here an aggressive act is used to alert the female to his intentions. In orang-utans forced copulations are common by sub-adult males, adult males are more likely to copulate

cooperatively. Nadler (1988) suggested that this is because they are larger and cannot catch the younger smaller females. It is proposed that the high forced copulation rate may be related to orang-utans' family structure. They live with their mother and no other siblings, unlike other apes that live communally. Therefore, they have no other apes to learn how to behave socially with. Nadler (1988) concluded that sexual aggression is carried out by male apes (to some degree), which suggests that sexual aggression is an inherent characteristic of great apes.

Orang-utans have been noted for their high incidence of forced copulation. Galdikas (1985) found that sub-adult males copulated forcefully the majority of the time. They would often find receptive females but would then be usurped by an adult male. Galdikas (1985) concluded that sub-adult males use sneak/rape and consort tactics, with sneak/rape as reproductive strategies. The operational gender ratio of orang-utans is biased towards males (Fox, 2001). Female orang-utans often sought protection from adult males in order to avoid forced copulation from sub-adult males. They did not necessarily mate with the adult male, which led Fox (2001) to suggest that although this association did provide opportunities for mating it also served a protective function for the female. Crawford & Galdikas (1986) examined the evidence of orang-utan forced copulations. They found that adult males did not generally force copulation, most resisted matings occurred within the first few minutes of the pair meeting, and that half of the copulations were incomplete in that ejaculation did not occur. They suggested that forced copulation is a *"best of a bad situation tactic"*. As sub-adults are smaller than adults, they cannot maintain associations with females for long as they are often ousted by larger adults.

Human sexual offending could be linked to paleopsychology. Male primates display erections and Maletsky (1995) points out that exhibitionism is the most common sexual crime in humans. Non-dominant apes copulate with juvenile females, but paedophilia is criminalized within human society. Maletsky (1995) suggested that incest avoidance reduces the amount of paedophilia that is demonstrated within humans.

Forced copulation varies amongst primates, with it being common among chimpanzees and orang-utans but rare among gorillas. Orang-utans live in a high gender ratio environment similar to guppies and mallards. This may explain the high occurrence of forced

copulation, i.e. females are scarce whereas there are a large number of males. Guttentag & Secord (1983) note that in a human high gender ratio population rape would be severely penalised and men would guard their mates in order to eradicate extra-pair copulations. This is similar to the orang-utans where a female may seek protection from a larger male. It would seem that sexual offending is as prevalent among non-human primates as it is among humans.

5) Theories of Rape

5.1) Social Learning Theory of Rape

Ellis (1989) has summarised the social learning perspective of rape as "aggressive behaviour towards women learned through four interrelated processes:

a) The *modelling effect - by imitating rape scenes and other acts of violence toward women, as one may see in real life or as depicted in the mass media,*
b) *The sex-violence linkage effect - by associating sexuality and violence, as when viewing sex and violence repeatedly depicted in the same context,*
c) *The "rape myth" effect - by perpetuating various "rape myths", such as "No means Yes," and "Women secretly desire to be raped" and,*
d) *The desensitisation effect - by desensitising viewers to the pain, fear and humiliation of sexual aggression".*

There are similarities between the social learning and feminist theories. Both see social and cultural learning as responsible for rape, both identify features of modern culture which encourage men to exploit women sexually, which in turn leads to rape, and finally both ignore or resist any suggestion that non-learning, extra-cultural or biological manifestations may be responsible for the occurrence of rape by some men (Ellis, 1989). Perhaps it is important to note that the main difference between the feminist and social learning theories is the role politics play. Feminism attributes rape to the desire for male dominance by all

men, with this being occasioned through the political and monetary power that they have acquired through the centuries. Social learning theorists view it as an immediate learning process, which has occurred regardless of any political agenda. In addition, social learning theorists are more accepting of the role sex plays in rape. They relate cultural traditions to aggression and sexuality learning to sexual assault (Ellis, 1989). Ellis (1989) concluded by saying that social learning theory is a blend of instrumental aggression and the feminist theory.

It has been argued that since sexual coercion is a social phenomenon, it cannot be separated from the social-cultural context (Burkhart & Fromuth, 1991). The factors important to the development of sexually coercive behaviour have been divided into three areas by Burkhart & Fromuth (1991). They suggest that gender socialisation is the foundation for sexual coercion. As children are socialised into their gender roles, rape supportive attitudes and interaction patterns, which contribute to the acceptance of sexual aggression, are learnt. The second area was sexually coercive cognitive schemas and beliefs. These are the beliefs, attitudes and information-processing heuristics which act as catalysts for sexual coercion. The third area was social-sexual interaction scripts. The expectations from the sexual script can increase the chance of sexual coercion when linked to the different expectations between male and females. Burkhart & Fromuth (1991) conclude by predicting that it is the norms and expectations of heterosexual interactions, which influence sexually coercive situations.

O'Toole (1997) suggested that there is a subculture of rape. There is a violent subculture, where there are boundaries and norms, which are different from those of the larger culture. In particular, she noted that there might be a fraternity subculture and a sports subculture: here rape is considered normal and part of the culture.

Being motivated by power has been related to sexual aggression (Zurbriggen, 2000). Power was defined as a concern with having an impact on other people or the world in general. Therefore, those who believe that power is an important social factor are also more likely to be sexually aggressive.

A substantive cross-cultural study on rape has found that rape is part of a culture that includes interpersonal violence, male dominance, and sexual separation (Sanday, 1981). A rape-prone society was defined as one where the incidence of rape is high, rape is a ceremonial act, or rape is used as punishment, whereas a rape-free society was defined as where the act of rape was infrequent or does not occur. It is suggested that men might be biologically capable of rape but the act is encoded culturally. A criticism of this study and therefore its conclusion is that rape-free societies were not necessarily rape-free: for example the author admitted that it may be where rape was rare; of course it may also be that rape occurred but it was just condoned and ignored.

5.2) Feminist Theories of Rape

There are several types of feminism (Beasley, 1999). One is liberal feminism where women in society are seen as having unequal rights and artificial barriers that stop them from participating in the public world. Another type is radical feminism, here women are considered oppressed by the patriarchal society that we live in. Another type is Marxist/socialist feminism. Here the oppression of women is seen as a dimension of class power. Much of the research concerning rape has developed from radical feminists such as Brownmiller (1975). Rape is the result of social traditions that have allowed men to dominate all the important political and economic activity of the social group (Ellis, 1989). It is suggested that rape is the use of sexuality to establish and maintain dominance over women by men.

It is generally agreed that there are fundamental differences between men and women. Feminists suggest that these differences have been arrived at through the development of a patriarchal society, where the subordination of women and the elevation of men is the norm. Often the differences and conflict between men and women are in some way connected to sex or a way to control sexuality. For example, Buss (1996) has noted a number of differences between men and women:

1) Men tend to control resources and power world-wide;
2) Men often control women through resources;

3) Men's control of women often centres on their sexuality and reproduction;
4) Men's sexual aggression circumvents women's choice;
5) Some men think of women as property to be owned and used: and
6) Women as well as men, often participate in perpetuating oppression.

There are some general gender differences between men and women, which can be identified to highlight the feminist view of dominance and power that men have over women. Hyde (1996) has considered several types of gender differences but most importantly aggression and sexuality. Aggression is probably an area where gender differences would be expected. Hyde (1996) found a moderate difference between genders, with males being more aggressive. Feminism would suggest that gender roles and socialisation were the causes behind the difference, i.e. males are socialised into the male role and females into the female role (Hyde, 1996). Finally, the largest difference between the genders concerned sexual behaviour and sexuality. It was found that males partook in masturbation significantly more than women, and that they had more liberal attitudes to casual sex. Hyde (1996) argues that these differences can lead to conflict in a sexual encounter, for example men being more capable of an orgasm with women feeling frustrated, and men wanting sex more readily than women. In extreme cases, she posits that this could lead to date rape.

One feminist theory that is pertinent to this discussion is Social Dominance Orientation theory (Pratto, 1996). This is the *"degree of preference for one's own group to dominate other groups"*. Pratto (1996) suggested that in societies where male dominance is the norm then it would be expected that men would be more socially dominant than women. She considered this the reason behind gender differences of political attitudes. Pratto (1996) explained the effect of social dominance orientated males on their mating strategies. She suggests that men who monopolise status resources, derogate out-group males, and assist political alliances which then restrict females' power, may increase their reproductive success. Therefore, the gender difference in social dominance orientation may be due to sexual selection pressures (Pratto, 1996).

The incidence of sexual assault has often been linked to the use of alcohol. Abbey, Ross, McDuffie & McAuslan (1996) have investigated the misperceptions that occur between the

genders when there is any alcohol involved. Feminists perceive rape to be an act of aggression, with rape being the extreme of one end of a continuum of sexually coercive behaviours, and that the cause of rape results from society and the perpetrators, but not the victims (Abbey *et al*, 1996). A review of the research area has revealed that the intake of alcohol increases women's sense of responsibility if they are sexually assaulted whereas it decreases a man's sense of responsibility. This highlights the disparities between men and women, especially when it comes to sex and sexuality.

One feminist view of rape is that it is primarily used as a method by all men to dominate and intimidate all women. Brownmiller (1975) conceded that this resulted from a basic anatomical difference between men and women, *"Man's structural capacity to rape and woman's corresponding structural vulnerability are as basic to the physiology of both our sexes as the primal act of sex itself"*. She suggested that it is this difference which has then shaped the way men perceive women and how women perceive themselves: *"Man's discovery that his genitalia could serve as a weapon to generate fear must rank as one of the most important discoveries of prehistoric times,...It is nothing more or less than a conscious process of intimidation by which* ***all*** *men keep* ***all*** *women in a state of fear"* (Author's emphasis). An example of this can be seen in Egyptian law where before 1999 a man could avoid a conviction of rape if he married his victim. In a country where virginity at marriage is of paramount importance, then this was often seen as the only choice for the victim (Eltahawy, 1999). This is similar to the practice of kidnapping females in Ethiopia to become the abductors bride (Getahun, 2001).

It seems therefore that Brownmiller's (1975) assertions may need quantifying. Are all women in a state of fear? Bohner & Schwarz (1996) have attempted to quantify the fear that women feel living in a rape-prone society. They assessed women's self-esteem, their trust in others, and their perception of personal control. They found that the feeling of being threatened with rape is associated with the behavioural restrictions that women place on their lives. Although there were flaws with their study they came to the conclusion that women either blamed the victim and therefore felt less threatened and in control, or they perceived the victim as blameless, but live in constant fear from the threat of rape. This therefore suggests that there are other variables reducing the fear that Brownmiller (1975) proposed was prevalent in *all* women.

Perhaps one of the most highly debated and controversial questions surrounding rape is whether it is sex or violence. Feminist writers argue (e.g. Brownmiller) that rape is violence exhibited through a sexual act. This argument focuses on the perpetuation of rape myths and a patriarchal society. Muehlenhard, Danoff-Burg & Powch (1996) have suggested that even men who do not rape may benefit from patriarchy by having access to opportunities which women are afraid to pursue. They suggested that considering rape as sex could have a detrimental effect for victims and all women. In contrast, Muehlenhard *et al* (1996) posit that this can be a problem where a rape has occurred with very little violence. They proposed a compromise where rape is considered as sex and violence, with these concepts being socially constructed. This would therefore include sexual experiences where it felt like sex with very little violence. Muehlenhard *et al* (1996) suggested that the concept at issue is really one of control, for example, was the victim not in control of the sexual situation, and did the rapist control the victim's behaviour. They suggested that by definition the victim is not in control whereas the rapist is and so therefore, where this occurs a sexual offence has been committed. They defined sexual coercion in terms of whether someone had freely consented to the sexual activity. Although this may be more suitable and more socially acceptable, it would be very difficult to prove in a court of law, retribution would be difficult, which may then lead to an increase in the behaviour due to the lack of public retribution.

The rape of women has been suggested as a method that all men use to keep all women in their place (Brownmiller, 1975). This may explain why rape is prevalent in war. Brownmiller (1975) has estimated high numbers of rapes occurring in the First and Second World Wars, by all sides. Rape during war in the nineties was as prevalent (Guinan, 1993). It has been suggested that it was used as a strategy by each side, in particular the Bosnia and Serbian war. It was considered that rape was a by-product of the stresses and strains of war. However the reports of rape camps and the keeping of women until they are impregnated would appear to indicate that rape is more an instrument of war and should be considered a War Crime (Guinan, 1993). Similar accounts have been noted by Beevor (2002) of German women being raped by the Russian army after the Second World War. He notes how they raped children as young as eight and women as old as 80. It would

seem that the Russian army were indiscriminate. Rape during war is committed by the side with the greatest power.

5.3) Physiological Theories of Rape

Physiological theories of rape are relatively rare (most include an evolutionary analysis which will be addressed section 5.4). Research has focused on criminal behaviour in general and has attempted to identify biological mechanisms, which contribute to the exhibition of anti-social behaviour. For example, Ellis (1991) has reviewed the relationship between monoamine oxidase (MAO) and brain functioning, and thus behaviour. It was found that low MAO is related to a variety of behaviours including criminality and psychopathy. In addition, men have lower MAO than women and Blacks lower than Whites.

Ellis (1989; 1991) has suggested that a more pertinent approach to rape is to incorporate biological mechanisms and social learning theory. He proposed that a combination of social learning and biology could explain the prevalence of rape, which he described as the 'synthesised' theory of rape. This theory has provided several propositions about rape. Firstly, the sex drive and a drive to possess and control motivate rape. He supports this with the following examples:

1) Rape has historically (and is presently, e.g. rural Ethiopia) been seen as a property offence in many societies;
2) Similar to other mammals, rapists occasionally urinate on their victims;
3) There is a higher risk of rape where the male always pays for the dates; and
4) Finally rape can have such an effect on the victim it creates a bonding response to the offender, which then reinforces the behaviour, e.g. the victim may continue a relationship with the offender. (Particularly in the case of rape by an acquaintance or intimate.)

The second proposition was that the behaviour associated with rape was learnt through operant conditioning. If rape was not reinforced as either a satiation of the sex drive or a method of controlling then it would have disappeared from the repertoire of sexual

behaviours common to man. The third proposition was that males have stronger sex drives and will try to copulate with many females, whereas women are more likely to wait until there is a long-term partner available. The final proposition was that the level of androgens in the male brain would affect their motivation and tendency to rape. This can either be in the hypothalamic-limbic system which controls hyper-sexuality and extreme possessiveness, or it could be a result of the reticular formation functioning pattern which means they can tolerate higher levels of aversive stimuli, so in the case of rape the suffering of the victim and societal penalties would have no bearing on them.

Ellis has depicted the synthesised theory as a graph for both men and women (1989; pp.82.). This compares the level of the drive for sex and drive to possess and control by the hypothetical number of the population, with a threshold for the use of forced copulatory methods. From this it can be predicted that 40% of males and 1-2% of females would use force in order to obtain sex (although this only applies to the US population as it was based on data obtained in the US).

5.4) Evolutionary Theories of Rape

There are different types of sexual strategies, which they are categorised as either short- or long-term. Short-term mating strategies include 'one night stands' and prostitution. Long-term mating strategies include marriage and cohabitation. Rape is therefore considered a short-term mating strategy. However, it may be that stranger rape is a short-term strategy but rape may also be incorporated into the long-term strategy of marriage.

Smuts (1992a) has noted that, in research conducted on various societies, male aggression (physical and sexual) towards females is a common occurrence. She has defined male sexual coercion as *"male use of force, or its threat, to increase the chances that a female will mate with the aggressor or to decrease the chances that she will mate with a rival, at some cost to the female"*. The development of pair-bonds within the human species is an anomaly amongst primates, and brings with it its own problems. The amount of aggression that any given female will experience is dependent on her social circumstances. It was

expected that there would be more male aggression where female alliances are weak, wives lack support from natal kin, where the strength of male alliances is important, where male relationships are less egalitarian, and where males control more of the resources (Smuts, 1992a). Figueredo, Corral-Verdugo, Frias-Armenta, Bachar, White, McNeill, Kirsner & del Pilar Castell-Ruiz (2001) found that men perpetrated spousal abuse when males had a high local kin density of male relatives, high family support, high family socio-economic status, and high personal honour. Women were found to experience spousal abuse when their kin density, family support, socio-economic status and personal honour were low, which supports the hypothesis of Smuts (1992a).

The control of female sexuality is not just exhibited in overtly aggressive behaviour but also in the sexual conflict that results between the genders. This 'battle of the sexes' (Buss, 1996) may result from the different problems that each gender needs to solve when pursuing a short- or long-term mating strategy – sexual strategies theory (Buss & Schmitt, 1993). Men need to resolve four problems when following a short-term strategy:

1) Partner number;
2) Identifying which women are sexually accessible;
3) Minimising cost, risk and commitment; and
4) Fertility.

Women need to resolve four problems when pursuing a short-term strategy. These are different to those for men:

1) Immediate resource extraction;
2) Evaluation of short-term mates as possible long-term mates;
3) Gene quality; and
4) Mate switching, mate expulsion, or mate backup.

It would seem that in a short-term mating strategy men need to pursue a high number of women who are fertile, which results in very little effort from the man. Women though are looking for a man with good genes with resources who may become a long-term mate. These differences may lead to conflict between the two genders as although both are pursuing a short-term strategy they have different agendas.

The problems that men need to resolve for long-term mating are different to those for short-term mating:

1) Paternity confidence;
2) Female reproductive value;
3) Commitment;
4) Good parenting skills; and
5) Gene quality.

For women there are slightly more problems that need resolving for long-term mating:

1) Identifying men who are able to invest;
2) Identifying men who are willing to invest;
3) Physical protection;
4) Commitment;
5) Good parenting skills; and
6) Gene quality.

Here there are more similarities in the problems that both genders need to solve. Therefore, when both genders are pursuing a long-term strategy then there is less likelihood of conflict as they are more compatible.

Buss (1998) has noted that according to sexual strategies theory:

1) Men and women have evolved a repertoire of strategies consisting of both short- and long-term strategies;
2) Different adaptive problems need to be solved when pursuing short- and long-term strategies;
3) Men devoted more time to short-term mating effort than women do; and
4) Different contexts determine which strategy is used.

If a man was pursuing a short-term mating whilst the female was pursuing a long-term strategy then this may lead to conflict as the male and female are not compatible. For example, the short-term male may use deception in order to mate with the female who wanted a long-term partnership. The same would apply if a man were pursuing a long-term strategy whilst the female was also following a short-term strategy. For example, where the female has an extra-pair copulation.

These differences may then lead to the friction between men and women, in particular when to embark on a sexual relationship. One reason for a large amount of conflict is that the most 'desirable' females are often the least available (Buss, 1994): so several men lose

out. This then results in them trying to use other methods to obtain the most desirable mates, e.g. rape, deception, or possibly status.

Although many scholars take the stance that rape is devoid of a sexual motive (e.g. Brownmiller), Symons (1979) posits that *"surely no completed rape has ever occurred in which the rapist did not experience some sexual feeling, and very likely no rape has ever occurred in which this was the only feeling the rapist experienced"*. This contradicts the feminist point of view. He suggested that there is a resistance to seeing the sexual component of rape because:

1) It is believed that sex is good and rape is bad; anything else would produce cognitive dissonance;
2) There is a fear of condoning it, as lust is less easily controlled the rapist may then not be held accountable for his actions;
3) As women do not have similar sexual feelings, they find it hard to understand why a man would want to rape;
4) Functionalist statements remain acceptable even though they have been criticised; and
5) Rape has been used as a punishment but this does not deny the sexual component: women are seen as a commodity that men want.

Sexual offending in general has been examined by Quinsey & Lalumiere (1995). According to these researchers, the sexuality of humans has been shaped by its relationship to reproductive success in the ancestral environment. Sexual coercion is a continuum ranging from deceptive tactics by intimates to predatory attacks by strangers. Males are generally attracted to females of high reproductive value, which tends to be between late teens and late twenties. Males have been adapted to respond to signs, which represent this value, i.e. gender, youthfulness, body shape, no genetic abnormalities.

Within the evolutionary literature it has been debated as to whether rape is an adaptive strategy, or whether it was a by-product of other mechanisms. Thornhill & Palmer (2000) have recently attempted to address this debate, but have not found conclusive evidence for either proposition.

5.4.1) Adaptive Hypothesis

Thornhill & Thornhill (1983) made several predictions about rape based on the evolutionary view that it is an adaptive mechanism. In particular, they proposed that rape was a strategy used when men are unable to compete for resources and status (which would have aided their attraction to females). The reproductive benefits of rape would outweigh the costs when there was no alternative. This view highlights the sexual component of rape. They interpreted the sexual aspect as part of the desire by men to control the sexuality of women in order to increase paternity certainty (Thornhill & Thornhill, 1991b). In addition, the Thornhills (1983) predicted that socially successful men would rarely incorporate rape into their repertoire, as the costs would usually outweigh the benefits.

There are three different kinds of reproductive strategies (Gross, 1996): alternative, mixed, and conditional. An alternative strategy is the evolution of two or more strategies that have equal fitness. These are very rare within nature. A mixed strategy is one strategy that has alternative tactics. There are no documented cases of these in nature. A conditional strategy is one strategy with alternative tactics. There are hundreds of examples of these in nature. Gross (1996) concluded that the conditional strategy is the most common. Thornhill & Thornhill (1983) suggest that if rape were adaptive then it would be a conditional mating strategy.

The definition of rape used by the Thornhills (1983) was based on an evolutionary perspective rather than a social one: *"rape is forced copulation of a female by a male"*. Forced copulation they explained was copulation without the female's explicit or implicit consent. Forced copulation according to the Thornhills (1983) does not necessarily involve physical force. They made several predictions about characteristics of a rape offence, which if supported would indicate the adaptiveness of rape.

- The first prediction was that victims of rape would be clustered around the age group, which exhibited peak fertility. All men would be expected to value females who are young and fertile. However, those pursuing a short-term strategy would be expected to be attracted to females who were currently fertile, whereas those pursuing a long-term strategy would be attracted to those who would be fertile in

the future (see the section 5.4.4 on Fertility and Reproductive Value). The Thornhills (1983) found little support for this prediction as fertility and reproductive values were significantly different from the distribution of rape rates.

- The second prediction was that men would be most likely to rape when male competition for females is most intense. This would be between the ages of puberty and first marriage. The Thornhills (1983) found that rape offenders were significantly younger than the male population. There is the perception by young men that risky behaviour is of low cost, which might explain why they are more likely to rape (Thornhill & Thornhill, 1991b). This would involve rape being a by-product of a general mechanism that increases risk-taking behaviour.
- The third prediction was that low status men would rape more often than high status men. It was presumed that high status men would not need to use force. The Thornhills (1983) provided evidence that men usually rape within their own areas and high status women rarely report being raped. The Thornhills (1983) concluded that high status men rape infrequently. However, it may be the case that the reporting of rape by high status men is rare.
- The fourth prediction was that rape offenders would feel social subordination as part of their personality. The Thornhills (1983) provided evidence that rape offenders have low self-esteem and poor social relationships.
- The next prediction was that those who rape non-reproductive victims would demonstrate a degree of psychotic mentality.
- Rapists would be more likely to not have any sisters because it was predicted that non-rapists would be able to increase their reproductive success through their sisters. If rapists do have sisters then they would not have any nieces or nephews. This is expected to be prominent in men who continue to rape late in life.
- Finally, rape offenders should be more slow to develop than the normal population as a slower development would allow less competitive males to acquire size and skills that will increase their competitiveness. There was no evidence provided by the Thornhills (1983) for these last predictions.

Overall, the Thornhills (1983; 1987; 1991; and Thornhill & Palmer, 2000) propose that the human male reproductive strategy is a repertoire of condition-dependent behavioural alternatives that may be used constantly or rarely.

Shields & Shields (1983) have suggested a perspective, which incorporated an evolutionary path but highlighted violence as the primary function behind rape, rather than sex. They proposed a general model of mating strategies. The first was honest courtship: if a male has good genes, resources, and will invest parenting time, then he might use this strategy. The second was deceitful courtship, here a male will try to deceive the female into believing he will invest, has good genes, and/or resources. The final tactic was forcible rape, this is used where the female rejects the male and he has neither the honest signals nor the deceptive ability. This would suggest that males possess either one, two, or all three tactics. Shields & Shields (1983) suggested that those who use all three would be the most reproductively successful. The potential costs and benefits would be different for each tactic. Unique to humans is the fact that costs can be both immediate and retributive. Shields & Shields (1983) proposed that all men are potential rapists, as they all possess the conditional mating strategy, which includes rape. They noted that for rape to have evolved there would only need to be the occasional ultimate benefit of pregnancy.

The Shields (1983) made several predictions about the evolutionary possibility of rape.

- The first was that being a victim of rape would alter as a function of their age. In particular, those who are capable of conception and full term pregnancy would be over represented. Evidence for this comes from the prevalence of young females amongst rape victims.
- The second prediction was that where there was high male hostility and high female vulnerability there would be an increase in the number of rapes perpetrated. The Shields (1983) gave the example of war, where regardless of its scale (e.g. tribal to world war) there is always a major increase in the number of rapes that occur.
- The next prediction was that the probability of rape would be high when women are vulnerable even if male hostility is variable. Examples are feudalism and slavery, here women were owned by their masters or subjected to the rule of the Lord, and their partners had no control over their sexuality or retributive power. This would suggest that rape in humans is not the domain of the poor and lower status males.
- The fourth prediction was that under peacetime, where hostility and vulnerability are variable, rape is considered a crime by most societies. This is the opposite to

what the Thornhills (1983) predicted where the crime of rape was linked to the mating system of the society, e.g. monogamous – heavy fine; highly polygynous – death.

- The next prediction was that where hostility is variable and vulnerability low then rape would be absent or at least at its lowest. Low vulnerability results from immediate costs, such as the female being capable of harming the offender, and retributive costs, such as the protection by kin.
- In addition, it was predicted that kinship would have an effect on rape. The more related a female was to the male then the less likely he would be to rape her due to his self-restraint. This has been enforced and controlled by the greater punishment of incest than rape in certain societies.

Shields & Shields (1983) predicted that the only way to minimise the frequency of rape would be to increase the punishment.

Thornhill & Thornhill (1992) noted that all reproductive strategies consist of mating effort and nepotistic effort. They suggested several reasons why rape was adaptive for ancestral males:

1) There is evidence that certain masculine traits have evolved: such as being aroused by visual stimuli and inferring sexual interest when there is none;
2) Sexual arousal for men will not be dependent on the sexual interest of a mate as there will have been women in the ancestral past who were uninterested and resisted the advances of males; and
3) The retributive costs of rape from the victim and her kin should have meant that the behaviour was maladaptive and should have been selected against: as it is not then the Thornhills (1992) suggest that it must be adaptive.

Thornhill & Thornhill (1992) advanced the theory of rape by examining in detail six testable predictions (some of which were based on their 1983 paper):

- The first prediction the Thornhills (1992) made was that men would exhibit high levels of sexual motivation and performance in both coercive and non-coercive mating situations. They suggested that men use both coercive and non-coercive behaviours frequently. For instance, homosexual rape is often perpetrated by

heterosexual men. Convicted offenders are often married but have raped another woman. Many men use coercive and non-coercive methods with their mates and the literature on 'date' rape suggested an abundance of coercive strategies.

- The second prediction was that gaining physical control over an unwilling partner should be sexually arousing. The Thornhills (1992) provided evidence that in laboratory studies, men are similarly aroused to both consensual and coercive sex.
- The third prediction was that a man's age should affect his use of sexual coercion. It would be expected that young men (teens - mid twenties) would demonstrate the highest degree of male competition and may thus lose out. In general, according to the Thornhills (1992) young men are over-represented as rape offenders.
- The fourth prediction was that the use of sexual coercion would relate to the offender's social status. The Thornhills (1992) provided evidence that men of low socio-economic status are convicted of rape more than higher status men.
- The fifth prediction was that sexual coerciveness would be sensitive to detection and negative social consequences, e.g. punishment. The increase of rape in war would support this prediction, as well as the abundance of rape in Western societies. The Thornhills (1992) suggested this to be the result of anonymity, which these circumstances provide.
- The sixth prediction was that a pair-bonded man would use sexual coercion if he suspected infidelity. The rape of a long-term partner is most likely to happen during or after the breakdown of the relationship (Mahoney & Williams, 1998).

The Thornhills (1992) concluded that the evidence supported the adaptive hypothesis but does not exclude the possibility of rape as a by-product. They predicted that there are other costs, which have not been investigated yet. These are the social power of the victim's family, the probability of punishment, and the age of the victim, i.e. being able to assess the reproductive and fertility values correctly (see the section 5.4.4 on Fertility and Reproductive Value). It should be noted that the Thornhills (1992) use sexual coercion and rape as synonymous in their paper.

There have been several comments and criticisms of the Thornhills (1992):

- A criticism by Archer (1992) was that the Thornhills assumed that rape is a conditional mating strategy: this has not been 'proved' as yet and it could quite

possibly be an alternative strategy used when another one does not work. In addition, according to Archer (1992), the paper failed to take account of female counterstrategies in rape: for example, sperm competition where the female ejects semen after intercourse more when there is no female orgasm.

- The Thornhills (1992) suggested that rape was the product of fixed or invariant genes, and would not vary in different genetic conditions. Bixler (1992) and Ghiselin (1992) criticised this as it does not take into account the basics of genetic theory, i.e. a genetic pattern can alter as the result of selection and mutation.
- An important point by Brownmiller & Mehrhof (1992) was the synonymous use of sexual coercion and rape. Although sexual coercion can be construed as similar, it does not involve the force that most would agree rape does.
- Figueredo (1992) suggested that if rape were adaptive then surely sexual arousal to coerced stimuli would be more stimulating: the Thornhills (1992) failed to show this. In addition, Figueredo (1992) suggested that there may be a more complex array of coercive and non-coercive mating strategies, rather than just the continuum that the Thornhills (1992) proposed. Malamuth (1992) also questioned the Thornhills (1992) continuum hypothesis and its development into an adaptation to rape, as selection would have inhibited the male's sexual arousal if the costs were more than the benefits. Palmer (1992) pointed out that if sexual coercion was a continuum then there would be no way to test the predictions of an adaptive hypothesis, as rape would not be a distinct adaptive behaviour.
- Smuts (1992b) made four criticisms of the Thornhills' (1992) paper. The first concerned the definition of sexual coercion (as above). The second was that individual differences that affect the development of adaptations were ignored. The third was that the data they considered was based on a biased sample. The final criticism was that they did not use a comparative method. In order to understand which adaptations and mechanisms were evolving in ancestral humans she suggested that you should consider other species and primitive societies.
- Mealey (1992) suggested that sexual coercion is best explained within the context of other sexual strategies: although still adaptive, rape would not be an adaptation on its own. She suggested that sexual coercion, sexual persuasion, and rape are

integrated in their development and emerge from a more general adaptation (e.g. emotion).

These criticisms question the evidence that rape is an adaptive mechanism as proposed by the Thornhills (1992). Empirical testing of the adaptive hypothesis would therefore need to take these criticisms into consideration.

Smith, Borgerhoff-Mulder & Hill (2001) have suggested that the examination of rape should really consider a costs-benefits analysis. Estimates of fitness costs and the benefits of rape should be calculated before rape can be considered a successful reproductive strategy. They estimated the likely costs and benefits in a human pre-industrial society and proposed that the benefits of rape would not have outweighed the costs. suggesting that it would not be an adaptive mechanism. (This however was the rape of a known victim and was not specific in the relationship.)

It would therefore seem that if rape was adaptive then there would be certain conditions fulfilled. These include those proposed by the Thornhills and the Shields, for example, victims of rape would have a high fertility, and offenders would have a low socio-economic status.

5.4.2) By-Product Hypothesis

Symons (1979) has discussed the relationship between sexual attractiveness and rape. He suggested that the average male perceives himself to be granted a favour by copulating with most women, whereas the average woman considers herself to be granting a favour to most males. Therefore, those males who are below average attractiveness and with whom no female would consider offering the favour of copulating, need to explore other avenues for copulation. These may include rape. In conclusion. Symons (1979) did not believe that there was enough evidence in 1979 to presume that rape is a facultative adaptation in human males.

The by-product hypothesis suggests that rape is a by-product of other adaptive mechanisms. for example aggression and promiscuity. Although most men may have the mechanisms to

exhibit rape, it only occurs when the relevant environmental conditions are apparent (Malamuth, 1996; 1997). Men may benefit more by using a variety of mating strategies. Malamuth's (1996) Confluence Model of sexual aggression suggested that there are two paths towards the exhibition of sexual aggression. These are the impersonal sex path and the hostile masculinity path; both are derived from the evolutionary approach, which emphasises sexuality and dominance/hostility mechanisms (as also stressed by the feminist literature) that are part of sexual aggression. The impersonal sex path is highlighted by a promiscuous sexual orientation, which tends to be unrestricted in its nature. The hostile masculinity path is the product of both an insecure, defensive, hypersensitive and hostile/distrustful orientation (towards women in particular) and gratification from controlling and/or dominating women. The characteristics of these paths can of course occur independently of one another. However, when they occur concurrently this is when the Confluence Model predicts that sexual aggression will transpire. The Confluence Model has been found to predict behaviour 10 years later (Malamuth, Linz, Heavey, Barnes & Acker, 1995). Malamuth (1996) concluded that sexual coercion might be reproductively successful under certain circumstances. Therefore, rape was a by-product of these two paths, assuming that each of these paths has adaptive consequences.

As the survival of a child conceived through rape would be compromised (due to a possible increase in miscarriage, abortion and infanticide) Malamuth & Heilmann (1998) predicted that the average male would only resort to rape when the possibility of being detected and punished is small, the costs are negligible compared to the benefits, and the reproductive benefit was higher where the rape is repeated. This was in contrast to the analysis conducted by Smith *et al* (2001) who suggested that as rape is a costly behaviour then the costs would always outweigh the benefits. Malamuth (1996; 1997) concluded that mating strategies are determined by early childhood experiences and either activate a mechanism for high quantity or high quality mate choice.

The adaptation/by-product debate has been examined by Palmer (1991). He has considered cross-species, cross-cultural, and modern societal data. If it were an adaptation, as Thornhill & Thornhill (1983) suggest, it would be used when the benefits outweigh the costs: Palmer (1991) cited evidence from scorpionflies and orang-utans in support of this. For instance, scorpionflies rape when they cannot obtain resources in order to attract

consenting mates, and sub-adult orang-utan males rape when they cannot compete with fully mature adult males. However, rape still occurs where this is not the case. Palmer (1991) has noted that interspecific rapes occur in some marine mammals, which would suggest that rape was a by-product as there are no reproductive benefits. According to Palmer (1991), cross-cultural data has not provided enough evidence for either the adaptive or by-product explanation. This is probably due to the methodological problems with these studies. Data for modern societies generally showed that victims are young females: this would support the adaptive and by-product hypotheses. To support the adaptation theory victims would have to be specifically of high fertility: this has yet to be found. Palmer (1991) cited evidence that would suggest that rape today is not reproductively successful. This is similar to the analysis by Smith *et al* (2001) who suggested that it is unlikely that the benefits of rape would outweigh the costs. Overall, Palmer (1991) found evidence that would support the adaptive and by-product hypothesis. Therefore, he did not conclude that rape was an adaptive mechanism or a by-product of other mechanisms.

5.4.3) Victims of Rape

Several predictions were made about victims of rape by Thornhill & Thornhill (1983).

- Firstly, a rape would have detrimental effects on the victim's relationship with their husband or boyfriend, particularly the husband. They provided evidence that sexual relations with partners did diminish after a rape.
- Secondly, victims of a non-reproductive age would have fewer adjustment problems than those of reproductive ages. Thornhill & Thornhill (1983) provided evidence that adults have more adjustment problems than adolescents or children.
- The third prediction was that adjustment by the victim would be affected more by their partner's belief in the situation, i.e. whether he believed she was raped, than the amount of violence experienced. The Thornhills (1983) found that victims who experienced more violence actually adjusted better. They suggested that this was because their partners would then believe the victim, as there was physical evidence that they were attacked.
- The fourth prediction was that victim adjustment would be most problematic if penetration occurred. The Thornhills (1983) cited evidence that supported this.

- The next was that adjustment would be problematic if the offender was of a lower social class than the victim. The Thornhills (1983) reported more suffering if the victim perceived the offender to be of a lower social standing.
- The next prediction was that unmarried women were more likely to report the rape than married women. It was found that more single women report rape than married women (Thornhill & Thornhill, 1983). Of course, this does not identify whether single women report more or are raped more.
- The seventh victim prediction was that those dependent on kin would report rape more than those married. The Thornhills (1983) found no evidence for this.
- The final prediction was that the victim fighting back would deter the rape offender, as this would increase the costs. The Thornhills (1983) suggested that there was evidence for this.

Reproductive aged women should find, in general, rape more traumatising than non-reproductive aged women, because they have an increased risk that the sexual act may lead to conception (Thornhill, 1996). The study by Thornhill & Thornhill in 1983 examined several predictions and considered existing data to support them. Later studies by the Thornhills (1990a; 1990b; 1990c; 1991) empirically assessed the predictions using a specific archival US database. It was found that reproductive aged women are more traumatised than older women or children (Thornhill & Thornhill, 1990a) and that married women were more affected than unmarried women. Although this is an interesting finding, it should be noted that methodologically victims were assessed five days after the attack and were not assessed for any long-term trauma that may have ensued.

The US database was then analysed with regard to the victim-offender relationship (Thornhill & Thornhill, 1990b). They found that most victims were attacked by strangers. Prereproductive-aged girls were more likely to be raped by family members. Attacks by strangers were deemed to be the most psychologically traumatising by the victims. It was found that rape by family members was not traumatising in comparison to other types. This does not support previous research (Culbertson & Dehle, 2001; Ullman & Siegal, 1993). However, the Thornhills (1990b) simply found no difference between the types and it cannot be concluded that it was not traumatising but merely that there was no difference.

In addition, there are criticisms of the way the data were collected: victims were assessed five days after the attack and for prereproductive-aged girls their mothers often answered the trauma questions. It would perhaps be more valid if victims were followed up at various time intervals past the rape, because some victims may be experiencing shock and deny their feelings about it.

In a third analysis of the same US database, Thornhill & Thornhill (1990c) found that reproductive aged women were more likely to be victims of force and/or violence than were older women or children. They also found that stranger rapes were more forceful than those by a friend or family member. They found that reproductive aged victims experienced more distress when subjected to violence than did those not violently attacked. This did not support the prediction originally made by the Thornhills (1983) that more violence would lead to less distress. There was no difference in distress of reproductive aged women raped by strangers, regardless of violence level.

The fourth analysis of the US database found that reproductive aged women were more likely to be victims of forced vaginal intercourse than non-reproductive aged women (Thornhill & Thornhill, 1991). In addition, forced vaginal intercourse was found to be the more psychologically distressing form of sexual assault for reproductive aged women.
Another limitation with these studies was that they did not consider the possibility that the victims who do not report the attack are in fact a specific group of victims, perhaps who are in fact more traumatised (or less) than those who do report the attack.

5.4.4) Fertility and Reproductive Value

Reproductive value was first defined by Fisher (1930). He suggested that a person's reproductive value could be estimated by establishing the value of their future offspring, i.e. *"To what extent will persons of this age, on the average, contribute to the ancestry of future generations?"* Reproductive value is therefore the value of an individual that is dependent on their potential future contribution to the population.

In addition to reproductive value, the current fertility of an individual is also important in estimating their value to the population. Fertility has been defined as the female's probability of present reproduction (Buss & Schmitt, 1993). Wilson & Bossert (1971) defined reproductive value as *"the number of female offspring produced at this moment by females of age x or older divided by the number of females which are age x at this moment"*. Fertility value is therefore the number of female offspring produced at this moment by females of age x divided by the number of females which are age x at this moment. The reproductive value of a female is therefore based on offspring produced by females of the same age and older, and the fertility value is based on offspring produced by females of the same age. Only female offspring were considered as this gives a net value; it is more difficult to estimate reproductive rates of future male offspring.

Symons (1979) suggested that the human female's age is closely associated with her reproductive value and therefore the physical characteristics that vary with age will be indicative of her reproductive value. The attractiveness of a female at a certain age will depend on the criteria that the male is using to evaluate her. If he is interested in a long-term partner then he will be concerned with her reproductive value, whereas if he is primarily interested in a short-term partnership then he will evaluate her fertility value. After menarche there is a period of anovulatory cycles. The female then enters nubility. However there is often both high maternal and infant mortality at this period. The female is then fully grown and reaches peak fertility. Symons (1979) suggested that males looking for a wife would target females who just reach nubility, whereas those looking for a short-term liaison would direct their attention towards those who were fully matured. In the west, females show signs of fertility much earlier than in more pre-industrial cultures. The female reproductive value is directly linked to age and health, the younger the female, the more it is interpreted that she will be a more healthy and suitable parent. Male reproductive value is indicated by status and prowess; this therefore may well increase with age. The female should choose a high status male for both short- and long-term partnerships. Symons (1989) suggested that females who are most attractive are those who are post-pubescent but have not yet had her first child.

Williams (1975) has suggested that in a society where there was completely promiscuous behaviour, females with a high fertility value would be considered the most attractive.

Where there was strict lifetime monogamy, females with a high reproductive value would be considered the most attractive, and finally in a society where there was monogamy, but also extra-pair copulations, females who were attractive would have an average fertility and reproductive value.

It has been predicted that men who seek long-term mates would prefer women of a high reproductive value, rather than a high fertility value (Buss & Schmitt, 1993), whereas men who are following a short-term strategy would be more likely to prefer a mate with a high fertility value rather than a high reproductive value. Long-term mating is concerned with the future ability of the mates and short-term matings are more preoccupied with current fertility.

Buss (1989) noted that fertility and reproductive value differ between cultures and are affected by cultural norms, but they are both dependent on the age of the female. He found, in a cross-cultural sample of 37 cultures, female attractiveness on average was closer to peak fertility age (25 years) than to the peak reproductive value age. Chisholm (1991) suggested that although women in their teens have the highest reproductive value and women in their early 20s have the highest fertility, it may well be that women in the mid to late 20s have the highest quality children. He suggested that in many societies having children in the early 20s is not the best time as that age group does not make the best mothers, as they do not have the patience and maturity to raise a family. Pawlowski & Dunbar (1999) calculated the market value of females and males through the use of personal advertisements. Market value was determined through the relationship between number and age of people advertising and the number and age of people sought in the advertisements. They then found that female market value is predicted more by women's fecundity than their reproductive value, whereas male market value is predicted by their earning potential and their risk of future termination of pair-bonds. They defined fecundity as the number of births per female during each five-year age interval.

Later studies have attempted to demonstrate which characteristics males and females desire in potential mates, for both long- and short-term liaisons. Symons & Ellis (1995) examined the different sexual desire of men and women, they found that physical attractiveness is more important for men as a cue of sexual attractiveness, than for women. When the men

were asked to imagine a sexual encounter with an anonymous female, their interest increased as her physical attractiveness increased and vice versa. It was not affected by the chance to form a relationship, i.e. a long-term partnership. The women's sexual interest decreased as the male's physical attractiveness decreased, but increased with the chance to form a relationship and had no effect when attractiveness increased. They suggested that the women attune to a threshold of physical attractiveness; the men have to be of a certain level of attractiveness before they are considered by the women but below another level. When the level of physical attractiveness was increased, some women said they were less likely to have sexual intercourse with them. Symons & Ellis (1995) suggested that this may be that women considered highly attractive men to have less potential as a long-term mate but not as a short-term liaison. In addition, the attractive men may be more of an infidelity risk. Finally, they suggested that the human brain is sexually dimorphic in the mechanisms that direct sexual experience. If rape is a sexual strategy then it may be that men are more prone to rape someone who is more physically attractive. Attractiveness is often associated with age, i.e. younger women are more attractive than older women.

Kenrick, Groth, Trost & Sadalla (1993) have found that males' criteria for casual sexual relationships was consistently lower than females' (e.g. in term of dominance, status, attractiveness, intellect). Greenless & McGrew (1994) have found that in 'lonely hearts' advertisements, men were more attracted to cues of reproductive value such as physical appearance and youth, whereas women were more interested in the status of the male. One of the most notable studies on sex differences in attractiveness was conducted by Buss (1989). He analysed evidence from 37 cultures and found that females valued cues for resource acquisition and males were more interested in cues that signalled reproductive capacity in females. Females valued financial capacity and older males. Males preferred youth and physical attractiveness and chastity. Support for Buss' (1989) finding that females were considered more attractive closer to the high fertility age, has come from Johnston & Franklin (1993) who found that participants judged the most beautiful facial composites to be 24.9 years old which is closer to a high fertility age than to a high reproductive value age.

Davis (1998) found that women prefer older men, although on average only five years older. He found that young fecund women did not prefer males who would be more

associated with wealth and prestige, but they preferred men only slightly older. The men in the study did prefer younger women, but not necessarily those who were most fertile, but those on average five years younger. Davis (1998) suggested that these findings do not support the theory that men prefer young women for reproduction and females prefer older men for status. It would appear that there is a trend in the direction but not conclusive evidence.

There have been differences found between individuals who prefer short- or long-term mating strategies. Landolt, Lalumiere & Quinsey (1995) found that males who perceived themselves as more successful in mating tactics used more short-term mating strategies than those males who perceived themselves as less successful. Another study has found that females are more likely to prefer resources and males choose women of greatest reproductive value (indicated by physical attractiveness), in addition women valued traits related to family commitment (Bereczkei, Voros, Gal & Bernath, 1997). Interestingly, they also found that when pursuing a short-term strategy males demanded more physical attractiveness and females sought males with more resources. For long-term strategies, both genders were concerned with family commitment instead of resources or attractiveness, and both genders prefer younger partners as they got older themselves.

An age preference for females as mates has been shown to cluster around the early 20s. It can therefore be assumed that reproductive value and fertility value play a significant part in the role of mate preference. With regards to crime, there have been studies that suggest that certain offences differ according to the age of the victim. For instance, Shackelford, Buss & Peters (2000) have found that younger women are more likely to be killed by their husbands than older women. These were explained as being due to the husband's sexual jealousy. The majority of victims were less than 20 years old, which suggested that they had a high reproductive value. It may be that they are murdered due to the husband 'feeling' that he cannot control her reproductive capacity and so he needs to obtain a new wife whose RV he can control. Shackelford (2001) found that women between 35-44 years were more likely to be murdered by their cohabiting partner. This age group would have a significantly low FV and RV. It may be that these women have not reproduced and so are expendable and the offender needs to move onto a more fecund partner. Shackelford (2001) did not provide evidence of number of children. In this study, it was also found that

cohabiting partners were more at risk from homicide than married partners. This may reflect sexual jealousy as the cohabitation does not provide the commitment that marriage does. Shackelford (2002) then found that women between 15-24 years and 75+ years were more likely to be raped and murdered. The younger age group would have a high RV whereas those over 75 years would have a low FV and low RV. It may be that for the older age group the primary motive was the murder, whereas for the younger age group it might be that the murder was the result of too much force being used, unfortunately Shackelford (2002) does not provide evidence for this. Another problem with the analysis is that rape-murders may not always be recorded as such. For instance, many offenders may be convicted of the murder but not the rape, as that is the more serious crime.

Felson & Krohn (1990) have found that victims of rape tend to be young. They suggested that opportunity does not play a role, as victims of rape/robbery (27.9 years) were significantly younger than those of robbery alone (35.0 years). This supported the view that rape victims have a high fertility value. Offenders were also less likely to injure younger victims than older victims. Felson & Krohn (1990) proposed that sexual motivation might play a role in many rapes. They suggested that rape has a variety of motives ranging from sexual motivation towards young victims, and punishment in older victims and estranged couples. Muram, Miller & Cutler (1992) also found that older victims (>55 years) were more likely to be injured than victims between 18-45 years. In particular, the older victims were subjected to more genital injuries than younger victims. Women are still abducted as brides in Northwest Ethiopia (Getahun, 2001). Most of these are between the ages of 7 and 20 years old with an average of 13 years. They are likely to be raped and so must then marry their abductor. These 'women' would have a high reproductive value and so would therefore be an investment for their abductor, as they would then have control of the woman's future reproductive life. In ancient civilisations harems contained young girls who were then brought up according to the taste of the master (Betzig, 1993). For sexual encounters monarchs then picked women who were at the peak of their fertility: between their mid-twenties and their mid-thirties. It would appear that in ancient harems girls were recruited into them but then were left to 'ripen' until they were reproductively mature.

5.4.4.1) Pregnancy and Rape

The theory that rape is a reproductive strategy is often criticised on the basis that it does not further the reproductive success of the perpetrator. However, evidence suggests that, even in modern society, pregnancies resulting from rape are apparent and would therefore have increased that offender's reproductive success. Boyer & Fine (1992) report that 11% of adolescent mothers, attending a rape trauma service in Oslo, had become pregnant as the result of a rape. In a study of rape victims at a medical rape trauma service, in Washington, it was reported that 2% of the victims became pregnant as a result of the rape (Bang, 1993). Unfortunately, the study did not differentiate any characteristics of these rapes. A study by Krueger (1988) has suggested that rape related pregnancy is high: he noted that there were 226 abortions due to rape or incest (this was 7% of the whole sample) in Pennsylvania. However these results are questionable due to a change in the law that stated that abortions could only be conducted for certain reasons, e.g. rape. Holmes, Resnick, Kilpatrick & Best (1996) found that 5% of rape victims of reproductive age become pregnant. They estimated that there are 32000 pregnancies that occur from rape each year, in the US. They found that 9% of pregnant rape victims were assaulted by a stranger, whereas 47% were attacked by their partner (boyfriend; husband), 15% attacked by a 'friend', 6% by their father or step-father, 12% by another relative, 9% by someone known to the victim and the remaining percent did not report who their attacker was. Twenty-one percent were aged 12-15 years at the time of the pregnancy, 27% were 16-17 years, and 52% were over 18 years. Of these pregnancies, 32% kept the baby, 50% had an abortion, 6% had the child adopted, and 12% had a miscarriage. Koss, Heise & Russo (1997) note that between 15 and 18% of rape victims became pregnant as a result. It would seem that pregnancy does result from rape and occasionally goes to full-term. Therefore it would seem that rape, does on occasion, increase the reproductive success of the perpetrator. In particular, Holmes *et al* (1996) note that it would seem that rape-related pregnancy is closely linked to domestic and family violence. It may be that here rape is a successful strategy in evolutionary terms, whereas for strangers and other types of offenders it is not a successful reproductive strategy. Rape is often common in war and Jakulic & Krstic (1993) noted that many Muslim women from Bosnia and Herzegovina became pregnant after being raped by Serbs. They did not report actual numbers but discussed the fact that many of the

pregnancies could not be terminated because they were too advanced by the time they presented to the hospital. Similarly, in Germany after the Second World War, there were accounts of German women being raped by the Russian army (Beevor, 2002) and the Russians boasting about the number of children left behind after the attacks

One possibility of this link between rape and pregnancy is coitus-induced ovulation. Although it has been shown that animals can ovulate at coitus (e.g. rabbits), the evidence for humans has been debateable. Jochle (1973) noted that in a sample of 720 rape-related pregnancies post-World War II, 543 were probably coitus-induced. This was due to a number of conceptions taking place just after menstruation, and a number taking place just before menstruation. He also noted that there were several rape-related pregnancies where the woman was previously amenorrhoeic. He suggested that fertility patterns in rape-related pregnancies were elevated at the beginning of the cycle and in the middle. However, these findings do not concur with the development of a counter-strategy to rape from females. It has been found that women are less likely to be raped during the mid-portion of their menstrual cycle (Chavanne & Gallup, 1998). Risk taking behaviour (e.g. going out at night) has been found to decrease at the time of ovulation in women. This suggests that women may have developed a counter-strategy to rape.

5.4.5) Socio-Economic Status

Status is often regarded as the important feature that deems a male's attractiveness to females. Status can be defined as how much access an individual has to resources that would either aid sexual reproduction or survival (Buss, 1999), the higher the status the more access. In addition, status naturally would determine how much sexual access a male would have to females. High status males would be expected to have more power and more resources which would then lead to them being able to access more women. Wettlaufer (2000) described the concept of *jus primae noctis* (the belief that the lord of the manor had the right to share the wedding bed with his peasant's bride). Wettlaufer (2000) noted that the actual evidence for this is sparse, but the belief was popular indicating that it was a symbolic gesture of male power. Therefore, even though it rarely occurred the myth ensued which was one way that high status males could ensure their status.

In Rome, mating was polygynous and Roman men often bought slave women as breeders (Betzig, 1992). In this situation, sexual access to the slave women was taken for granted by the owners but it would be a risk by other men. It can be assumed that many sexual acts were forced. Similarly in other civilisations men had harems (Betzig, 1993). The number of women in a harem would depend on the status of the male. The higher the status of the man the more women in the harem.

In order to attain high status, Weisfeld (1994) noted that dominance aggression plays an important part. This type of aggression is usually inter-male and tends to occur in group-living species where resources are contested. Weisfeld (1994) noted that status-striving is a universal motive, even though the definition of status varies. Gard & Bradley (2000) highlighted the fact that a high status individual within a particular social group (e.g. gang) may be regarded as a low status individual in terms of society (e.g. unemployed). It would seem that the definition of status might be dependent upon the social group in which the individual is being assessed. Therefore, the status of an individual may change in a subculture (e.g. gangs or prison) but remains stable in the wider societal context.

The social status of individuals has been related to criminal behaviour, as there are higher crime rates among the low status. Ellis & McDonald (2001) found that individual status was more predictive of criminal behaviour than parental social status. This was a review study, which found that those of a low status (education; income; occupation level) were more likely to be involved in crime. Historically, rape has been committed more by low status offenders than high status ones (Clark, 1987), although these have generally been consistent with the population proportions of the status groups, i.e. there were more low status males in the population. Therefore, according to the base rate low status males are no more likely to rape than high status males.

Rape has been considered a crime committed by low status individuals (Thornhill & Thornhill, 1983). A change in research direction has noted that rape is also committed by high status individuals, although the conviction rates for these are usually considerably low. Martin & Hummer (1988) reported the occurrence of rape in fraternities at US universities. They noted that the way fraternities were organised contributed to the use of coercive and

violent sex. Benedict & Klein (1988) considered celebrity athletes accused of rape. They found that they were not treated more leniently but that they did mange to avoid conviction more than a national sample of men charged with sexual assault. Therefore, it would appear that high status men do commit sexual assault but the likelihood of conviction is less than men of lower status. Therefore, the prevalence of conviction rates for low status males is more a reflection of high status males avoiding conviction. It would be expected that the likelihood of high and low status males committing rape is similar.

When participants were asked to rate the severity of a crime of assault, Macrae & Shepherd (1989) found no difference between ratings for offenders of a low (labourer) and high (accountant) status. Ruby & Brigham (1996) found no difference in participants' opinions of an offender (buying illegal drugs) dependent on his social status. Mazzella & Feingold (1994) examined opinions with regard to crime in a mock-jury Meta analysis. (Crimes ranged from theft to murder.) They found that high socio-economic status defendants were less likely to be perceived as guilty, but if they were, they received a lower punishment than low status defendants. Therefore, it would seem that the effect of status might be specific to the crime.

Judgments of an acquaintance rape account, in a US study, showed that being a celebrity resulted in less disapproval for a White defendant, whereas for a Black defendant it was considered a liability (Knight, Giuliano & Sanchez-Ross, 2001). Participants regarded high status individuals as less culpable of the rape if they were White, but more responsible if they were Black. Interestingly this study used actual celebrity names, such as Mel Gibson, and Will Smith. These were matched on attractiveness, fame, and likeability. However there was no individual assessment of how much the participant liked the celebrity. This may have affected the results. It may have been that the participants in the Black condition were in fact racist and that participants regarded status as important. These could have been controlled using attitude scales.

High status men traditionally have more power, more resources, and more sexual partners than low status men. Therefore, the majority of men strive to be high status. In addition, high status men may commit crimes but they generally avoid conviction, and are perceived

as less culpable in attitude studies. Therefore, high status is beneficial to men and this is acknowledged by other social groups.

5.4.6) Gender Ratio

The imbalance of gender ratios has been discussed in the animal literature (Emlen & Oring, 1977; see section 4 for a discussion of the animal literature). When the availability of one sex becomes limited then intra-sexual competition increases in the other sex. The operational gender ratio is the average ratio of fertilisable females to sexually active males. If it is skewed towards males then polygyny is predicted, where it is skewed towards females then polyandry is expected. This is because an individual member of the limited sex is expected to try to maximise its inclusive fitness by attempting to control access to mates of the limiting sex. Therefore, where there is a high gender ratio polygyny is predicted and where there is a low gender ratio polyandry is predicted.

The study of gender ratios has been analysed in human societies. Guttentag & Secord (1983) suggested that in a population where there was a high gender ratio (i.e. more men than women) then women should be highly valued by men, which may lead to women being seen as possessions, if there was a low gender ratio (more women than men) it may be that women would feel powerless, and would be viewed more as sex objects, even though they may have more independence. In classical Greece, Athens had a high gender ratio and Sparta had a low gender ratio. Athenian women had traditional high gender ratio roles in that they worked domestically as wives and mothers. Athenian wives were considered property of their husbands, as both rape and seduction of them by other men were considered very serious crimes and the husband could then divorce his wife for either. Women in Sparta had greater economic, educational, and sexual opportunities than those in Athens. In Sparta, the penalty for rape or adultery was a monetary fine to the offender, which indicates the insignificance of these in the low gender ratio society. Guttentag & Secord (1983) then analysed medieval Europe. Early medieval Europe (500-900 A.D.) had a high gender ratio. Women of childbearing age were valued very highly and wives were important in the domestic area. In the late Middle Ages in medieval Europe (1000-1500 A.D.) there was a low gender ratio. Here women's economic and social mobility through

marriage declined and women even married below their class. In addition, misogynist attitudes prevailed. In this population, prostitution became prevalent: Guttentag & Secord (1983) suggested that this was due to the excess of women there. Jewish populations have been found to have high gender ratios. This supported the theory that high gender ratio populations are traditional and have stable families with males incorporating high parental investment.

Colonial America also provided evidence for the effect of gender ratios (Guttentag & Secord, 1983). In the early 17th century there was a high gender ratio in America, which greatly enhanced the marital opportunities for young women. At this time the Midwestern frontier had a balanced gender ratio, where women were educated but were still required to play an important part in the domestic life of the farm. The western frontier had very high gender ratios, which led to men valuing women greatly and showing them respect, whilst attempting to control them as well. In the 1800s, the gender ratio was higher in the South than it was in New England. Guttentag & Secord (1983) found that in the South there were constraints on women's freedom, with an emphasis on purity, chastity, and submissiveness. In New England where there was a low gender ratio, Guttentag & Secord (1983) suggested that the surplus of women made them more vulnerable to exploitation by men. Guttentag & Secord (1983) found that in the 1960s and 70s America when there was a low gender ratio, White men tended to marry later, and so there were more single men. This she suggested was due to the oversupply of women and that marrying would limit their relationship opportunities. It would seem that low gender ratios do lead to polygyny, as Emlen & Oring (1977) suggested, as men are more interested in having a varied sexual life and the offences of rape and seduction have a limited punishment. However high gender ratio societies do not lead to women exhibiting polyandry, rather men value women more and seek to control all aspects of their lives.

Although there are different characteristics to high and low gender ratio societies Guttentag & Secord (1983) noted that in both women's roles are shaped more to the advantage of men, which was due to the structural power by men. In a high gender ratio society there is a protective morality that favours monogamy for women, limits their interactions with men, and shapes female roles in traditional domestic areas. In a low gender ratio society the domestic roles of women weaken, men have multiple relationships, and are less willing to

commit to marriage. Therefore, it would seem that societies differ according to their gender ratio.

Gender ratio has been examined in relation to crime. Svalastoga (1962) found that where there was a high gender ratio there were also a higher number of rapes. (Analysis of these results give very high correlations: r=0.95, df=2, p>0.05; rho=0.50) Of course due to the date of this study there may be a reporting bias, in that women were often reluctant to report rapes. Lester (1974) repeated Svalastoga's study in the US: he found the relationship between rape offences and gender ratio was r=0.12 (df=48, p>0.05). He suggested that there was no data to support the hypothesis that rape was more common where there were relatively fewer females than males. It was found that gender ratio and rape incidences in Canadian provinces (Singh, 1977) were negatively related (r=-0.44, df=10, p>0.05). For urban metropolitan areas (e.g. Vancouver) the relationship was positive but not significant (r=0.34, df=10, p>0.05). The relationship between rape prevalence and gender ratios would therefore appear to need further testing.

A more recent study assessed the relationship between gender ratio and crime (Barber, 2000). He predicted that low gender ratio societies are more likely to have increased family conflict which then leads to more external aggression and therefore more crime, such as homicide, rape and assaults. He analysed 70 different countries. He found that rape was negatively related to the gender ratio. Therefore, when there was an abundance of women there was more rape. This was explained by Guttentag & Secord's (1983) analysis of low gender ratio societies where men are less likely to commit to marriage and are more likely to pursue short-term mating strategies.

5.4.7) Fluctuating Asymmetry (FA)

FA is the deviation from symmetry of bilateral traits, e.g. ear height, which may be a biological indicator of fitness. This suggests that there has been developmental instability for the organism; otherwise, the two traits would be symmetrical as they would have been subjected to the same environmental stressors (Møller & Swaddle, 1997). Fluctuating asymmetry will therefore account for any differences between the traits. Therefore the

more symmetrical a person's traits are then the less they have been subjected to developmental stress and will therefore have increased fitness. This fitness may therefore be related to the behaviour, which they exhibit. FA has been examined in relation to aggression and sexual behaviour but it has not been associated with rape behaviour.

Several studies have considered the relationship between FA and reproductive fitness in men. Thornhill, Gangestad & Comer (1995) found that males with a low FA (i.e. more symmetrical) had partners who experienced more copulatory orgasms than males with higher FA. They suggested that this supported the theory that female orgasm influences sperm competition. They also found that male height and female height had a significant effect on female orgasm, which suggested that FA plays a role but is not alone in influencing orgasm. This influence on sperm competition may therefore play a role in rape where males with low FA might be more reproductively successful so may be less likely to rape. Interestingly, within women, asymmetry of soft tissue seems to change during the menstrual cycle. Scutt & Manning (1996) have found that asymmetry was lowest on the day of ovulation. The authors speculated that if males can assess this change then it would have implications for reproductive success. They suggested that long-term partners would therefore be able to assess when asymmetry was low (ovulation): of course if asymmetry was low then it may be that at ovulation women are also more attractive to other males and so may be more susceptible to being victims of rape. Examination of whether males can detect that females are more attractive when ovulating would need to be conducted.

FA has also been associated with psychological concepts. For example Martin, Manning & Dowrick (1999) have found that asymmetric men reported more depression than males who were more symmetric. As no relationship was found in women, the authors suggested that the difference might be due to the high levels of prenatal testosterone in males. Testosterone may slow the growth of the left hemisphere and increase the growth of the right (Geschwind & Galaburda, 1985), which may then lead to more problems, such as depression in males but not in females. Therefore, males with low FA may be less susceptible to depression and so this would increase their genetic advantage. FA has been related to intelligence (Furlow, Armijo-Prewitt, Gangestad & Thornhill, 1997). It was found that low FA was significantly associated with high intelligence scores. This would support the theory that symmetry results in a higher quality of individual.

It has been found that amongst male athletes, those who exhibited more symmetrical traits also had better performance times than their more asymmetrical counterparts (Manning & Pickup, 1998). The authors suggested that symmetry indicated good running ability, which then may indicate (reproductive) fitness in that individual.

Males with low FA have been found to be heavier than more asymmetrical males, whereas low FA females do not weigh as much as females with high FA (Manning, 1995). It has been suggested that in males this is related to the fitness hypothesis, in that only males with the best genes are able to maintain a large size. This would follow as low FA suggests that they experienced greater developmental stability and therefore would have 'good genes'. It is more difficult to explain the relationship in females. It may be that those with low FA (and hence good genes) may be better able to adjust their weight in order to be attractive in the society that they live in, so for example in a society which values thinness then females with a low FA can maintain a low body weight easily.

FA has been associated with facial attractiveness (Gangestad, Thornhill & Yeo, 1994; Scheib, Gangestad & Thornhill, 1999). It has been found that men who are more symmetrical are also perceived as more attractive. Interestingly, although in Scheib *et al's* (1999) study, women found symmetrical men more attractive, but they could not identify the symmetrical and asymmetrical subjects. Swaddle & Cuthill (1995) found that symmetrical faces were perceived as being less attractive. They suggested that this might be because symmetrical faces are not natural, and in fact, it may be that slightly asymmetrical faces are perceived as more attractive than artificially created symmetrical faces.

There was a small negative relationship (r=-0.14) found between FA and sociosexual orientation (promiscuous behaviour) by Simpson, Gangestad, Christensen, & Leck (1999). Gangestad & Thornhill (1998) found that unrestricted (promiscuous) men were more symmetrical (r=-0.20). It should be noted that these correlations are low and so need to be interpreted with caution.

Simpson *et al* (1999) found that men with a low FA were more likely to use direct competition tactics than asymmetrical men, when judged by raters in a laboratory condition. Specifically they compared themselves to the competition male. they used humour less, they did not claim to be likable. and they exhibited some sort of pretence. The authors suggested that this supports evolutionary hypotheses that direct intra-sexual tactics would only be successful if an individual has the necessary genetic viability to compete, and the physical and personal attributes to support such an approach. Men with a low FA have increased fitness and so would be more likely to use direct tactics.

The number of sexual partners that men have had in their lifetime has been associated with FA (Gangestad, Bennett & Thornhill, 2001; Thornhill & Gangestad, 1994). Men with low FA (symmetrical) had more sexual partners than those with high FA, and males with a low FA were younger when they first had intercourse compared to those with a high FA (Thornhill & Gangestad, 1994). This suggests that those with a low FA had more sexual access to mates than those with a high FA.

FA has been associated with violence and aggression. Furlow, Gangestad & Armijo-Prewitt (1998) found that males with a low FA reported a higher number of fights and a likelihood to escalate encounters into physical aggression. They also assessed aggression using Buss & Perry's (1992) Aggression Questionnaire. Furlow *et al* (1998) factor analysed the results of the subscales with the reported tendency to win fights, and found that there were no significant relationships with FA. They did not correlate the subscale values with FA: this would have provided insight into the different types of aggression. Manning & Wood (1998) have found there to be a relationship between FA and physical and verbal aggression. Boys with a low FA were more likely to be physically aggressive (the relationship was stronger with physical than verbal aggression). One problem with this study was that it only used one trait as a measure of FA (ankle). This has been criticised as not being a suitable measure of FA (Gangestad *et al*, 2001). Therefore, the results can only be interpreted tentatively.

It would seem that low FA is related to higher intelligence, less depression, being a fast runner, being heavier, being more attractive, being more promiscuous, the use of direct competition tactics, having more sexual partners, having partners who have more

copulatory orgasms, more fighting behaviour and more physically aggressive behaviour than those with high FA. This builds a picture of low FA being related to reproductive behaviour. It could be suggested that the male who has low FA may also be more likely to rape, as it has been found to be related to aggressive and promiscuous behaviour. Malamuth (1996) suggested that rape was the product of aggressive behaviour and an impersonal attitude towards sex, therefore if both those behaviours are present in males with a low FA then it may be that they may also have a propensity to rape. However, Thornhill & Thornhill (1983) suggested that it is the 'losers' who rape, i.e. those who cannot compete with more reproductively successful males. According to the 'loser' hypothesis, it would be expected that males with a high FA were more prone to rape, as they would have suffered from developmental instability and may not possess reproductive fitness.

5.4.8) 2D:4D Digit Ratio

Another biological indicator of fitness is 2D:4D. The ratio of the 2^{nd} to 4^{th} digit is a sexually dimorphic trait (Phelps, 1952), which is often related to gender differences. Phelps (1952) has noted that there are three formulas of the ratio between the index finger and ring finger (2^{nd}:4^{th} ratio):

1) 2<4;
2) 2=4; and
3) 2>4.

Phelps found that 2<4 was most common ratio among males and the 2>4 ratio was more common among females. These differences in digit length are determined as early as the 7^{th} week of the foetus' development. Garn, Burdi, Babler & Stinson (1975) found that in foetuses the proportions of the bone structure of the hand are similar to adult proportions by week 13. This suggested that the ratio between the 2^{nd} and 4^{th} digit is determined prenatally.

2D:4D digit ratio has been related to sperm numbers and testosterone. Manning, Scutt, Wilson & Lewis-Jones (1998) found that in a sample ranging from 2-25 years, age did not predict 2D:4D digit ratio in both males and females, which they suggested indicated that

the ratio is determined in utero or at least in the first 2 years (i.e. due to prenatal testosterone). They also found that sperm numbers were negatively related to 2D:4D digit ratio – so more prenatal testosterone led to a higher number of sperm. Testosterone levels were negatively related to 2D:4D digit ratio – so those with a longer fourth digit had more current testosterone levels.

2D:4D digit ratio has also been related to sexual selection in males and in particular male competitiveness. Manning & Taylor (2000) suggested that sports are an indicator of male physical competitiveness. They found that men with low 2D:4D digit ratios reported being better at sports. Football players in the first team had lower 2D:4D digit ratios than those in reserves or youth teams and men who had played for their country had lower ratios than those who had not. It would seem that men with a low 2D:4D digit ratio are more likely to think they are better at sport and are actually better. Manning & Taylor (2000) suggested that this was because testosterone promotes traits used in sports, which are the same as those in male-male fighting. Musicians from a British symphony orchestra have been found to have lower 2D:4D digit ratios than controls (Slumming & Manning, 2000). The authors suggested that musical ability is a sexually selected trait in men, which may indicate fertilising capacity and fitness. Therefore, sporting and musical ability may be a signal of reproductive success.

It would seem that a low 2D:4D digit ratio predicted high sperm numbers, sporting ability and musical ability. This suggested that heterosexual males (see study 7 for a discussion of sexuality) with a low 2D:4D digit ratio might be more reproductively successful than males with a high 2D:4D digit ratio. The low 2D:4D digit ratio males it would seem may have high fitness (similar to those with low FA) because they may be more likely to succeed at certain competitive activities. Therefore, these 'good gene' males may be similar to those males with a low FA and so may pursue promiscuous mating behaviour and may exhibit displays that are more aggressive. If this was the case then it may well follow that these males will demonstrate a rape proclivity, in accordance with Malamuth's Confluence model (1996). As before, the 'loser' hypothesis (Thornhill & Thornhill, 1983) would predict that males with a high 2D:4D digit ratio would be more likely to exhibit rape prone behaviour, as they would be the ones who were not competing successfully.

5.4.9) Life History Theory

Life history theory is an evolutionary theory, which explains the life course of organisms. In particular, it is concerned with fertility, growth, developmental rates, and death. A life history pattern can be determined by environmental factors. The life history of an organism describes their life pattern, such as the onset of puberty, the fertility schedule, and when death will occur. Life history patterns are different across species (Hill, 1993) and within species. According to life history theory, there are tradeoffs between current and future reproduction and between the number and quality of offspring. Decisions have to be made as to whether reproduction is feasible now or whether it will have an effect on future reproduction and therefore should be delayed. In addition, too many offspring may have a detrimental effect on fitness. These decisions are of course not conscious but biological. Hill (1993) has examined the life histories of humans and other animals. He suggested that human life histories are more similar to bird life histories than they are to other mammals. This is because both have extremely high levels of parental care, delayed juvenile independence and exceptionally low adult mortality rates. Hill & Kaplan (1999) noted that there are at least four distinct characteristics of human life histories:

1) Long life span;
2) Extended period of juvenile dependence;
3) Support of reproduction by post reproductive individuals; and
4) Male support of reproduction through provisioning of females and their offspring.

According to Hill & Kaplan (1999), life history theory defines the age of sexual maturity as the age of first birth. In humans there is generally a period of time between physiological and morphological sexual maturity and actual reproduction. Human hunter-gatherers often first give birth between 18-20 years old, whereas for Western humans this is usually much later, but can be as young as 12 or 13 years.

McNamara & Houston (1996) have discussed life histories that are state-dependent: how the organism's physiological state affects the decisions made. They noted that if two individuals followed the same strategy, they need not perform the same behaviour, because that was dependent on the state of the organism. This would suggest that even if two males

had experienced the same life history, one might commit rape whilst the other does not. This is because it may be dependent on the individual state of that person.

Life history theorists have noted that there has been a demographic transition in fertility, i.e. the number of offspring families produce has declined, and rich families reduce their fertility earlier (Borgerhoff-Mulder, 1998). It has been suggested that this is due to human psychology being driven by a desire to maximise wealth. However, MacDonald (1997) suggested that stressful environments can delay maturation and the onset of reproductive production. He concluded that competition and environmental adversity leads to animals having fewer and widely spaced offspring, long parental care, long life spans, and lower mortality.

Chisholm (1993) suggested that reproductive effort is dependent on early experiences with the causes or correlates of death. According to life history theory, effort by the organism is directed towards either somatic effort – for survival or maintenance and growth and development, or reproductive effort – either mating effort or parenting effort. Chisholm (1993) has noted that mortality rates are correlated with the age at which mammals (between species) become sexually mature. In addition, mortality determines the type of sexual strategy used, when mortality rates are high, then short-term strategies are the most productive. When mortality rates are low then the long-term strategy of maximising descendents is more productive. Therefore, early experiences with mortality rates may influence how reproductive effort is allocated. Therefore, men and women may be able to adjust their mating and parenting effort according to the local environment. An optimal life history is one where at each age the sum of current reproduction and reproductive value are at the maximum (Clark, 1993). The balance between mating, parenting and somatic effort is therefore negotiated in order to result in the maximum reproduction over the organism's lifetime and for future generations.

Life history theory examines the patterns of birth, life, and death. Environmental and situational factors of an organism's life pattern may affect the choices they make. For example, as suggested by Chisholm (1993), if mortality rates are high then a short-term strategy may be the more productive. This theory may therefore apply to humans who have individual perceptions of their future. A study by Hill, Ross & Low (1997) compared the

future unpredictability beliefs of students with their general risk-taking behaviour. They defined risk taking as acts that could endanger survival. They found that those who presented a higher unpredictable future and shorter lifespan expectation took part in more frequent risk taking behaviours.

Rape is a risky behaviour where the costs may outweigh the benefits that may occur. Life history theory has been applied to the analysis of rape. Mealey (1999) noted how according to life history theory some behaviours will vary within a species due to circumstances, as there are points in the organism's life where 'choices' are made. She noted that there are at least five ways in which life history patterns can vary due to:

1) Genetically based stable differences between individuals, i.e. the temperament and personality of an individual;
2) The random use of multiple behaviours by all members of the population, i.e. being unpredictable and using behaviours randomly;
3) Environmentally contingent behaviour, i.e. acting predictably towards the environment;
4) Stable developmental individual differences, i.e. personality is moulded by the environment; and
5) Individual differences resulting from different genotypes, i.e. people respond differently to their environment depending on their personality.

Mealey (1999) suggested that rapists are in fact following different life history strategies and that rape is more than one type of motivated behaviour. She suggested that the stranger rapist and acquaintance rapist is unlikely to be operating under the same set of motivations. With regards to the above causes of life history variation, Mealey (1999) applied these to the rape offender. The first mechanism considered genetic differences in personality; Mealey (1999) suggested that this is likely to reflect the combination of personality traits that make a rape offender, e.g. extraversion, sensation-seeking, impulsivity. The second mechanism concerned being unpredictable, e.g. a partner rapist is often kind and loving after the attack, and an acquaintance rapist may use deception in order to obtain sex. However being unpredictable may hinder some long-term relationships, as the female may prefer to pair-bond with a predictable male. The third mechanism referred to opportunity and reacting to the environment: some men will only rape in certain circumstances, e.g. gang rape, rape in war. The fourth mechanism considered personality as shaped by the

early environment: men rape because they have experienced sexual violence as a child e.g. witnessing their mother being abused. The fifth mechanism considered the gene-environment interaction; some rapists are born with certain 'handicaps' e.g. mental illness, low intelligence, and unattractiveness. Mealey (1999) suggested that the prevention of rape will only occur when prevention strategies acknowledge that different types of rapists emerge from different life history patterns. Different life history patterns may be examined by considering the victim-offender relationship and the types of mating strategies used by offenders.

6) Conclusion

Rape is a behaviour that has been prevalent throughout history. Particularly in ancient civilisations (Betzig, 1993), medieval Europe (Carter, 1985) and modern times. Research conducted on rape has often focused on the convicted offender, however this may cause problems as many rapes are not reported (Russell, 1984), therefore the offender is not convicted. Recent research has focused on the non-convicted offender and several studies have assessed a respondent's rape proclivity. This method may provide more salient results than just considering a convicted population. Another problem is that previous research has focused predominantly on stranger rape whereas it has become apparent that other types of rape are just as prevalent. This needs to be taken into consideration when conducting research on rape. The prevalence of forced copulation in non-human animals suggests that it is a universal behaviour across species. There are several different theories of rape, namely social learning, feminist, biological and evolutionary. Social learning theory and feminist theory provided relevant information that aids a discussion on rape. For the purpose of this thesis, the main hypotheses, which were tested, were provided by evolutionary theory. It is suggested that rape is either an adaptive mechanism (Thornhill & Thornhill, 1983), which was naturally selected for in our ancestral past or that it was a by-product of other adaptive mechanisms (Malamuth, 1996). If it were adaptive then you would expect victims to be targeted who have a high FV and offenders would have a low

socio-economic status. Biological indicators may show a difference between males who have good genes and those who do not, e.g. FA and 2D:4D digit ratio. Evidence on gender ratio would suggest that rape would be more prevalent in a society where there was a high gender ratio (more males than females). Life history theory would suggest that rape is not a generic behaviour and that types that are more specific need to be considered. For instance, you would expect differences between the patterns of rape in victim-offender relationships.

The following studies have used a variety of methods for assessing the adaptiveness of rape. Studies 1-3 used archival data and studies 4-7 incorporated participant data. In studies 1 and 2 data was collected from the prison service, law reports, and the probation service. In study 3 census data and criminal records were analysed. In studies 4 and 5 participants were asked to interpret a rape scenario. In study 6 a questionnaire design was used to assess perception of life histories. Finally, in study 7 both biological measurements and questionnaires were incorporated to assess rape proclivity, FA, and 2D:4D digit ratio.

6.1) Predictions

1) *The prevalence of rape would increase as the victims' FV increased. Rape of victims with a low FV would be explained by the offender's sexual preference for non-reproductive ages, or the occurrence of a secondary offence. In addition, these victims would be less likely to be injured.*

2) *There would be a greater proportion of rapes of strangers by low status men than rapes of strangers by high status men, as stranger rape is more costly and so would be less likely to be committed by high status men. There would be a greater number of rapes of acquaintances than rapes of strangers by high status men, as an acquaintance rape would have fewer costs than a stranger rape.*

3) *It was predicted that in an area with a high gender ratio there would be a greater number of rapes committed.*

4) *A rape committed by a high status offender would be more accepted than a rape committed by a low status offender. The acceptance of a rape would change when the FV of the victim was altered, i.e. the rape of a female with a high FV would be disapproved of more than the rape of a female with a low FV.*

5) *It was predicted that males who are regarded as short-term strategists would be more accepting of a stranger rape, and more disapproving of a marital rape as they would identify with the stranger rape which is also a short-term strategy whereas the marital rape is part of a long-term strategy. Long-term strategists would show more disapproval of stranger rape and more acceptance of marital rape as they would identify with the marital rape which is part of a long-term mating strategy whereas they would not identify with the stranger (short-term) rape.*

6) *It was predicted that as risky sexual behaviour is related to a perceived shorter lifespan, sexually aggressive behaviour would also be related to a poorer perception of future life prospects, as predicted by life history theory.*

7) *It was predicted that symmetrical males would be more aggressive, and more likely to possess an unrestricted sociosexuality (short-term mating strategy). Aggressiveness and promiscuity were predicted to lead to sexual aggression by Malamuth's (1996) Confluence Model. According to the Confluence Model, it was predicted that symmetrical males would be more likely to exhibit a rape proclivity and to have experience of sexual aggression. However, the mate deprivation hypothesis suggests the opposite, that low status males (who would have a high FA) would be more excluded from consensual sex and therefore more likely to rape and that they would be more aggressive and possess an unrestricted sociosexual orientation and express a likelihood to rape. This was because the mate deprivation hypothesis would predict that males with a high 2D:4D digit ratio (who may have low fitness) would be more likely to sexually aggress, as they cannot compete with their low 2D:4D digit ratio counterparts.*

PART 2: ARCHIVAL DATA - STUDIES 1-3

STUDY 1: FERTILITY VALUE AND THE PREVALENCE OF RAPE

Introduction

Sexual strategies theory (Buss & Schmitt, 1993) separates mating strategies into long- and short-term. Buss & Schmitt (1993) stated that if a male were adopting a long-term strategy, he would be attracted to a female with a high capability of reproducing in the future (a high reproductive value; RV). If a male were adopting a short-term strategy, he would prefer a female who is currently capable of reproducing (a high fertility value; FV). It has been found that male preference for partners differs according to the level of involvement they would like (Buunk, Dijkstra, Kenrick & Warntjes, 2001). Males from 20-60 years old were asked what the minimum and maximum ages of a partner they would like for various relationships. Regardless of the man's age they desired mates of a reproductive age for short-term mating and sexual fantasies, whereas for long-term mates they preferred someone who was younger than themselves but sometimes above the age of maximum fertility. It would seem therefore that in short-matings males prefer someone between 17-45 years, whereas for long-term matings they prefer someone closer to their own age. This suggests that male preferences follow the pattern expected from sexual strategies theory.

Williams (1975) and Symons (1979) have both suggested that men are most attracted to a female who has both a high FV and a high RV, as discussed in the Literature Review. In modern society this would be females around the age of 20 years old (see Figure 1.1). Therefore, if rape were a by-product of mechanisms for consensual attraction, most rape offences would be directed towards women in their late teens and early twenties, i.e. the age category to which most male sexual attention is directed. Fertility and reproductive values are based on the number of offspring born in the current environment. Therefore, they are dependent on modern circumstances. In the ancestral environment, these values

may therefore be different, as females in Western societies have children much later but enter menarche earlier. Symons (1979) has therefore suggested that women, in non-Western societies, valued as long-term partners would be between 17-22 years and women valued as short-term partners would be 23-28 years. The current FV and RV is a more stringent construct and it could be suggested that the cues exhibited by a woman with a high FV in modern society are the same as the cues exhibited by a female with a high FV in an ancestral society. The life histories of females, in modern society, have been expanded but they still pass through the same developmental experiences as ancestral women, and regardless of cues, only women of a certain age will reproduce. Behavioural ecologists would suggest that it is the cues in the current environment that are relevant (Smith, Borgerhoff-Mulder & Hill, 2001).

Figure 1.1: Fertility Value and Reproductive Value of Females in England and Wales between 1988-1997.

Thornhill & Thornhill (1983) proposed that rape was an adaptive short-term mating strategy, as discussed in the Literature Review. This they suggested would be demonstrated by victims being clustered around the ages at which they were most likely to have children, i.e. they would be of high FV. In England and Wales the age of highest fertility value is approximately 28 years old, although this may hide variations according to socio-economic status, since it is likely to be lower in low socio-economic women (as they are more likely to enter puberty earlier (Chisholm, 1993). However, the Thornhills' analysis of data from the US did not demonstrate any reliable relationship between the FV of victims and the prevalence of victimisation in that age group. Subsequently Thornhill & Palmer (2000) reviewed the literature relating to the age of victims, and argued that there are a higher proportion of victims of fertile ages than other ages. However, the evidence they reviewed was not subjected to statistical analysis.

Several studies have assessed the prevalence of rape using surveys and representative samples. A study by Coyle, Van Horn & Wolan (1996) assessed the level of sexual assault experienced by women veterans of the Baltimore Veterans Affairs Medical Centre. The survey asked the sample if they had ever been forced into unwanted sexual intercourse. Forty-one percent of women less than 30 years old said they had, 48% of women 31-40 years confirmed the question, 53% of women 41-50 years said they had and 20% of the over 50's responded yes. These results indicated that the prevalence of sexual assault was extremely high. However, these findings do not mention when the offence took place. A study of female US army soldiers (Martin, Stretch, Rosen, Knudson & Durand, 1998) found that 23% of their sample had experienced rape. Of these, the offence took place between the ages of 2-29, with a mean age 16 years. Therefore, sexual prevalence was extremely high but cannot be analysed in the current study.

A British study (Percy & Mayhew, 1997) found women between the ages 20-29 years were more likely to have experienced coerced sex (forcing someone to have sex against their will). However, this study assessed the prevalence for lifetime abuse so that the age at which the women experienced the offence was not noted. This demonstrates the prevalence of rape in a British study but cannot be analysed in the current study, as it does not note the actual age of the offence.

Many studies have assessed the prevalence of rape in college students, who are generally between the ages 18-25 years. Koss, Gidycz & Wisniewski (1987) found that 15% of US students reported having ever been raped. Gavey (1991) found in a sample of New Zealand students that 14% reported ever being raped. Newton-Taylor *et al* (1998) found that 15% of Canadian students reported being sexually assaulted in the previous year. Amongst Chinese students 7% reported that they had either been raped or experienced an attempted rape (Xu *et al*, 1998). Amongst German adolescents, 17% reported forced sexual experiences (Krahe, 1998). Eleven percent of Australian students reported that they had been raped whilst 24% indicated that they had experienced unwanted sexual intercourse (Patton & Mannison, 1995). In a Swedish sample of students, the reporting of rape was much lower than other countries at only 4% (Lottes & Weinberg, 1996). Assessment of rape in Addis Ababa and Western Shoa found that 5% of the sample reported a completed rape and 10% reported an attempted rape (Mulugeta *et al*, 1998). Although these studies do demonstrate that among young college students sexual assault is high they do not indicate at exactly what age the offence took place. Young women are not victims of more crime because they have an active nightlife (Felson, 1997). It was found that males with an active night life were more likely to witness and participate in violent attacks, whereas going out at night was not a risk factor for women in either witnessing or participating in violent crime.

Although the majority of rape victims do appear to be young women (as reviewed above), there are still a number of victims who have low fertility value (FV). For instance, in a study by Grace, Lloyd & Smith (1992) 25% of victims were between 0-16 or over 50 years. Lloyd & Walmsley (1989) similarly found that 25% of the victims were between 0-15 or over 50 years old. It would appear that a large minority of victims are not capable of current reproduction, which on the face of it would not be expected if rape were an evolved strategy. However there may be other reasons why these victims are attacked: there may be identifying characteristic of these rapes, which differentiate them from the rape of women at high FV ages. There are at least three possibilities:

1) It would be obvious that if the perpetrator possessed a sexual preference towards a non-reproductive age group, he would target this age group;

2) Non-reproductive females may also be raped as the result of the offender committing another crime, their age therefore being a consequence of availability for a generally disinhibited individual; and
3) In addition, a consequence of having a high FV might be that victims would be more likely to be injured, as they are more likely to fight back: the perpetrator would therefore need greater force to complete the attack (Thornhill & Palmer, 2000; Thornhill & Thornhill, 1990a). Therefore, victims with a low FV would be less likely to be injured as they would not fight back and therefore be 'easy' targets. However, in contrast to this, Ruback & Ivie (1988) found that older victims were more likely to be injured.

The current data set was designed primarily to assess the hypotheses of Thornhill & Thornhill (1983) that rape victims would be more prevalent at ages indicating high FV. The incidence of rape at different ages, as shown in recorded rapes, was compared with both the FV and the RV of the victims. The latter was included, since according to sexual strategies theory (Buss & Schmitt, 1993), RV should be more closely associated with a long-term strategy. Any association with this would not be predicted by the view that rape is an adaptive short-term strategy. However, it might be predicted if rape was considered part of a long-term mating strategy then victims would have a high RV. For instance, as mentioned in the Literature Review, teenage girls (high RV) are still abducted and raped in rural Ethiopia as brides (Getahun, 2001), where their reproductive ability is then controlled by their husbands/abductor.

Female homicide was analysed in the current study in order to compare the patterns of offending for rape and homicide offences. The majority of female homicide is committed by men (Wilson, Daly & Scheib, 1997) and a large proportion of women are killed by their husbands. Women killed by someone other than their husbands are often subjected to some kind of sexual assault (Wilson *et al*, 1997). It may therefore be that the killing of women is often a reflection of a male's sexual proprietariness over women. In particular, the risk of femicide increases the younger the wife (of course this may be the result of a young male husband who is more prone to violence). Being married seems to result in more violence than if the couple were simply cohabiting (Wilson, Johnson & Daly, 1995). For females that were married, the risk of femicide reduced as they grew older but for cohabiting

females, the risk continued to grow until middle age. It has been suggested that non-lethal violence is used coercively to increase the proprietariness of the males. Shackelford (2001) has found that a woman is more likely to be murdered by her partner if she is cohabiting with him than if she is married to him and in contrast to Wilson *et al* (1995) middle aged cohabiting women are the most at risk. Wilson *et al* (1995) suggested that whilst the wife is young then she has more opportunities to take part in an extra-pair copulation. This may be why male sexual proprietariness is elevated at this time. Wilson *et al* (1995) found that the risk of femicide increased when the wife was either considerably younger or older than the husband. In addition, it has been found that men are more likely to kill their wives than other household members, which increases the risk for wives and rules out the interpretation that they are targeted due to opportunity. Although violence towards wives is often initiated by their husbands, the question arises as to why they form pair bonds originally. The bodyguard hypothesis (Wilson & Mesnick, 1997) suggested that wives are subjected to less violence, from other men, than unmarried women. They found support for this hypothesis, which suggested that the risk of femicide is far greater if a woman was unmarried than if she was married. Shackelford *et al* (2000) have found that women of a reproductive age (<45 years) are more likely to be battered and killed by their husbands than are older women. This is similar to the finding of Wilson *et al* (1997). The present study also assessed the relationship between FV (and RV) and female homicide rates. It was predicted that there would be a positive relationship between FV and homicide, as this may be indicative of sexual proprietariness. If husbands kill wives as a result of jealousy, this would tend to occur when wives are highly fertile and more likely to be seeking an extra-pair copulation, i.e. when they reach their maximum FV.

The data for the current study were obtained from the British Prison Service, British Law Reports, the Probation Service and three previously published British Home Office studies. FV and RV were calculated from British demographic statistics for the appropriate time period. The prevalence of rape was converted to age-specific prevalence rates (i.e. relative frequency) in order to take into account the population in which the rapes occurred. Previous studies (e.g. Thornhill & Thornhill, 1983) have not adjusted for this, which questions their validity.

It was predicted that as the rate of rape increased so would the victims' FV. There would be a difference between the victims' FV and RV according to the victim-offender relationship. Rape of victims with a low FV would be explained by the offender's sexual preference for non-reproductive ages or the occurrence of a secondary offence, and would be less likely to be injured.

Method

Calculation of FV and RV

These were calculated using the formulae of Wilson & Bossert (1971). Fertility value (FV) is the number of female offspring[2] born to females of age x, divided by the number of females at age x. Reproductive value (RV) is the number of female offspring born to females of age x and above, divided by the number of females at age x. These were calculated using Birth Statistics 1988-1997, the 1991 Census Report for Great Britain, and Mortality and Death Statistics 1988-1990, and 1992-1997. Only live births were used. Values were then obtained for each age group. The FV and RV for each age group can be seen in Figure 1.1. These were then standardised using z scores in order to compare FV and RV for the Kruskal-Wallis analysis of variance and the logistic regression analyses.

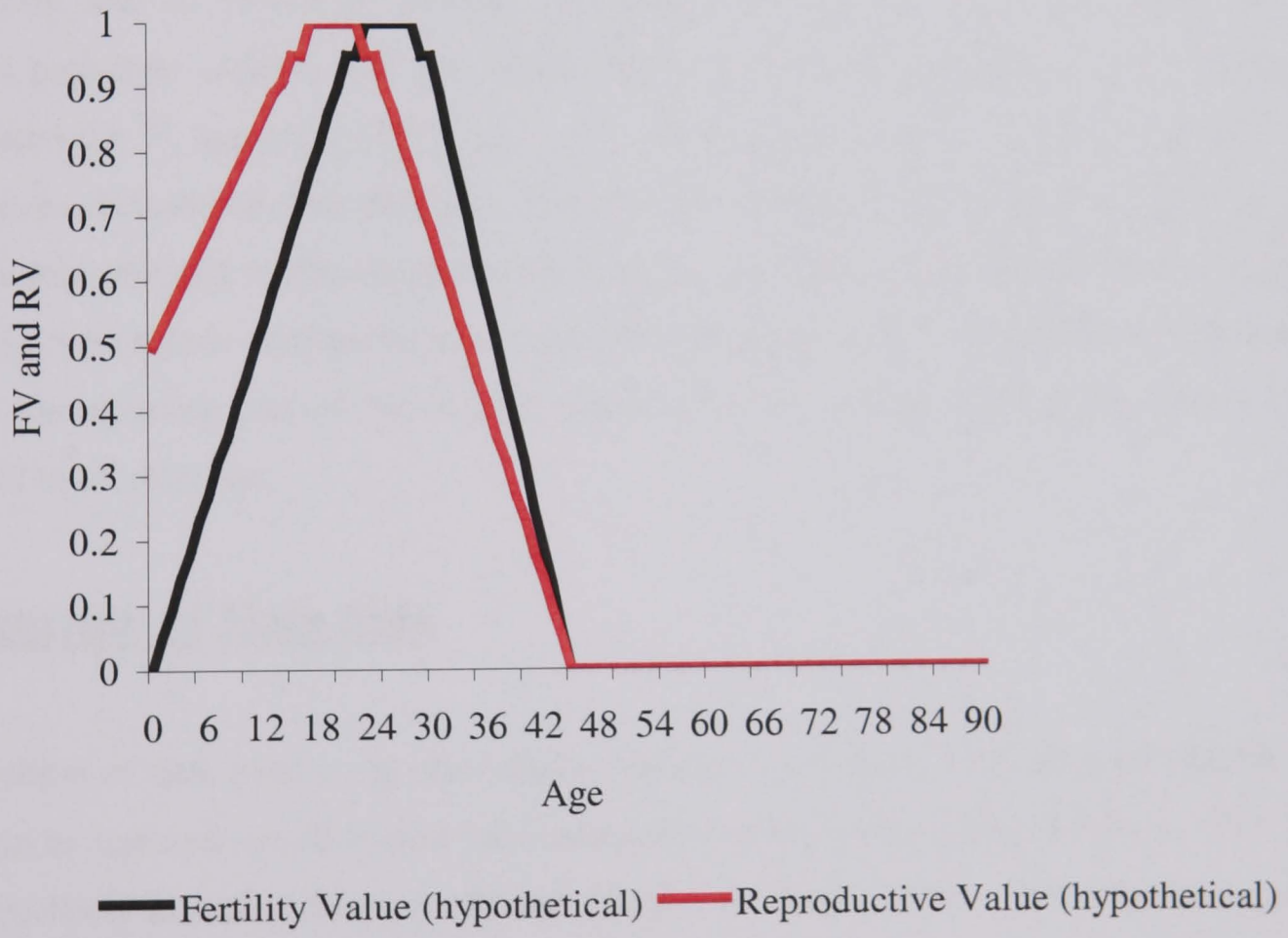
Ancestral (Hypothetical) FV and RV Curves

In addition to the fertility and reproductive curves calculated based on current birth statistics for women in British society, two more curves were also calculated in order to assess the relationships with a more ancestral pattern of fertility and reproductive value (this was similar to that conducted by Crawford, Salter & Jang, 1989). Symons (1979)

[2] Only female offspring were calculated as this provides the minimum input into the future population that the female has – the net value.

suggested that a female valued as a wife (reproductive value) would be between 17-22 +- 2 years, and a female valued as a sex partner (fertility value) would be between 23-28 +- 2 years. He notes that for a Western society these ages would be lower as the age of menarche has dropped in the last hundred years. In Figure 1.2 it can be seen that, due to infant mortality rates, the RV curve drops to half of the maximum for children and that women over 45 years have received an FV and RV of zero. The maximums are therefore different to the curves produced using current birth statistics.

Figure 1.2: Fertility and Reproductive Values based on Ancestral Definitions.



Sources

Rape in English law is defined as *"sexual intercourse where a man knows that a woman is not consenting or is reckless as to wherever or not she is consenting"* (Smith & Hogan,

1996). Therefore, under English law there is no differentiation between age of victim: if there is no consent, it is rape. The following studies only include the rape of a female by a male (penile to vaginal). There are limitations to the data sets used, but it was not possible to obtain a more representative sample of the population for England and Wales, as the British Crime Survey (which estimates crime from a representative sample) does not ask about specific sexual offences. Rape characteristic information, such as age of victim, date of offence and age of offender, was obtained from the following:

1) Current Data Set

Offences that occurred between 1988-1999 were compiled from the Prison Service, Law Reports, and the Probation Service. The researcher collected data from the local prison, local probation officers and law reports which are available in the library. These were collated for 91 age groups (0; 1; 2; ...88; 89; over 90 years). There were a total of 354 offences recorded in this data set. The number of rapes that occurred in each age group were then divided by the number of females in that age group (obtained from Census data 1991), which then resulted in an age-specific prevalence rate. A limitation of this data set was the reporting bias of the original report writer; for instance, the age of victim was not noted in all offences.

Inclusion of Data Sets

Inclusion of data from a previous study required their results to present prevalence of the crime by age and sex of victim for comparable years, in England and Wales. The studies are publicly available from the British Library or Home Office. This therefore excluded many surveys, which ask respondents if they have ever been raped, they do not note the age of the offence, which would be needed in order to compare the prevalence with FV and RV. Where age is mentioned in surveys they fail to give prevalence rates broken down by age groups. Therefore, only very specific studies could be included in the analysis.

2) Lloyd & Walmsley (1989)

This is a British Home Office study of rape convictions from 1985 in England and Wales: there were 405 convictions with 10 age groups (0-9; 10-12; 13-15; 16-17; 18-20; 21-29; 30-39; 40-49; 50-59; over 60 years). One limitation of this study was that it only used convicted rapes, the number of rapes committed is likely to be much larger than those convicted.

3) Grace, Lloyd & Smith (1992)

This is a British Home Office study of rapes committed in the latter half of 1985 in England and Wales. The offences were those recorded by the police. It included those reported but 'no-crimed' (which refers to cases for which the police decide that there is insufficient evidence to continue to prosecution); there were 289 offences committed: with six age groups (0-16; 17-20; 21-30; 31-40; 41-50; over 51 years). This study used victim reports: although it included those for no-crimed cases, it did not take into account offences not reported.

4) Harris & Grace (1999)

This is a British Home Office study of rapes committed in 1996 in England and Wales. It included those that were later no-crimed. The data were collected from police and Crown Prosecution Service files; there were 446 offences, and 6 age groups (0-12; 13-15; 26-35; 36-45; over 46 years). The sample was obtained from five police force areas. a small proportion of England and Wales, and again it did not take into account offences not reported.

5) Homicide 1985 (Research Development Statistics, Home Office, 1986)

These are the number of convicted female homicides in England and Wales in 1985; there were seven age groups (0-1; 1-4; 5-15; 16-29; 30-49; 50-69; over 70 years). There were 257 offences recorded for this year.

6) Homicide 1997 (Research Development Statistics, Home Office, 1998)

These are the number of convicted female homicides in England and Wales in 1997; there were seven age groups (0-1; 1-4; 5-15; 16-29; 30-49; 50-69; over 70 years). There were 224 offences recorded for this year.

Procedure

Initially FV and RV were calculated. Results for the current data set were then collected. Each rape offence in the current data set was classified as:

1) Either being committed by an offender with a non-reproductive sexual preference or not (these included anyone classified in their prison report as a paedophile or if they raped a child less than 13 years old);
2) The offender committed an additional crime or not (specifically at the time of the index offence); and
3) Whether the victim was injured or not (this included any physical injury).

There were no rape-murders included in the data set. There were 403 offences collated, of which 354 could be classified by the victim's age group.

Results

a) Correlations between FV, RV, and Rape Prevalence (and Homicide)

1) Rape

Current FV and RV Curves

The prevalence of rape relative to the base rate (age specific prevalence rate per hundred thousand) was correlated with FV and RV for each age group: e.g., the proportion of rapes for an age group was matched with the FV for that age group

The Current Data Set did not meet parametric assumptions and transformation did not reduce the effects for both the FV, RV, and prevalence rate. Therefore, a non-parametric correlation (Spearman's rho) was used. The data sets of Lloyd & Walmsley, Grace *et al*, and Harris & Grace met parametric assumptions and were therefore analysed using Pearson's r.

Table 1.1 shows that FV was moderately related to rape prevalence in the Current Data Set, the Lloyd & Walmsley study and the Grace *et al* study: so age groups with higher FVs had higher frequencies of rape. However, Table 1.1 also shows that rape prevalence was more highly related to RV in all four data sets: the higher the frequency of rape then the higher the RV for each age group (see Figures 1.3 and 1.4).

Table 1.1: Correlations between Age Specific Prevalence of Rape per Hundred Thousand and FV or RV, within Categories.

	FV	RV
Current Data Set – rho	0.29**	0.62***
Lloyd & Walmsley (1989) – r	0.32	0.79**
Grace *et al* (1992) – r	0.53	0.98***
Harris & Grace (1999) - r	0.04	0.94**

***p<0.001, **p<0.01, *p<0.05.

Figure 1.3: Pearson's Correlation between RV and Rape Prevalence (r=0.98) using the Grace *et al* Data Set.

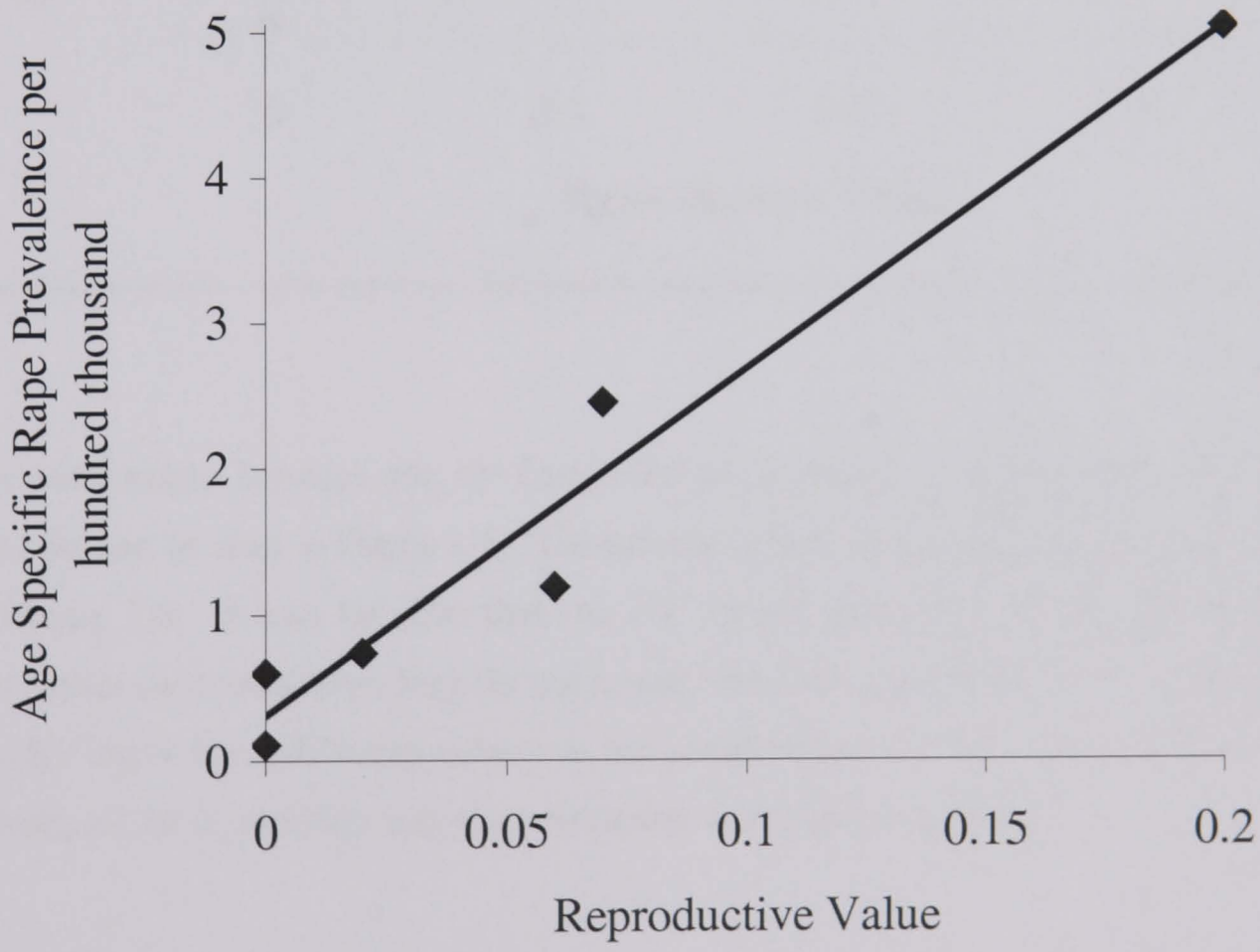
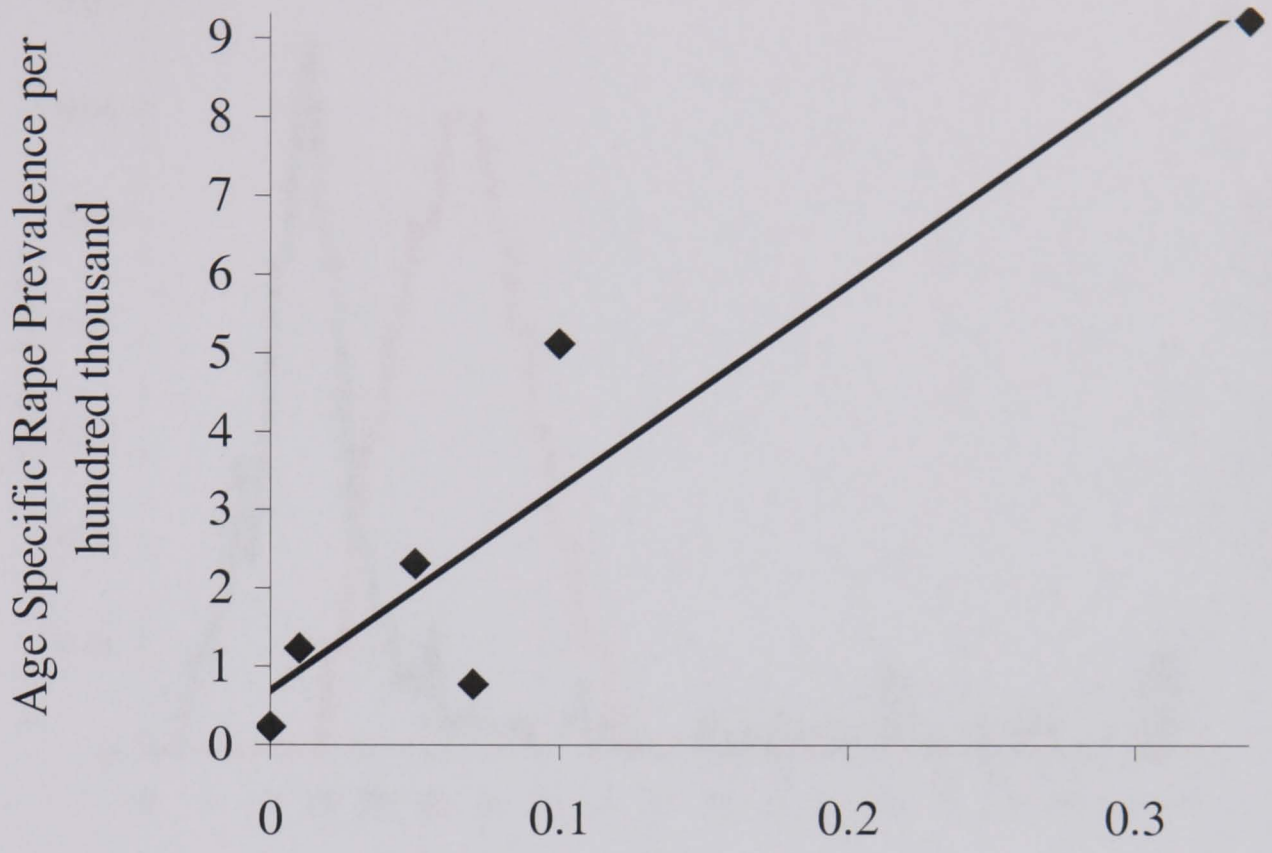
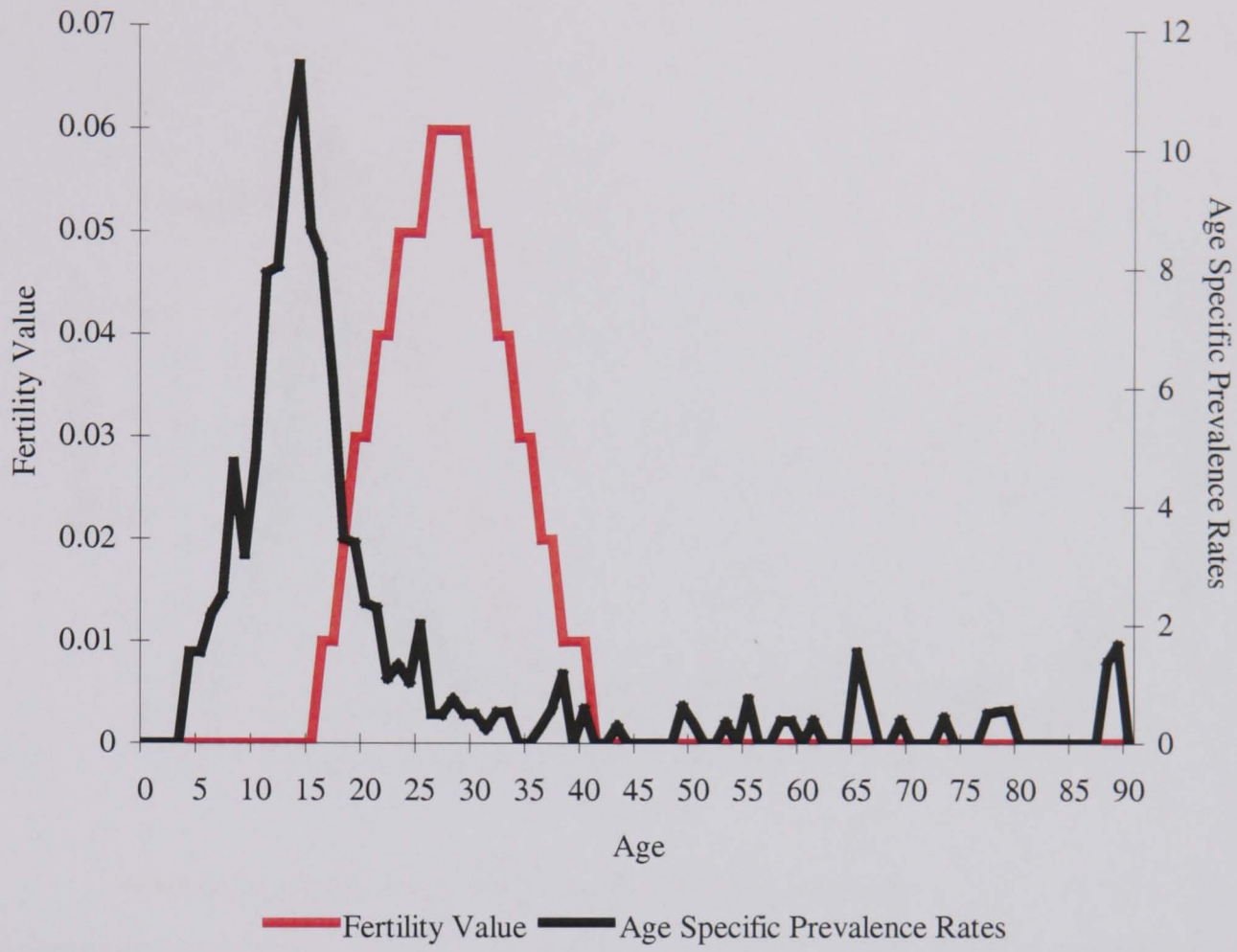


Figure 1.4: Pearson's Correlation between RV and Rape Prevalence (r=0.94) using the Harris & Grace Data Set.



The relationship between the FV curve and the prevalence rates of rape for the Current Data Set can be seen in Figure 1.5. The pattern of prevalence and the RV curve can be seen in Figure 1.6. It can be seen that the FV curve demonstrates a similar pattern to the prevalence curve however, they do not match which would account for the low correlation. The RV curve has a different pattern to the prevalence curve but high values do correspond in both, which is probably why the correlation was higher with these.

Figure 1.5: Fertility Value and Rape Prevalence Rates per hundred thousand by Age in the Current Data Set.



The correlations were reanalysed without victims less than 13 years old, so that any effect of paedophile activity on the samples could be eliminated and the analysis would only consist of the rape of females who have reached puberty (13-90 years). The results are shown in Table 1.2. The correlational pattern remained substantially the same but increased the association with FV in the Current data set.

Figure 1.6: Reproductive Value and Age Specific Prevalence Rates per hundred thousand by Age in the Current Data Set.

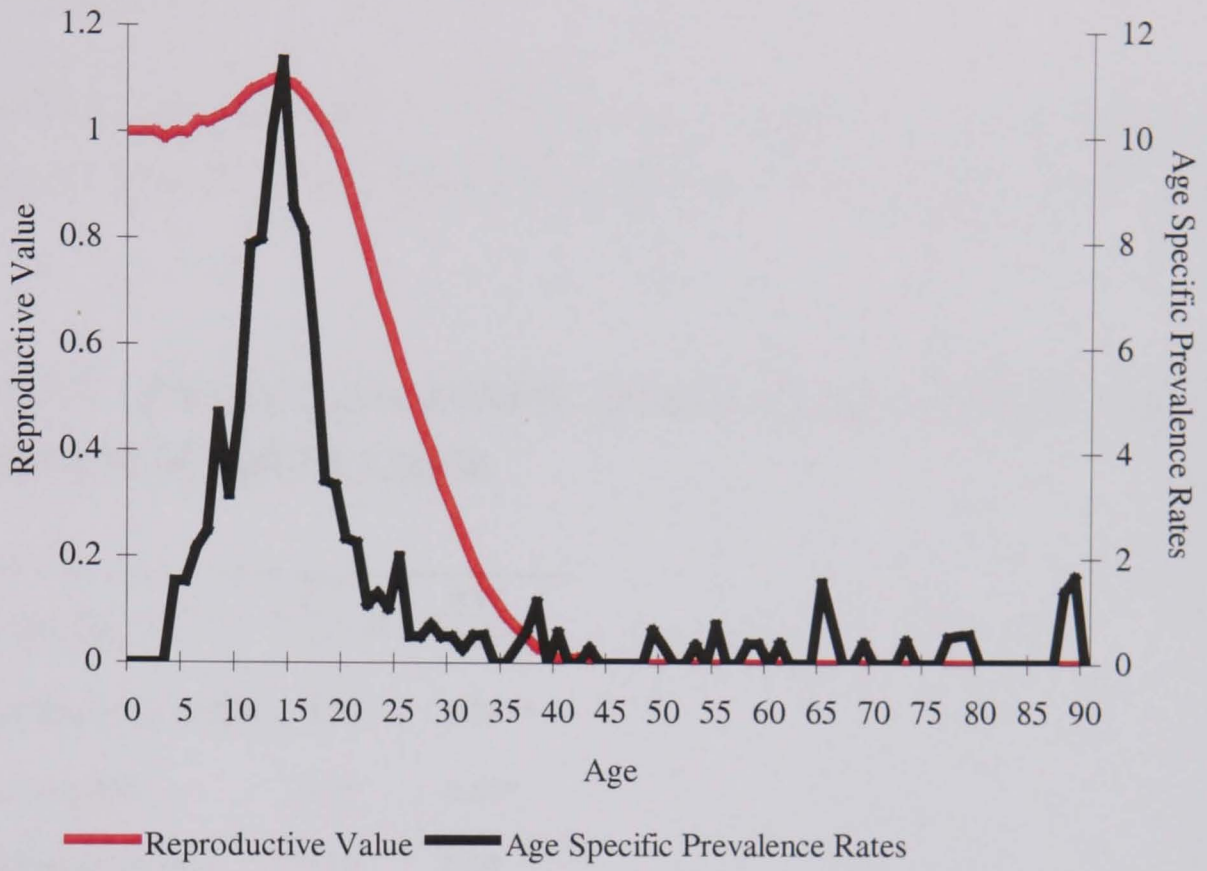


Table 1.2: Correlations between Age Specific Rape Prevalence per Hundred Thousand and FV and RV for Categories, Excluding Victims of less than 13 Years Old.

	FV	RV
Current Data Set – rho	0.46***	0.58***
Lloyd & Walmsley (1989) – r	0.24	0.97***
Grace *et al* (1992) – r	0.52	0.99**
Harris & Grace (1999) - r	-0.10	0.97**

***p<0.001, **p<0.01, *p<0.05.

Ancestral (Hypothetical) FV and RV Curves

In order to meet the assumptions of a normal distribution the age specific prevalence rate. the hypothetical FV and hypothetical RV for the Current Data Set were transformed using an inverse transformation (inv + 1).

Correlations were then performed between rape prevalence and the hypothetical FV and RV curves. It can be seen in Table 1.3 that the relationships with FV and RV increased.

Table 1.3: Pearson's Correlations between Rape Prevalence and Ancestral (hypothetical) FV and RV Curves.

	FV	RV
Current Data Set	0.61***	0.69***
Lloyd & Walmsley (1989)	0.76*	0.79**
Grace *et al* (1992)	0.75	0.83*
Harris & Grace (1999)	0.59	0.73

***p<0.001, **p.0.01, *p<0.05

The correlations were then repeated with victims less than 13 years old excluded. It can be seen in Table 1.4 that the correlations did not differ significantly from those in Table 1.3.

Table 1.4: Pearson's Correlations between Rape Prevalence and Ancestral (hypothetical) FV and RV Curves, excluding Victims less than 13 years old.

	FV	RV
Current Data Set	0.61***	0.69***
Lloyd & Walmsley (1989)	0.76*	0.92**
Grace *et al* (1992)	0.74	0.88
Harris & Grace (1999)	0.54	0.84

***p<0.001, **p.0.01, *p<0.05

2) Homicide

Current FV and RV Curves

The FV and RV, for the Homicide data for 1985 did not demonstrate normal distributions and were therefore transformed using a square root. The RV and prevalence rates of the Homicide data for 1997 were also transformed. RV was transformed using a square root and prevalence was transformed using a logarithm. Homicide correlations were then analysed using a Pearson's r.

Homicide was related to the victims' RV: as the RV of an age group increased, so did the age group's rate of murder victimisation (Homicide 1985 – $r=0.75$, $p<0.10$; Homicide 1997 – $r=0.63$, $p>0.05$). There was no relationship with FV (Homicide 1985 – $r=0.01$, $p>0.05$; Homicide 1997 – $r=0.15$, $p>0.05$).

The analysis was repeated with victims less than 13 years old excluded to replicate the removal of paedophiles in the rape analysis. This reduced the RV correlations (Homicide 1985 – $r=0.54$, $p>0.05$; Homicide 1997 – $r=0.62$, $p>0.05$) and increased the FV correlations (Homicide 1985 – $r=0.55$, $p>0.05$; Homicide 1997 – $r=0.62$, $p>0.05$). Therefore, with adults only there are correlations between homicide and both FV and RV.

Ancestral (Hypothetical) FV and RV Curves

The correlations were repeated with the ancestral curves. The ancestral FV and RV met the assumptions of a normal distribution and so therefore did not require transformation.

It was found that there was a weak relationship between the hypothetical FV and homicide (Homicide 1985 – $r=-0.22$, $p>0.05$; Homicide 1997 – $r=-0.17$, $p>0.05$). There was no relationship found between homicide and the hypothetical RV (Homicide 1985 – $r=0.04$, $p>0.05$; Homicide 1997 – $r=-0.06$, $p>0.05$).

When the analysis was repeated on victims above 13 years old it was found that the relationships increased. There was a moderate relationship found between FV and homicide (Homicide 1985 – r=0.52, p>0.05; Homicide 1997 – r=0.61, p>0.05). There was also a moderate relationship found between RV and homicide (Homicide 1985 – r=0.50, p>0.05; Homicide 1997 – r=0.57, p>0.05).

b) Kruskal-Wallis ANOVA of Current Data Set between Current FV, RV, and Victim-Offender Relationship

A Kruskal-Wallis one-way analysis of variance was conducted to investigate the differences in current FV and RV between the following categories of victim-offender relationships in the current data set: (stranger; acquaintance; step-relative - non-blood relative apart from partner; partner/ex – long-term partner either married or not; and kin). Due to missing data, 285 of the original 403 cases were analysed. It was found that FV was significantly different across victim-offender relationships (χ^2=16.40, df=4, p<0.01), as was RV (χ^2=18.84, df=4, p<0.001). Table 1.5 shows the results of post-hoc Dunn tests: all differences were significant at p<0.05. It can be seen that partners were more likely to rape a victim with a higher FV than other offenders and that strangers were more likely to rape a victim with a lower RV than other offenders. To address the problem of paedophiles being included, all cases that involved a victim younger than 13 years (N=94) were excluded and the analysis was rerun. It was found that both FV (χ^2=15.63, df=4, p<0.01) and RV (χ^2=13.86, df=4, p<0.01) were again differentiated (see Table 1.5), in that victims of partner rape had a higher FV than victims of stranger or acquaintance rape. This does not support the prediction derived from the argument that rape is a short-term strategy, i.e. that victims who were strangers would have a higher FV than those who were not. However, it was also found that victims of step-relatives and acquaintances had a higher RV than stranger victims, which does support the prediction that rapes of known victims may reflect a longer-term strategy than the rape of strangers. Ruback & Ivie (1988) found that stranger victims were older (27.2 years) than non-stranger victims (24.9 years). This suggests that stranger victims had a higher FV and a lower RV than non-stranger victims. The current

study therefore supports Ruback & Ivie (1988) as stranger victims were found to be 36 years old (mean) and have a lower RV than other victims (who were 16 years old).

Table 1.5: Post-hoc Dunn tests for Kruskal-Wallis ANOVAs between Victim-Offender Relationship and FV (z score) and RV (z score).

	FV	RV
All Cases, n=285	Partner/Ex>Kin Partner/Ex>Acquaintance Partner/Ex>Step-relative	Step-relative>Stranger Acquaintance>Stranger
Excluding Paedophiles, n=191	Partner/Ex>Stranger Partner/Ex>Acquaintance	Step-relative>Stranger Acquaintance>Stranger

As differences were found in FV and RV between the victim-offender relationship. It was hypothesised that the relationship between rape prevalence and FV and RV would alter depending on the victim-offender relationship. Therefore, rape prevalence was subdivided between the five victim-offender relationships and the correlations with current FV and RV were conducted again. These were non-parametric tests as the variables did not meet the requirements of a normal distribution. It can be seen in Table 1.6 that there were large correlations found. There were no relationships found between stranger rape and FV and RV. There was a positive weak relationship found between acquaintance rapes and FV, but a strong relationship found with RV. There was a weak relationship found with FV and rapes by step-relatives, but a strong relationship found with RV. There was a weak relationship with both FV and RV with the rape of partners or ex-partners. There was a weak correlation with FV and those raped by kin, but a strong relationship with RV.

The analysis was repeated excluding victims of less than 13 years old. These results can be seen in Table 1.7. It can be seen that most of the relationships with FV increased.

Table 1.6: Spearman's Correlations between Current FV, RV, and Rape Prevalence according to Victim-Offender Relationship.

		FV	RV
Victim-Offender Relationship	Stranger	0.09	0.06
	Acquaintance	0.24*	0.62***
	Step-relative	0.30**	0.77***
	Partner/Ex	0.39***	0.30**
	Kin	0.26*	0.68***

***p<0.001, **p<0.01, *p<0.05.

Table 1.7: Spearman's Correlations between Current FV, RV, and Rape Prevalence according to Victim-Offender Relationship, excluding Victims less than 13 years old.

		FV	RV
Victim-Offender Relationship	Stranger	0.06	0.15
	Acquaintance	0.41***	0.58***
	Step-relative	0.58***	0.75***
	Partner/Ex	0.38**	0.44***
	Kin	0.43***	0.68***

***p<0.001, **p<0.01, *p<0.05.

c) Logistic Regressions of Non-Reproductive Sexual Preference, Secondary Offence, and Physical Injury Groups

Three hierarchical and stepwise logistic regressions were performed to assess the identifying characteristics that differentiate the rape of women. FV was entered first with RV, age of offender, and victim-offender relationship entered sequentially if they had a significant effect. Only the final models are presented here. Where victim-offender relationship was entered into the model the fifth parameter (kin) was held as a constant and therefore values are not shown: these were not needed as the overall value for victim-

offender relationship demonstrated whether it was a significant predictor; if it was, a post-hoc loglinear analysis was performed. The odds ratio is the (increased or decreased) odds of being in one outcome category when the value of the predictor increases by one unit. Due to missing data, 228 of the original 403 cases were analysed. The z scores of FV and RV were used.

1) Non-Reproductive Sexual Preference/Reproductive Sexual Preference Groups

It was found that all four variables significantly predicted membership of the non-reproductive sexual preference and reproductive sexual preference groups, with 89% of offenders in the reproductive sexual preference group correctly classified and 89% in the non-reproductive sexual preference group. Table 1.7 presents the significant predictor variables and Table 1.9 the mean values of FV, RV, and age of offender.

Table 1.8: Final Logistic Regression Model for Non-Reproductive Sexual Preference/Reproductive Sexual Preference Groups.

	B	Wald test	Odds Ratio
FV (z score)	-124.43	17.01***	0.00
RV (z score)	2.31	6.04*	10.10
Age of Offender	-0.08	10.14**	0.93
Victim-Offender Relationship		12.32*	
Parameter 1 (stranger)	2.24	0.00	9.36
Parameter 2 (acquaintance)	0.76	0.00	2.14
Parameter 3 (step relative)	2.98	0.01	19.64
Parameter 4 (partner/ex)	-8.63	0.00	0.00
(Constant)	-68.80	3.65	

***p<0.001, **p<0.01, *p<0.05.

Table 1.9: Means (and Standard Deviations) of FV (z score), RV (z score), and Age of Offender in Non-Reproductive Sexual Preference/Reproductive Sexual Preference Groups.

	Non-Reproductive Sexual Preference, n=83	Reproductive Sexual Preference, n=145
FV (z score)	-0.54 (0.01)	0.50 (1.12)
RV (z score)	1.67 (0.13)	1.20 (0.81)
Age of Offender	33.51 (10.73)	38.02 (11.36)

Victim-offender relationship also significantly differentiated the two groups (Wald test=12.32, $p<0.05$). A hierarchical loglinear analysis found that there were a significantly ($p<0.001$) larger number of rapes committed against a step-relative in the non-reproductive sexual preference group (61%) than there were in the reproductive sexual preference group (32%).

2) Secondary Offence/Rape Only Groups

The second logistic regression analysed the difference between those offenders who had committed a secondary offence and those who had not. It was found that only FV and victim-offender relationship significantly predicted group membership (see Table 1.10). Means (and standard deviations) of FV (z score) were 0.86 (SD=1.15) for the secondary offence group and 0.01 (SD=0.96) for the rape only group. Ninety-eight percent of the rape only group were correctly classified whereas only 25% of the secondary offence group were.

The victim-offender relationship was significantly differentiated (Wald test=15.19, $p<0.01$). The post-hoc hierarchical loglinear analysis found that victims raped by a stranger were more likely to be subjected to an additional crime[3] (25%) than to be raped without any additional crime (7%). Step-relatives were more likely ($p<0.001$) to rape without an additional offence (47%) than rape with another crime (16%). Partners or ex-partners were more likely ($p<0.05$) to commit an additional crime (13%) than just the index offence (3%).

[3] For example, theft, criminal damage, or burglary.

Table 1.10: Final Logistic Regression Model for Secondary Offence and Rape Only Groups.

	B	Wald test	Odds Ratio
FV (z score)	0.67	12.70**	1.95
Victim-Offender Relationship		15.19*	
Parameter 1 (stranger)	0.96	4.93	2.62
Parameter 2 (acquaintance)	0.12	0.10	1.13
Parameter 3 (step relative)	-1.46	11.39	0.23
Parameter 4 (partner/ex)	0.70	1.34	2.02
(Constant)	-1.80	45.77***	

***p<0.001, **p<0.001, *p<0.01.

3) Physical Injury/No Injury Groups

The third logistic regression considered the amount of physical injury the victim suffered. It was found that victim-offender relationship and FV (which was forced into the equation) predicted group membership. Thirty-five percent of offenders who had physically injured their victims were correctly classified whereas 93% of offenders who had inflicted no injury were.

Table 1.11 shows that FV did not significantly differentiate members of the two groups, although victim-offender relationship did (Wald test=20.30, p<0.001). The post-hoc loglinear analysis found that victims of a stranger rape were more likely (p<0.01) to be injured (26%) than not injured (5%), victims of an acquaintance rape were more likely (p<0.05) not to be injured (26%) than injured (20%), victims raped by a step-relative were more likely (p<0.01) not to be injured (47%) than injured (28%) and victims of partner or ex-partner attacks were more likely (p<0.05) to be injured (11%) than not to be injured (2%).

Table 1.11: Final Logistic Regression Model for the Physical Injury/No Injury Groups.

	B	Wald test	Odds Ratio
FV (z score)	0.20	1.46	1.22
Victim-Offender Relationship		20.30**	
Parameter 1 (stranger)	1.21	9.19*	3.36
Parameter 2 (acquaintance)	-0.67	3.67	0.51
Parameter 3 (step relative)	-0.90	8.42*	0.41
Parameter 4 (partner/ex)	0.98	2.91	2.68
(Constant)	-1.01	21.97***	

***p<0.001, **p<0.001, *p<0.01.

Discussion

The first part of this study assessed the relationship between fertility value (FV) and the frequency of rape victimisation. It was found that FV was higher when victimisation was higher, according to three of the four data sets. Reproductive value (RV) was much more highly correlated with the frequency of victimisation, in all four data sets. Examination of homicide rates demonstrated that the frequency of victimisation was significantly positively associated with the RV of the victim (1985 data) as predicted because of long-term mate guarding (although this was not the case when child victims were removed as FV was then also moderately correlated). The current data set was the only one to separate victims into each chronological year rather than very broad age bands: this would therefore have given a more accurate result, since it had nine times as many age bands than Lloyd & Walmsley's study and 15 times as many as Grace *et al* (1992) and Harris & Grace (1999). Overall, FV and RV were both related to rape prevalence but RV consistently demonstrated stronger associations. This would suggest that the majority of victims were between 9-17 years old. Buunk, Dijkstra, Kenrick & Warntjes (2001) found that male preferences for a partner in a

sexual fantasy were young but not as young as the victims of rape found in the current study (17-45 years), which suggest that patterns for raping and sexual fantasy are different.

Although Thornhill & Thornhill's (1983) prediction that the prevalence of rape would be related to FV was supported to some extent in three of the four data sets, this finding was tempered by the existence of a higher positive association with RV in all four cases, and particularly so in the current data set which separated each year. This indicated that in these cases rape shows characteristics expected to be associated with a long-term strategy, particularly so as the majority of rapes were committed by intimates. It may therefore be used as a consistent method of controlling the victims, supporting the mate-guarding hypothesis of partner violence (Wilson & Daly, 1992). Studies have suggested that there is a relationship between rape and domestic violence, i.e. rape within a relationship is often associated with physical abuse in both directions (Mahoney & Williams, 1998).

The analysis of the ancestral curves found that the majority of the relationships increased. Most notably the correlation with FV increased significantly bringing them in line with the RV correlations. It would appear that according to the ancestral curves, rape is targeted towards victims with both a high FV and RV. This would suggest that rape might incorporate a mixture of long- and short-term strategies.

It was also predicted that there would be a positive relationship between homicide rates and the FV of victims as this would also be indicative of mate-guarding – assumed to occur most when the woman is more likely to conceive (also based on the assumption that homicides are indicative of underlying aggressive motivations: Daly & Wilson, 1988). The current study found that RV was associated with homicide. This was not predicted as it was considered that women would be more at risk when they were more fertile but it would appear that the future reproductive capability of women is more closely related to their risk of homicide. If their killers were their husbands, as Wilson *et al* (1997) and Wilson *et al* (1995) would predict, it would appear that sexual jealousy and male proprietariness were operating more strongly when females are young rather than when their fertility value was highest (which is similar to the study of rape abductions in Ethiopia (Getahun, 2001) who were usually abducted at 13 years old). Unfortunately, the homicide statistics analysed in this study did not provide information on who committed the offence. This information

would have allowed a parallel analysis with the rape data into victim-offender relationships. Future research could address this. Shackelford *et al* (2000) found that there were more murders of wives of a reproductive age than older wives but this study did not calculate FV and RV. Analysis of hypothetical FVs and RVs, in the current study, found that there were no relationships with homicide. This suggested that homicide of females is not directly related to FV and RV cues of the past.

There were significant differences in FV and RV between victim-offender relationship categories (see Table 1.5). Partners were found to rape a victim with a significantly higher FV than offenders who raped kin, acquaintances, or step-relatives. Strangers also raped a victim with a significantly lower RV than those who raped a step-relative or acquaintance. When presumed paedophiles were excluded from the analysis, partners were found to rape victims with higher FVs than victims of strangers or acquaintances. Strangers raped victims with lower RVs than did step-relatives or acquaintances. These results suggested that offenders who raped strangers targeted someone with a lower RV than when the victim was known, which suggested that their victims were older. However, they did not specifically target those with a higher FV, as predicted by the hypothesis that rape is a short-term strategy. Since this hypothesis would apply more clearly to stranger rape, this is a particularly noteworthy finding.

Partners tended to rape women with a higher FV than was the case for the other categories of victim. However, it may simply be that partners were closer to the maximum fertility age (28 years) than the other categories, which would then give them a higher FV. This finding suggested that men who rape partners were operating more on short-term cues than were other categories of rapists. Again, this finding would not be expected from the hypothesis that it is strangers who would rape victims with higher FVs, whereas those raping known victims (step-relative; kin; partners/ex) would be more likely to choose a victim with a high RV, as part of a longer-term strategy. Correlations were conducted between rape prevalence among victim-offender relationships, and FV and RV. It was found that there were no relationships found between stranger rape and FV or RV. It would be expected that stranger rape would have correlated with FV, as it was a short-term mating strategy. This finding therefore provides no support for the hypothesis that stranger rapists would attack a victim with a high FV. There were relationships found with FV and RV

among acquaintance rapists. The relationship with RV was much stronger, which suggested that rapists of acquaintances target victims with a high RV. There were relationships found with FV and RV among offenders who were step-relatives. Again, the relationship with RV was much stronger suggesting that victims of step-relatives are much younger and may be targeted for their future reproductive capability. This may be similar to the abduction and rape of children in Ethiopia (Getahun, 2001), who are then forced to marry their abductor, as they would not be able to marry someone else. This practice may be similar to step-relatives in attempting to control the RV of the victims. The prevalence of partner rape was related equally to FV and RV, which suggested that partners rape a victim with both a high FV and high RV. It might be that the partner offenders are exhibiting a compromise between short- and long-term strategies. The rape prevalence of kin was related more to RV than FV. This suggested that the rape of kin might be a long-term strategy. It would seem that the prevalence of certain types of rape are related to FV and RV, which may then indicate whether they are a short- or long-term mating strategy.

It has been found that women who are at the midpoint of their menstrual cycle are less likely to be raped (Chavanne & Gallup, 1998). This is because they reduce their risk taking behaviour, i.e. they are less likely to go out socially and more likely to stay at home. Risky behaviour was defined as putting themselves into a situation where they may be vulnerable to a sexual assault. Even though Felson (1997) found that having an active nightlife did not increase the risk of violent crime for women, the common perception is that it does increase the risk, particularly of stranger rape. Perhaps women who have a high FV are also more likely to partake in less risky behaviour, which would provide an explanation of why stranger victims had a lower FV than partner victims, who would not be able to avoid potential rapists by lowering their risk-taking behaviour. This possibility could be investigated by asking women of different ages to state what risky behaviours they would take part in. Women could also be asked what they approve of women doing at different ages.

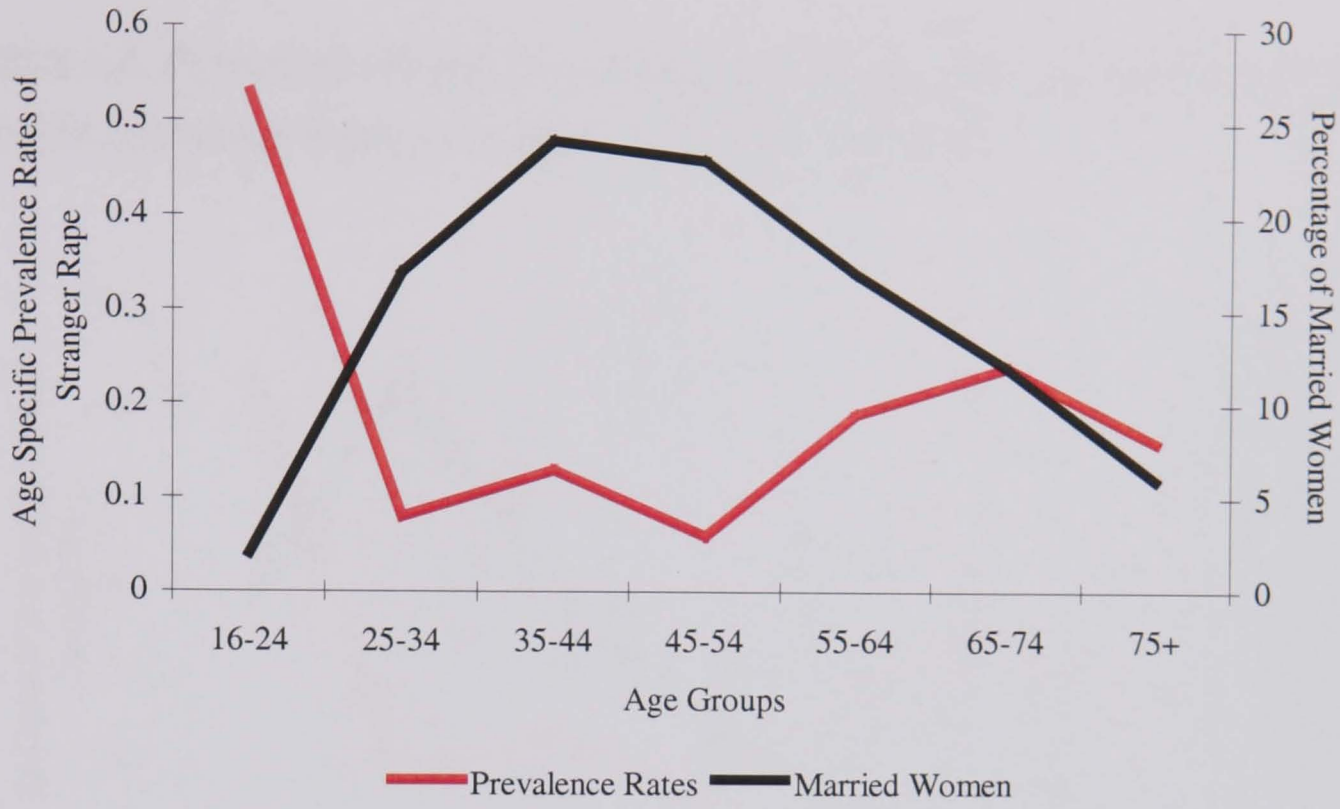
The low correlations of stranger rape with FV and RV may also be due to the population of high FV and high RV women being protected, in some way, from stranger rape. For example, it may be that women who are married/cohabiting may be less likely to be raped by a stranger as they are protected by their partner. Wilson & Mesnick (1997) suggested

that this is the case for female homicides, i.e. married women incur less violence than unmarried women. Figures 1.7, 1.8, and 1.9 demonstrate the relationship between the number of age-specific stranger rapes in the Current Data Set compared to the percentage of women who are married, cohabiting, or single[4]. It can be seen that in the age groups 35-54 there were a large proportion of married women, and there are a large proportion of cohabiting women in the group 25-34, whereas the highest prevalence of stranger rape in the Current Data Set was in the 16-24 age group. The largest proportion of single women is in the group 16-24 which corresponds with the highest proportion of rapes. Therefore, it may be that being married or cohabiting may protect females from being raped, which would support the bodyguard hypothesis (Wilson & Mesnick, 1997).

The second part of the study examined hypotheses explaining why victims with a low FV are ever raped. It was predicted that this would occur because the offender possessed a non-reproductive sexual preference, or a secondary offence was committed. In addition, Thornhill & Thornhill (1990) proposed that victims with a low FV would not be physically injured. The categorisation of the offenders into the groups was determined by the information in reports. There may however have been omissions by the author of the report of certain information (e.g., whether the offence contained additional violence). This weakness is noted but is not rectifiable due to the limited information provided by the reports (i.e. prison; law; probation).

[4] See www.statistics.gov.uk/statbase/Expodata/Spreadsheets/D5375 for source.

Figure 1.7: Percentage of Married Women in a UK sample compared with the Age Specific Prevalence Rates of Stranger Rape (r=-0.77, p<0.05).

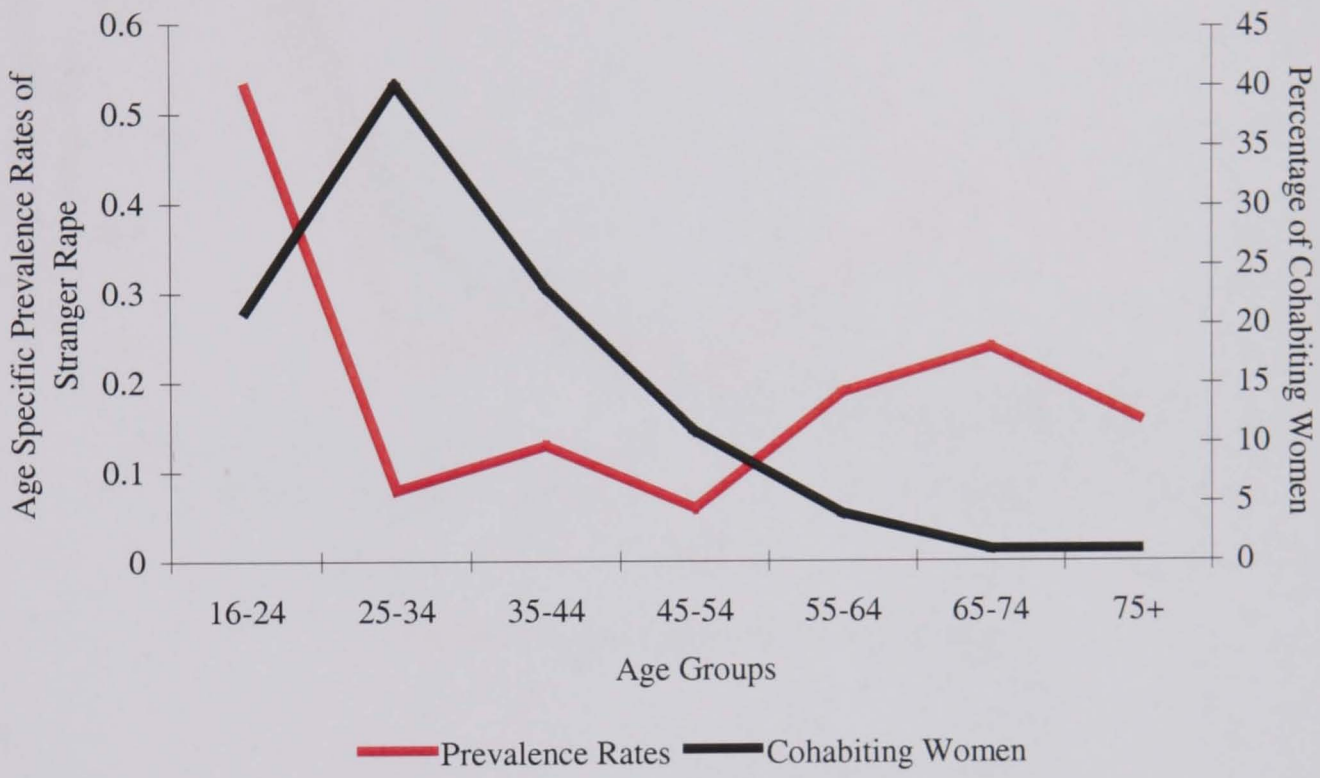


Offenders in both the non-reproductive sexual preference and reproductive sexual preference groups were correctly classified according to the age of offender, the victim-offender relationship, and the FV, and RV of victims. Those in the non-reproductive sexual preference group raped victims with a lower FV, and higher RV (of course this finding is partly determined by the decision rule used, but the analysis was conducted to confirm it statistically). The offenders were younger and were more likely to rape a step-relative than were those in the reproductive sexual preference group.

Only a small proportion of offenders who had committed a secondary offence were correctly classified, whereas the majority of those who had committed a rape on its own were correctly classified. Offenders in the secondary offence group had raped victims with a higher FV than those in the rape-only group: this was the opposite to what was predicted. Felson & Krohn (1990) have found that victims of a rape and robbery are significantly younger (28 years) than female victims of a robbery (35 years), which suggested that those

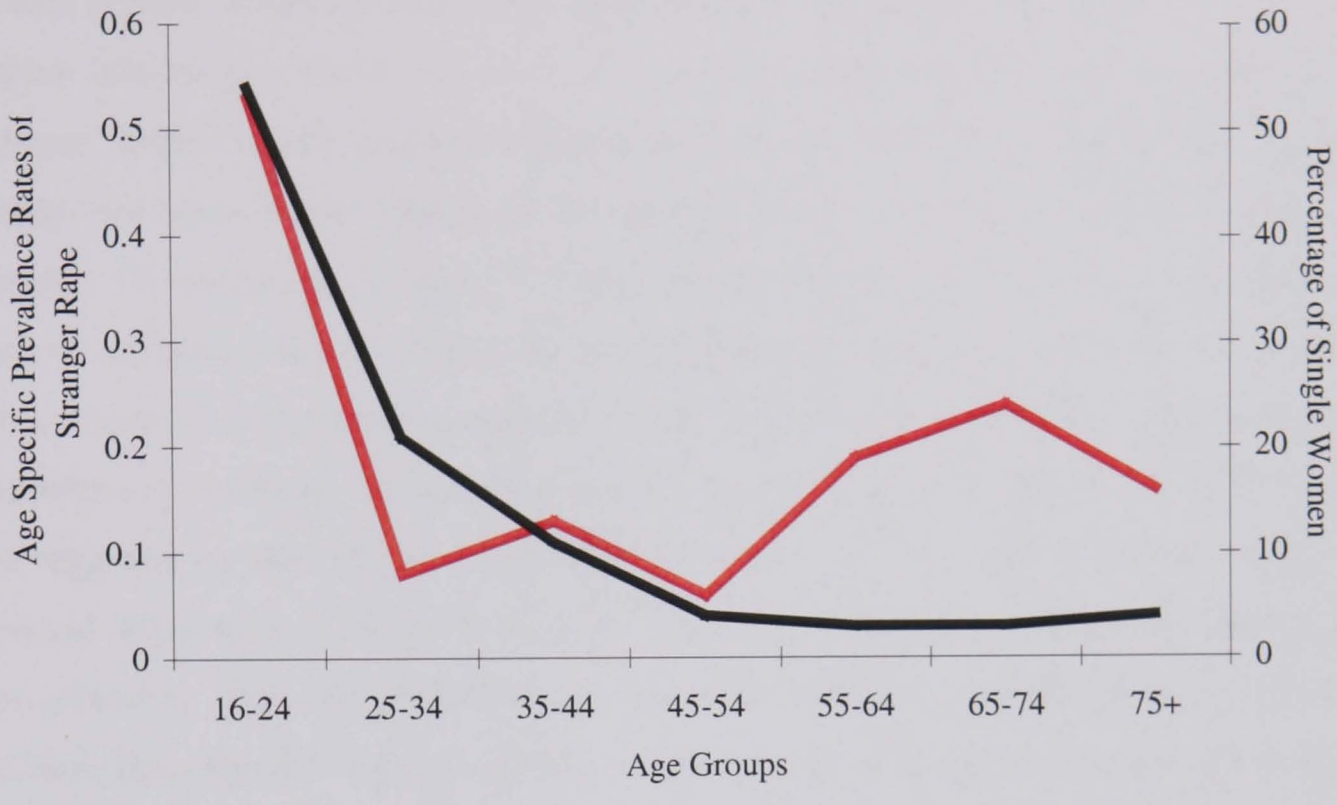
women who are more fertile are more likely to be raped, even when opportunity was controlled for.

Figure 1.8: Percentage of Cohabiting Women in a UK sample compared with the Age Specific Prevalence Rates of Stranger Rape (r=-0.07, p>0.05).



Both rapists of strangers and partners were more likely to commit a secondary offence (e.g. strangers = theft; partners/ex-partners = assault) whereas those of step-relatives were more likely to rape the victim without an additional crime. These findings are complicated by the problem of ascertaining whether the secondary offence precipitated the rape, or whether the rape then led to an additional crime. The method of data collection did not allow these to be distinguished. It has been noted that there is often extra violence and other crimes connected with a marital rape (Mahoney & Williams, 1998), which appears to have been supported here. The rape of a step-relative is likely to occur within the family home between an adult and child or young person, which would mean there is less reason for an additional crime to occur.

Figure 1.9: Percentage of Single Women in a UK sample compared with the Age Specific Prevalence Rates of Stranger Rape (r=0.79, p<0.05).



Finally, a third of those offenders who physically attacked their victims were correctly classified, whereas the majority of those who did not injure their victims were correctly classified. FV did not differentiate between offenders who had attacked their victims and those who did not, which neither supports the hypothesis in this study nor that proposed by Thornhill & Palmer (2000), and Thornhill & Thornhill (1990c). However, strangers and partners were more likely to injure the victim, whereas acquaintances and step-relatives were less likely to injure their victim, which supported the findings of Thornhill & Thornhill (1990c). This suggested that violence is related to the type of relationship between the victim and her attacker. A stranger rape is more likely to require force and marital rape is associated with violence and control (Mahoney & Williams, 1998).

Limitations

The main limitation concerns the use of data from convicted offenders. It is generally assumed that the prevalence of rape is much greater than is reflected in official statistics. Russell (1984), used a victimisation questionnaire, which identified rape as forced penile-vaginal intercourse, found that the rate was seven times higher than that reported by the National Crime Survey (survey assessing victimisation including unreported offences), and twenty-four times higher than those in the Uniform Crime Reports (official reported crime reports). Of course, the reporting of rape has increased in the past twenty years due to more positive attitudes towards victims by the police (Harris & Grace, 1999), but it is still likely that a majority of rapes are unreported. There may also be the problem that reported rapes committed by intimates are associated with more violence than other types, as often rape is just regarded as part of the relationship (Mahoney & Williams, 1998) and for it to be reported it has to be excessively violent. This may produce an unrepresentative picture of rape offences. There was, however, no way of avoiding this problem, as data were required for both the offender and the victim. Future research could investigate the hypotheses using a more representative sample, perhaps involving respondents from rape crisis centres, as well as using offender reports. Although these may not be representative of all rape victims.

The value of females in this study was equated with their FV and RV. However, a female's life history pattern may affect their FV and RV. Females who have developed within a stressful family environment enter puberty earlier, reach sexual maturity earlier, and marry earlier than those who have a stable family upbringing (Belsky, Steinberg & Draper, 1991). It can be inferred, therefore, that they will also have their first child earlier than those who mature later. This pattern would lead to their high FV being much younger than the current average (28 years). Females with a stressful upbringing may also express more behavioural mating effort due to their early development. Females who had a stressful upbringing may be from a low socio-economic background and females with a low socio-economic status are more likely to be raped (Thornhill & Thornhill, 1983) which may result from their early sexual maturity, if sexual attractiveness is a key factor. Rape offenders are also often from a low socio-economic background (Thornhill & Thornhill, 1983) and tend to victimise

females from the same area, also with a low socio-economic status. The current study could not address this issue, as information on female status was not available and female value was deemed to be represented by their FV and RV.

Only female offspring were used in the calculation of FV and RV as this provided the minimum input that the female would have into future populations (i.e. their net value). However, the inclusion of male offspring may alter the results, but for the purpose of this study the use of female offspring was regarded as more parsimonious as it is difficult to estimate the reproductive rate of males. A more complete analysis would calculate FV and RV using male offspring, and both female and male offspring.

FV and RV are constructs that are based on the age of an individual. These therefore do not take into account the individual differences in appearance relating to cues indicative of FV and RV. It may be that some of the older victims looked much younger than they were. There are societal expectations that women must make themselves look younger and maintain their appearance, this may account for the rape of some older women. One way to assess this would be to have the age of women rated and find out if women can be correctly aged.

Conclusion

This study investigated the hypothesis that rape would occur most frequently to women with a high FV, as this reflected a short-term adaptive mating strategy. In the samples studied, although there was some evidence for an association between incidences of rape and the victim's FV, it was much more closely related to the victim's RV, which suggested that the age of victimisation more closely followed what was expected because of a long-term mating strategy. Further analysis showed no evidence that stranger rapists targeted victims with a higher FV to a greater extent than rapists of known victims. FV was related to the frequency of offences for acquaintance, step-relative, partner and kin offences, however RV produced stronger correlations for acquaintance, step-relative, and kin offences. There were no relationships with stranger offences. This suggested that non-

stranger offences are a long-term strategy as they target victims with a high RV, whereas stranger rapists seem to rape regardless of the victims FV and RV. The offence of homicide was also analysed, and it was found that this was related to RV. If homicide were similar to domestic violence in that the offender is often a partner. we would expect it to be related to RV. The rape of victims with a low FV was primarily explained by the sexual preference of the offender, in that most victims were children who were raped by people assumed to be paedophiles.

Summary – Study 1

From the hypothesis that rape is a short-term mating strategy (Buss & Schmitt, 1993), which was adaptive (Thornhill & Palmer, 2000), it was predicted that the prevalence of rape would be positively associated with fertility value (FV). A positive relationship with reproductive value (RV) would be expected if rape were a long-term strategy. It was further predicted that where the victim had a low FV, the offender would possess a non-reproductive sexual preference or commit another offence, and be less likely to be injured. British data were collected from the Prison Service, Law Reports, and a Probation Service. Three Home Office studies were also examined. A significant positive relationship was found between FV and rape prevalence, but also between RV and rape prevalence, suggesting that rape may be a long-term strategy in some cases, most notably in acquaintance, step-relative and kin offences. In addition, it was found that female homicide was related to RV, which may support the mate-guarding hypothesis. Logistic regression indicated that offenders with a non-reproductive sexual preference were more likely to rape someone with a low FV, whereas offenders who committed a secondary offence were more likely to rape a victim with a high FV. Victims who were injured were just as likely to have a high or low FV.

STUDY 2: THE ASSOCIATION BETWEEN OFFENDER SOCIO-ECONOMIC STATUS AND VICTIM-OFFENDER RELATIONSHIP IN RAPE OFFENCES.

Introduction

Study 1 considered the relationship between fertility/reproductive value and rape prevalence. It was found that RV was predictive of rape prevalence, which did not support the adaptive hypothesis that victims with a high FV would be targeted. The relationship between RV and prevalence was particularly strong for those offences committed against acquaintances, step-relative, and kin. A second evolutionary hypothesis was that offenders of sexual offences would be males who could not compete with more successful males, i.e. low status. The second study will discuss offender status and the victim-offender relationship.

Male social groups usually involve dominance or status hierarchies (Weisfeld, 1994). Men who are ranked at the top of the hierarchy have greater access to key resources, in particularly those that contribute to reproduction and/or survival. Those who are ranked lower have less access. (See Literature Review for a discussion on status.)

It has been suggested that the social status of men would affect their use of rape as a mating strategy. Thornhill & Thornhill (1983) predicted that men who were socially successful would rarely rape, as the costs would outweigh the benefits (see Thornhill & Palmer, 2000 for a recent review and the Literature Review). In contrast to this prediction was the proposal by Shields & Shields (1983). They suggested that the most reproductively successful male would be the one who uses a mixture of reproductive strategies. Therefore,

rape is just as likely to be committed by a high-ranking male as by a low-ranking male, but it is dependent on the circumstances, in particular the costs. There have been many accounts of high status men raping, particularly in historical analyses and college campuses (see the Literature Review). It would therefore appear that the relationship between rape and status might not be as clear as the Thornhills (1983) suggested.

The costs and benefits of rape may differ depending on the situation. One factor, which may alter the cost/benefit ratio, is the victim-offender relationship. The cost of raping a stranger may be higher than raping someone known intimately: for example, accessing the victim may be more difficult, it would more likely be in a public place and it is not possible to know the victims' retributive capacity[5]. Raping someone known intimately may involve the genetic cost of incest in the case of kin, but it is likely to involve a lower risk of retribution. The rape of an acquaintance may have the greatest fitness benefits, as there would be no risk of incest, but the victim would still be known to the offender, so access and retributive assessment would be possible. These examples differentiate between the types of rape from the perspective of fitness costs and benefits.

Each type of rape would therefore have a different cost/benefit ratio for an offender depending on his status. For instance, if a high status man raped a stranger and he was then punished (as in both modern and pre-state societies) for the offence he would have more to lose than the low status offender would. Victims of a stranger rape are more likely to report it (Russell, 1984), which would increase the costs. The rape of an acquaintance may have fewer costs than that of a stranger, for the high status man, as he would be able to predict her retributive ability. In addition, the rape of an acquaintance tends to blur the definition of deceptive and forced copulation and is less likely to be reported.

Some evolutionary psychologists have been very quick to offer hypotheses about rape but these have rarely been supported by any substantive data. This has been particularly evident in the recent work of Thornhill & Palmer (2000). This book attempted to overview the literature on rape. However, it reported findings uncritically, which created an unscientific basis. Specifically it failed to acknowledge the lack of empirical evidence for

[5] Including that of kin and allies.

the hypotheses proposed. Sambrook (2000) pointed out that they *"fail as scientists because they do not look for evidence that would falsify their claims"*. This book has received similar critical appraisals in other reviews (e.g. Burr, 2000; Coyne & Berry, 2000; Ellison, 2000; and McKie & McVeigh; 2000).

The aim of study 2 was to empirically assess hypotheses, concerning the offender status and victim-offender relationship, by examining the prevalence of rape among offenders of higher and lower status according to different victim-offender relationships (stranger; acquaintance; step-relative; partner/ex; or kin). The first prediction was that there would be a greater proportion of rapes of strangers by lower status men than rapes of strangers by higher status men in the sample. The second prediction was that there would be a greater number of rapes of acquaintances than rapes of strangers by higher status men. No specific predictions were made with regard to step-relatives, partners, or kin as these consisted part of the exploratory analysis, however it may be that the patterns of frequency may be similar to those for acquaintance rape, as they knew the victim.

Method

Sample

Information on 255 rape offences was obtained from the Prison Service, Law Reports, and the Probation Service. These were the same sample as in study 1, although the information used in this study was different. These offences had been committed between 1988 and 1999. Convicted offences were analysed, as this was the only direct way to assess the socio-economic status of the offender and the victim-offender relationship. The relationship between the victim and offender was categorised into one of five groups: stranger; acquaintance; step-relative; partner/ex; or kin. Higher status offenders were deemed to be in a high social class: professional; managerial; or non-manual skilled. Lower status offenders were in a low social class: manual skilled; partly skilled; or

unskilled. In the general male population 44% are of a higher status and 56% are of a lower status (Bennett, Jarvis, Rowlands, Singleton & Haselden, 1996; Breeze, Trevor & Wilmot, 1991; Bridgwood & Savage, 1993; Foster, Jackson, Thomas, Hunter & Bennett, 1995; Foster, Wilmot & Dobbs, 1990; Rowlands, Singleton, Maker & Higgins, 1997; Smyth & Brown, 1993; Thomas, Goddard, Hickman & Hunter, 1994; Thomas, Walker, Wilmot & Bennett, 1998).

Two analyses were conducted on the data. The first specifically addressed the predictions and the second was exploratory of the whole data set. There were 88, out of the 255 offences, in the first analysis, which included only rapes committed against strangers and acquaintances. These consisted of victims with a mean age of 20 years and a range between 8-79 years. The offenders were on average 32 years and between 17-68 years old. On average, each offender had nine previous non-sexual convictions and <1 previous sexual conviction. Sixty percent of offenders were White, 15% were Black Caribbean, and 6% were Asian (20% were missing data). Twenty-nine percent were single at the time of the offence, 15% were married, 21% were cohabiting, 11% were divorced, 9% were separated, and 2% were widowed (14% were missing data).

In the second analysis, which included each type of victim-offender relationship, all 255 offences were analysed. Of these the victims averaged 17 years with a range of 5-79 years. This is slightly younger than in the previous sample and obviously includes children who were raped by step-relatives and kin. The offenders were between 17-68 years with a mean of 36 years. They had on average nine previous non-sexual convictions and <1 sexual conviction. Seventy-eight percent of the sample were White, 6% were Black Caribbean, 2% were Black African, and 2% were Asian (12% were missing data). Seventeen percent were single, 38% were married, 14% were cohabiting, 10% were divorced, 13% were separated, and 1% were widowed (7% were missing data).

Results

Statistical analysis consisted of two hierarchical loglinear analyses. These can be thought of as a categorical version of an ANOVA, although interpretation is slightly different as it is based on the log of the number. It produces an interaction and main effects. A hierarchical loglinear analysis builds a model that best fits the data. It first assesses whether an interaction best fits the data; if not it will then assess the main effects. The first analysis addressed the predictions made and the second involved exploratory relationships. In this instance there were two variables, status and victim-offender relationship. A main effect indicated if there is an effect of one variable regardless of the other, and an interaction demonstrates if one variable has an effect on the other at one of the levels.

Table 2.1 demonstrated the observed frequencies (and cell averages) of cases classified by status and as either a stranger or acquaintance rape. Here 88 of the original 255 offences have been analysed. There was no significant interaction between status and victim-offender relationship, in other words this was a poor fit of the model (Likelihood Raito χ^2=2.28, df=1, p=0.13). There was a main effect of status (Likelihood Ratio χ^2=41.63, df=1, p<0.0001) and victim-offender relationship (Likelihood Ratio χ^2=16.96, df=1, p<0.0001), both significantly contributing to the model.

Table 2.1: Frequency of Cases by Status and Stranger and Acquaintance Victim-Offender Relationship*.

		Status						
		Higher	Column %	Row %	**Lower**	Column %	Row %	**Row Total**
Victim-Offender Relationship	**Stranger**	**2**	13	8	**23**	32	92	**25 (13)**
	Acquaintance	**13**	87	21	**50**	68	79	**63 (32)**
Column Total		**15 (8)**			**73 (37)**			**88 (22**)**

*Row and column averages in parentheses.

**Average of all ten cells.

More precise analysis can be seen with the parameter estimates in Table 2.2. This showed that there were significantly more lower status offenders (37) than higher status ones (8). There were significantly more rapes committed against acquaintances (32) than rapes committed against strangers (13). These figures were obtained from Table 2.1.

Table 2.2: Parameter Estimates of Status and Stranger and Acquaintance Victim-Offender Relationships.

Effect	Level	Z-Value
Status	Higher	-4.86***
	Lower	4.86***
Victim-Offender Relationship	Stranger	-3.35**
	Acquaintance	3.35**
Status by Victim-Offender Relationship	Higher/Stranger	-1.26
	Lower/Stranger	1.26
	Higher/Acquaintance	1.26
	Lower/Acquaintance	-1.26

***p<0.001, **p<0.01, *p<0.05.

As there was no interaction, there was no support for the predictions that:

1) There would be more rapes committed against acquaintances than strangers by higher status men; nor
2) That there would be more stranger rapes committed by lower status offenders than higher status ones.

The second analysis expanded the victim-offender relationship by including step-relatives, partners, and kin. This was an exploratory analysis to examine any possible associations. Table 2.3 shows the observed frequencies (and cell averages) of cases classified by status and victim-offender relationship. There was a significant interaction between status and victim-offender relationship as it made a significant contribution to the model (Likelihood Ratio χ^2=11.81, df=4, p<0.05). The results are explained by an interaction of status and

victim-offender relationship, this being the best fitting model. Therefore, there is a difference in the number of higher and lower status offenders, a difference in the number of rapes committed against strangers, acquaintances, step-relatives, partners and kin, and an interaction between the two variables.

Table 2.3: Frequency of Cases by Status and Victim-Offender Relationship*.

		Status						
		Higher	Column %	Row %	**Lower**	Column %	Row %	**Row Total**
Victim-Offender Relationship	**Stranger**	**2**	3	8	**23**	12	92	**25 (13)**
	Acquaintance	**13**	20	21	**50**	26	79	**63 (32)**
	Step-relative	**33**	52	34	**64**	34	66	**97 (49)**
	Partner/Ex	**8**	13	33	**16**	8	67	**24 (12)**
	Kin	**8**	13	17	**38**	20	83	**46 (23)**
Column Total		**64 (13)**			**191 (38)**			**255 (26**)**

*Row and column averages in parentheses.

**Average of all ten cells.

Table 2.4 presents the parameter estimates. It can be seen that the number of higher status offenders is significantly lower than the number of lower status offenders. Table 2.3 shows that the average number of higher status men is 13 and the average number of lower status offenders is 38.

Table 2.3 and 2.4 show that there were significantly fewer stranger rapes (13) than expected, significantly more rapes of acquaintances (32) than expected, significantly more rapes of step-relatives (49) and significantly fewer rapes of partners (12) than expected. The interaction was significant, in particular there were significantly more rapes committed against step-relatives by higher than (52%) lower status offenders (34%).

Table 2.4: Parameter Estimates of Status and Victim-Offender Relationship.

Effect	Level	Z-Value
Status	Higher	-6.72***
	Lower	6.72***
Victim-Offender Relationship	Stranger	-3.15**
	Acquaintance	2.38*
	Step-relative	7.45***
	Partner/Ex	-2.27*
	Kin	-0.03
Status by Victim-Offender Relationship	Higher/Stranger	-1.75
	Lower/Stranger	1.75
	Higher/Acquaintance	-0.14
	Lower/Acquaintance	0.14
	Higher/Step-relative	2.47*
	Lower/Step-relative	-2.47*
	Higher/Partner/Ex	1.62
	Lower/Partner/Ex	-1.62
	Higher/Kin	0.67
	Lower/Kin	-0.67

***p<0.001, **p<0.01, *p<0.05.

It was found that there were more lower than higher status offenders, there were more offences committed against step-relatives and acquaintances, and fewer offences committed against strangers and ex/partners than expected, and there were significantly more rapes committed by higher status men against step-relatives than there were by lower status men

Population Adjusted Prevalence Rates

In order to take into account the distribution of higher and lower status males in the population the frequencies were recalculated (Bennett *et al*, 1996; Breeze *et al*. 1991; Bridgwood & Savage, 1993; Foster *et al*, 1995; Foster *et al*, 1990; Rowlands *et al*. 1997; Smyth & Brown, 1993; Thomas *et al*, 1994; Thomas *et al*, 1998). Higher status frequencies were divided by 44 and multiplied by 100, and lower status frequencies were divided by 56 and multiplied by 100. These were based on the divisions of higher and lower status males within the population, i.e. 44 and 56%. For example, higher status offenders in the first analysis: 15/44 * 100 = 34.

Table 2.5 demonstrates the population adjusted observed frequencies (and cell averages) of cases classified by status and as either a stranger or acquaintance rape. This led to an adjusted total of 164 offences. There was a significant interaction between status and victim-offender relationship, in other words this was the best fit of the model (Likelihood Raito χ^2=4.18, df=1, p<0.05). Therefore, there is a difference in the number of higher and lower status offenders, a difference in the number of rapes committed against strangers and acquaintances, and an interaction between the two variables

Table 2.5: Frequency of Cases by Status and Stranger and Acquaintance Victim-Offender Relationship (Population Adjusted Rates)*.

		Status						
		Higher	Column %	Row %	**Lower**	Column %	Row %	**Row Total**
Victim-Offender Relationship	**Stranger**	**5**	15	11	**41**	32	89	**46 (23)**
	Acquaintance	**29**	85	25	**89**	69	75	**118 (59)**
Column Total		**34 (17)**			**130 (65)**			**164 (41**)**

*Row and column averages in parentheses.

**Average of all ten cells.

More precise analysis can be seen with the parameter estimates in Table 2.6. This shows that there were significantly more lower status offenders (65) than higher status ones (17). There were significantly more rapes committed against acquaintances (59) than rapes committed against strangers (23). These figures were obtained from Table 2.5.

As there was an interaction, there was support for the predictions that:

1) There would be more rapes committed against acquaintances (25%) than strangers (11%) by higher status men; nor
2) That there would be more stranger rapes committed by lower status offenders (32%) than higher status (15%) ones.

Although the interaction was significant the parameter estimates, in Table 2.6, did not reach significance. In order for parameter estimates to reach significance, the model's significance level needs to be very high.

Table 2.6: Parameter Estimates of Status and Stranger and Acquaintance Victim-Offender Relationships (Population Adjusted Rates).

Effect	Level	Z-Value
Status	Higher	-6.25***
	Lower	6.25***
Victim-Offender Relationship	Stranger	-4.89***
	Acquaintance	4.89***
Status by Victim-Offender Relationship	Higher/Stranger	-1.82
	Lower/Stranger	1.82
	Higher/Acquaintance	1.82
	Lower/Acquaintance	-1.82

***p<0.001, **p<0.01, *p<0.05.

The second analysis expanded the victim-offender relationship by including step-relatives, partners, and kin. This was again an exploratory analysis to examine any possible associations. Table 2.7 shows the adjusted observed frequencies (and cell averages) of

cases classified by status and victim-offender relationship. There were now 486 offences analysed. There was a significant interaction between status and victim-offender relationship as it made a significant contribution to the model (Likelihood Ratio χ^2=24.47, df=4, p<0.001). The results are explained by an interaction of status and victim-offender relationship, this being the best fitting model. Therefore, there is a difference in the number of higher and lower status offenders, a difference in the number of rapes committed against strangers, acquaintances, step-relatives, partners and kin, and an interaction between the two variables.

Table 2.7: Frequency of Cases by Status and Victim-Offender Relationship (Population Adjusted Rates)*.

		Status						
		Higher	Column %	Row %	**Lower**	Column %	Row %	**Row Total**
Victim-Offender Relationship	**Stranger**	**5**	3	11	**41**	12	89	**46 (23)**
	Acquaintance	**29**	20	25	**89**	26	75	**118 (59)**
	Step-relative	**75**	52	40	**114**	33	60	**189 (95)**
	Partner/Ex	**18**	12	38	**29**	9	62	**47 (24)**
	Kin	**18**	12	21	**68**	20	79	**86 (43)**
Column Total		**145 (73)**			**341 (172)**			**486 (49**)**

*Row and column averages in parentheses.

**Average of all ten cells.

Table 2.8 presents the parameter estimates. It can be seen that the number of higher status offenders is significantly lower than the number of lower status offenders. Table 2.7 shows that the average number of higher status men is 73 and the average number of lower status offenders is 172.

Tables 2.7 and 2.8 show that there were significantly fewer stranger rapes (23) than expected, significantly more rapes of acquaintances (59) than expected, significantly more rapes of step-relatives (95) and significantly fewer rapes of partners (24) than expected.

The interaction was significant, in particular, there were significantly more rapes committed by lower status offenders against strangers (12%) than by higher status offenders (3%). There were more rapes committed against step-relatives by higher than (52%) lower status offenders (33%). Finally, there were more rapes committed against partners by higher status offenders (12%) than by lower status offenders (9%).

Table 2.8: Parameter Estimates of Status and Victim-Offender Relationship (Population Adjusted Rates).

Effect	Level	Z-Value
Status	Higher	-8.12***
	Lower	8.12***
Victim-Offender Relationship	Stranger	-4.62***
	Acquaintance	3.40**
	Step-relative	10.91***
	Partner/Ex	-3.26**
	Kin	-1.14
Status by Victim-Offender Relationship	Higher/Stranger	-2.55*
	Lower/Stranger	2.55*
	Higher/Acquaintance	-0.22
	Lower/Acquaintance	0.22
	Higher/Step-relative	3.72***
	Lower/Step-relative	-3.72***
	Higher/Partner/Ex	2.26*
	Lower/Partner/Ex	-2.26*
	Higher/Kin	-1.52
	Lower/Kin	1.52

***p<0.001, **p<0.01, *p<0.05.

The results of the population-adjusted rates demonstrated that there were significantly more higher status than lower status offenders, fewer stranger rapists, more acquaintance rapists, more rapists of step-relatives and fewer rapes of partners than expected. There was support for the predictions that there would be more lower status stranger rapists, whereas higher status offenders were more likely to rape a step-relative or partner.

The adjusted rates, which took into account the proportion of higher and lower status males in the population, increased the strength of the parameters and produced more interactions. These then led to support of the hypotheses.

Discussion

Before discussing the results, it is important to note that this research did not manage to assess the status of a representative non-convicted sample of rape offenders. In her survey of victims, Russell (1984) noted that the prevalence of rape was 24 times that recorded in official crime statistics (this was in the US and included only penile-vaginal rape) and international prevalence studies suggest that a large proportion of offenders are never convicted (Gavey, 1991; Koss *et al*, 1987; Malamuth *et al*, 1995; and Martin & Hummer, 1998). It would be impossible to ask victims the social status of their offenders (apart from when these are known well to them). The only way to address this problem would be via the indirect route of sexual aggression questionnaires, for example asking participants to indicate their social status and assessing their rape proclivity (Malamuth, 1989a; 1989b). This would provide an idea of the number of high status males who are prone to be sexually aggressive. Thus, research can only indirectly assess the social status and victim-offender relationship association in representative samples. However, for a definite answer to the research question, a convicted sample was the most practical way to address it. It would appear that the pattern of reporting has changed over the last decade. Lloyd & Walmsley (1989) found 39% of rapes were committed against strangers; 31% against acquaintances and 30% committed against someone known intimately (step-relative; kin; or partner).

whereas the current study found 10% of rapes were committed against strangers; 25% against acquaintances and 65% against someone known intimately. It would appear that although the present study does contain convicted offenders, the pattern of reporting has changed and may therefore more closely reflect all offenders.

Both the original and population adjusted analyses found that there was a significantly higher number of lower status than higher status offenders in the sample of rapists. This finding supported the predictions of Thornhill & Thornhill (1983) (Thornhill & Palmer, 2000; Thornhill & Thornhill, 1992) that men who were socially successful would rarely be represented among rape offenders. On this view, the abundance of lower status offenders is the result of their lack of ability to compete with the more reproductively successful higher status males. Shields & Shields (1983) suggested that males who incorporated rape into a variety of mating strategies would be the most reproductively successful. An alternative explanation is that higher status males rape as often, but are not caught as a reflection of their status and power. For example, Roman Emperors had frequent access to rape females but were not punished as it was perceived to be their right (Betzig, 1992) and US University students often commit rape but are rarely punished due to the fraternity ideology that it is their right to have sexual access (Martin & Hummer, 1998). Additionally, as Donat & D'Emilio (1997) noted, historically if a male was lower status he was more likely to be dealt with by the legal system for all sorts of offences.

Rapes differ in the relationship between the victim and offender, and this affects the costs and benefits involved. For example, the rape of a marriage partner was not a criminal offence until 1994 (Smith & Hogan, 1996) and was therefore relatively low-cost for the perpetrator. This may have applied in the Environment of Evolutionary Adaptedness (EEA) as it is unlikely that any punishment would have resulted there. This study found there to be a significant effect of victim-offender relationship on the number of rapes committed, in both the original and adjusted analyses. In particular, there were fewer rapes committed against strangers and partners than would be expected on the basis of an equal distribution, and there were a larger number of rapes committed against acquaintances, and step-relatives, than would be expected on the basis of an equal distribution. This is an interesting finding as Russell (1984) reported that victims of a stranger rape are more likely to report the offence. In the current study, the large proportion of offences committed

against step-relatives and acquaintances may be the result of an increase in public awareness towards reporting offences. However, it may be that the large proportion of rapes against step-relatives and acquaintances rather than strangers may be because naturally, people encounter strangers less often. This does not, however, explain the infrequent reporting of partner rape. The high occurrence of this has been well documented (Russell, 1984), the lack of reporting is probably due to the intense relationship and the fact that the relationship often continues after the rape and is associated with high levels of domestic violence (Mahoney & Williams, 1998) and control (Muehlenhard *et al*, 1996).

In the original data set there was no support found for the predictions: there was no difference in the number of higher and lower status offenders raping strangers and there was no difference found between the number of stranger and acquaintance victims raped by higher status men. However, when the data set was adjusted to take account of base rates (see Table 2.5) there was found to be an interaction between status and victim-offender relationship. There was almost a significant difference between the number of stranger rapes committed by lower and higher status offenders, and between the number of stranger and acquaintance rapes committed by higher status men. There were more rapes committed against strangers by lower status offenders and higher status offenders were more likely to rape an acquaintance. These findings do support the hypothesis of Thornhill & Thornhill (1983) that high status men would rarely rape as the costs would outweigh the benefits, and that low status men would rape, as they would not be able to compete. Shields & Shields (1983) predicted that high status men would rape but it would be dependent on the costs. The present findings imply that different types of rape correspond to different costs. These predictions from these evolutionary analyses of rape were, therefore, supported by this study, suggesting that status is a good predictor of rape proclivity.

The second part of the original analysis found that there were significantly more rapes committed against step-relatives by higher status men than by lower status ones. This was confirmed by the adjusted analysis. There are several possible explanations for this occurrence. It might be that higher status men have more access than lower status men to step-relatives, for instance they may have more opportunities to remarry and if they do remarry they may be more inclined to marry a partner who previously has children as they can afford to support them. Lower status men may remain married to one partner and this

may relate to the Thornhills (1983) suggestion that lower status men have reduced access to mates. These suggestions would need to be investigated. Another explanation may be that step-relatives of higher status men are also higher status and would be more likely to perceive the act as rape (Muehlenhard *et al,* 1996) and to later report it.

The adjusted analysis also found that there were fewer rapes committed by higher status offenders against strangers than by lower status offenders. This has been discussed above with regards to the predictions. There were also more rapes committed by higher status offenders against their partners than by lower status offenders. This might be because higher status men can treat their partners in any manner as they believe they would not lose them whereas lower status men may 'feel' that if they abused their partners then they may lose them and then lose their main reproductive strategy. This would need to be investigated further.

Conclusion

This study found that lower status men were more common than higher status ones among a sample of convicted rapists. However, this may be the result of higher status men avoiding conviction. There were a small number of stranger and partner rapes and a high number of rapes committed by step-relatives and acquaintances, which may indicate the change in public awareness resulting in an increase in reporting. There was support for the predictions that there would be more rapes committed against strangers by lower status than higher status men, and that there would be more rapes committed against acquaintances than strangers by higher status men. There were more rapes committed against strangers by lower status offenders than by higher status offenders. There were more rapes committed against step-relatives by higher status men than by lower status men. Finally, there were more rapes committed against partners by higher than lower status offenders. This evidence suggested that the association between offender social status and victim-offender relationship is predicted by an evolutionary cost-benefits analysis.

Summary – Study 2

The aim of this study was to assess the association between a rapist's social status and the relationship with his victim. Research based on an evolutionary theory of rape suggests that lower status males are more likely to rape (Thornhill & Thornhill, 1983), as the relative benefits are higher for them. However, costs and benefits may depend on the relationship with the victim (e.g. victims of a stranger rape are more likely to report it than those raped by an acquaintance, Russell, 1984). This study collected data on 255 rape offences from the Prison Service, the Probation Service and Law Reports. The offenders were classified as either higher or lower status, and the relationship with the victim was categorised. The first hierarchical loglinear analysis found support for the prediction that there would be a relationship between status and the victim-offender relationship. The second analysis found an interaction between status and victim-offender relationship. There was a main effect of status, i.e. there were more lower status than higher status offenders. There was a main effect of victim-offender relationship, i.e. there was a smaller number of offences committed against strangers and partners, and a larger number of offences committed against step-relatives and acquaintances. There was a significant interaction in that there were more offences committed against strangers by lower status men, more offences committed against step-relatives by higher status men and more offences against partners by higher status men.

STUDY 3: A POPULATION STUDY OF GENDER RATIOS AND THE PREVALENCE OF RAPE.

Introduction

It has been found in study 1 that the prevalence of rape is associated with both FV and RV, which suggested that rape might be used as both a short-term and long-term mating strategy. Study 2 investigated the relationship between status and rape prevalence. It was found that lower status males were more likely to be convicted of rape, but higher status males were more likely to commit rape against step-relatives and partners. Study 3 has investigated the relationship of the environment with rape prevalence, incorporating FV and RV from study 1 and the 'mate deprivation hypothesis' examined in study 2.

Several predictions have been derived from the view that rape is adaptive. One is that men who lack alternative reproductive options are more likely to rape (Thornhill & Thornhill, 1983). Apparent support for this 'mate deprivation hypothesis' comes from the finding that men from lower socio-economic classes are more likely to rape as in study 2 (see also Thornhill & Thornhill, 1983, and Vaughan, 2001). A more direct test of the mate deprivation hypothesis was undertaken by Lalumiere, Chalmers, Quinsey & Seto (1996), who asked participants to rate their self-perceived mating success, their likelihood of sexual coercion and their past sexual experiences. They found that men who reported being sexually coercive had a higher self-perceived mating success and more sexual experience, which is directly contrary to the mate deprivation hypothesis.

Another evolutionary-based prediction is that victims would be individuals currently capable of reproducing (i.e. have a high fertility value as investigated in study 1). This was due to rape being viewed as a short-term mating strategy (Shields & Shields, 1983; Thornhill & Palmer, 2000; Thornhill & Thornhill, 1983): this is in contrast to mating

strategies that are long-term (e.g. marriage) which are more directed towards females who will be capable of reproducing in the future (i.e. have a high reproductive value). Study 1 found support for rape prevalence being associated with the victim's RV. Williams (1975) has suggested that in a society where there was completely promiscuous behaviour, females with a high fertility value would be considered the most attractive, whereas females with a high reproductive value would be considered the most attractive where there was strict lifetime monogamy. In a society where there was monogamy, and also extra-pair copulations, those females who have an average fertility and reproductive value would be viewed as most attractive. Study 1 found that the prevalence of rape relates to both fertility and reproductive value, which suggested that rape could be both a short-term and long-term strategy. It was also suggested by Thornhill & Thornhill (1983) that there is a peak age at which male competition is high, i.e. where the competition for females is greatest: this is past puberty and before the age of first marriage.

In a high gender ratio (more men than women) society there is a protective morality that favours monogamy for women, limits their interactions with men, and shapes female roles in traditional domestic areas. In a low gender ratio (more women than men) society the domestic roles of women weaken, men have multiple relationships, and are less willing to commit to marriage. Therefore, it would seem that societies differ according to their gender ratio, as discussed in the Literature Review (Guttentag & Secord, 1983).

Human gender ratios differ for a variety of reasons (Guttentag & Secord, 1983). Most notably birth rates, death rates and migration affect the population and will additionally affect the characteristics of the population, i.e. gender ratios. Guttentag & Secord (1983) have noted that gender ratios may be sensitive to ethnicity; for example, Blacks (in America) tend to have a lower gender ratio whereas Orthodox Jews in Eastern Europe have higher gender ratios. Differences have also been found for socio-economic status, in that high status areas have higher gender ratios whereas low status areas tend to have an equal ratio. The most important effects on child gender ratios were female infanticide and female neglect, which of course will have an effect on the future adult population. In addition, the death of women in childbirth will also alter the gender ratio. These however are relevant for more historical populations. Guttentag & Secord (1983) have also noted that the number of men in a population may be reduced by plagues and pestilence, where women

and children were evacuated from an area and so the men were left to die. Of course, again this would be an explanation for historical population. Another reason for the reduction of men within a population is war. The majority of people that fight in a war are men. This would therefore lead to a low gender ratio. Guttentag & Secord (1983) suggest that the greatest source of variations in gender ratios is due to selective migration. They note that it is usually men who emigrate which then leads to a high gender ratio in the place they have migrated to and a low gender ratio in the population they have left. It is important to note that gender ratios may not be the actual cause of the resulting social consequences. It might be that the types of individuals within that area create the effect. For example, it might be that only males of a certain personality migrate. This point was not covered by Guttentag & Secord (1983).

Gender ratios have also been discussed in the animal literature. It has been noted that gender ratios affect the prevalence of forced copulations. Most commonly it would appear that a high gender ratio leads to more forced copulations, as discussed in the Literature Review. Guttentag & Secord (1983) have noted how in a high gender ratio society rape is perceived as a serious crime whereas in a low gender ratio society the punishment for a rape would be a monetary fine.

The mate deprivation hypothesis would also predict that rape would be more prevalent when there were more men than women in a particular geographical area. Svalastoga (1962) found that where there was a high gender ratio there were also a higher number of rapes. Lester (1974) repeated Svalastoga's (1962) study in the US. He found a small relationship between rape offences and gender ratio. He suggested that there was no data to support the analysis that rape is more common where there are relatively fewer females than males. The hypothesis was then repeated on the Canadian provinces (Singh, 1977). It was found that gender ratio and rape incidences were negatively related.

The relationship between gender ratios and crime was studied by Barber (2000). In his cross-cultural study, he found that in countries where there was a low gender ratio (i.e. more women than men between 15-64 years) there were higher rates of homicide, rape, and violent assault (he found no effect with a younger age group of 15-19 years). He attributed this finding to family conflict resulting from of an oversupply of women, which increases

instability and discord in marriages and thus increases aggressive behaviour in general. *"When women are in short supply as marriage partners they control the marriage market, which means that they can require very high levels of economic investment from husbands, including a lifetime commitment to the marriage as an economic and reproductive union. When such conditions prevail, marriage enhances the status of women and marriages tend to be highly stable. At the same time, relations between the sexes are harmonious. Conversely, when there is an oversupply of women in the marriage market, women lose their bargaining power and obtain less of an economic commitment from husbands, which contributes to instability and discord in marriages"* (Barber, 2000, p. 265). The conflict between the genders, which has derived from marital instability, would then be predicted to increase violent crime because, as Barber (2000) noted, children raised in a home with conflict often turn to crime later in life. It would appear that the family conflict hypothesis suggests that the increase of rape only occurs when there is an increase in other types of violent crimes. It may therefore be considered a by-product hypothesis for rape. Barber (2000) used a very wide range of ages whereas the current study has used specific age ranges more closely related to adaptive hypotheses. An additional problem with Barber's study was that a cross-cultural analysis might concentrate on too wide an area and not necessarily generalize to variations within a country.

The previous studies do not take into account the operational gender ratio (Emlen & Oring, 1977). This is the average ratio of fertilisable females to sexually active males. If it is skewed towards males then polygyny is predicted, where it is skewed towards females then polyandry is expected. This is because an individual member of the limited sex is expected to try to maximise its inclusive fitness by attempting to control access to mates of the limiting sex. Therefore, where there is a low gender ratio polygyny is predicted and where there is a high gender ratio polyandry is predicted. Considering only males and females who are capable of reproducing or who are valued for their reproductive capabilities might be a more precise method of analysing gender ratios.

Population density may be a confounding factor when considering crime. Wallace & Wallace (1998) found that the number of violent deaths increased where there was overcrowding in areas of New York City. Population density predicted both property and violent crime in a US study of county crimes (Kposowa, Breault & Harrison, 1995). The

violent crimes included aggravated assault, rape, robbery, and homicide. Kelley (1985) found that as the population size increased, so did the frequency of personally violent crimes: these included murder, rape, and robbery. Perry & Simpson (1987) found, in a longitudinal study, that city and county population size correlated positively with the occurrence of rape – as the population increased then so did the incidence of rape. Therefore, population density may be a factor in the number of crimes committed. Ruback & Menard (2001) suggested that the differences in crime are not due to population density but are due to the difference in reporting between urban and rural areas. They found that rural counties had higher rates of sexual victimisation than urban counties, according to Rape Crisis Centre records, whereas official reported rapes are often higher in urban areas. This difference, between official and survey patterns, they suggested was due to the different culture and because stranger rape is higher in urban areas than rural ones.

The current study investigated gender ratios and rape prevalence in British Police Force Areas and US States. The majority of offenders and victims of rape have been found to live in the same vicinity (Amir, 1971): although assessing British police force areas may not take into account offenders who have travelled across the country in order to commit the offence, it is likely that most will have perpetrated the offence in the area that they live. LeBeau (1987) found that on average the distance travelled by a variety of rapists ranged from an average of 1.10 miles to 8.10 miles. This is a short distance and unless a rapist lived on a county boundary, it would be unlikely that they would have crossed a boundary in the current study. LeBeau (1987) noted that most crimes against persons occur in vicinities nearer to the offender's home than crimes against property.

The mate deprivation hypothesis would predict that as the number of women decreased and the number of men increased in a particular area, the prevalence of rape would increase (high gender ratio). However, Barber's (2000) family conflict hypothesis predicts the opposite that a low gender ratio would lead to an increase in rape prevalence, as an increase in women will lead to more family conflict. Therefore, according to the animal literature and the mate deprivation hypothesis, it was predicted that a high gender ratio would be associated with rape prevalence.

Method

Materials

1) British Data

The data set involved using the RV and FV calculated for 1991 from the formulae of Wilson & Bossert (1971) as used in study 1. Population figures were obtained from the 1991 Census for each county in England and Wales, which were then transferred into Police Force Areas: 42 British Police Force Areas in England and Wales were used. These were either the same as the county boundaries or consisted of a group of counties e.g. Thames Valley police contained the counties Berkshire, Buckinghamshire and Oxfordshire. Rape figures for each police area were collected from Criminal Statistics 1991 (Research Development Statistics, Home Office, 1992). These were for penile-vaginal rapes only.

2) US Data

Population figures for 1997 were found at the US Government's Census site (see www.census.gov/population/estimates/state/stats/ag9798.txt). There were 51 States of America used. American rape figures for 1997 were found in the Sourcebook of Criminal Statistics Online (see www.albany.edu/sourcebook/).

Procedure

1) British Data

The number of females with a high FV and a high RV were calculated for each of the 42 British Police Force Areas. High was defined as one standard deviation above the mean for England and Wales. The values were 0-21 years for a high RV, and 19-34 years as a high FV. The number of males of high competition age (male competition: MC) was calculated for each Police Force Area. This was between 15-28 years old, i.e. between puberty and first marriage. According to Marshall & Tanner (1970), the average age for completed puberty in British males is 15 years[6]. The average age of first marriage in England and Wales is 28 years (Marriage, Divorce and Adoption Statistics 1991, Table 3.5b). The number of males of reproductive age (male reproductive: MR) was calculated as above 15 years old. Therefore, there were five sets of gender ratios (see Appendix 1).

Five gender ratios were calculated. The male figure for each British Police Force Area was divided by the female number for each British Police Force Area.

1) Total ratio – total number of males divided by total number of females;
2) MC/FV – number of males between 15-28 years divided by number of females between 19-34 years;
3) MC/RV – number of males between 15-28 years divided by number of females between 0-21 years;
4) MR/FV – number of males above 15 years divided by number of females between 19-34 years; and
5) MR/RV – number of males above 15 years divided by number of females between 0-21 years.

The higher the ratio, the more males there were to females.

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[6] Puberty amongst males is stable across cultures and generations as it is not susceptible to environmental changes.

One standardised measure of rape prevalence was calculated for each British Police Force Area: the number of rapes per hundred thousand within the entire female population of the British Police Force Area.

The same procedure was applied to the prevalence of indecent assault, which was then added to the rape figures, to assess a general sex-offending pattern.

2) US Data

For each of the 51 American States the ratio of men to women was calculated – male-female (total males divided by total females): the higher the number, the more men there were to women. Rape figures were provided as per hundred thousand in the total male and female population of each State. Indecent assault figures were not available for the US data.

Results

Assessment of Normal Distributions in Variables

Initially the variables were assessed to see if they met the assumptions of a normal distribution.

1) British Data

The total gender ratio met the assumption of a normal distribution so was not transformed. The MC/FV gender ratio did not meet a normal distribution. However transformation did not significantly reduce this so non-parametric correlations were used. The MC/RV gender

ratio (skewed = $p<0.01$) was transformed by the inverse method. The MR/FV and MR/RV gender ratios met the assumptions of a normal distribution.

Rape in the female population was significantly skewed ($p<0.01$). This variable was transformed using a logarithm. Rape and indecent assault in the female population was also significantly skewed ($p<0.001$) and was therefore transformed using an inverse transformation. These variables now met the assumptions of a normal distribution.

The population per square hectare was also significantly skewed ($p<0.001$): this was transformed using a logarithm.

2) US Data

Rape in the total population was not significantly skewed. The US gender ratio was significantly skewed ($p<0.001$); transformation however did not reduce this significantly. Therefore, a non-parametric correlation was used to assess this relationship.

Correlational Analysis

It can be seen in Table 3.1 that there was a significant relationship between the gender ratio MR/FV and rape in the British population: as there were more women of high FV age than men of male reproductive age, so the incidence of rape increased (Figure 3.1).

When indecent assault cases were added to the prevalence of rape in the British data the correlational pattern changed. There was now a stronger relationship between the MC/FV ratio and the prevalence of indecent assault and rape (see Table 3.2). Although the correlation is positive because the prevalence rate was inversely transformed the correlation is interpreted as a negative one, as the transformation reverses the numbers used, see Figure 3.2.

Table 3.1: Correlations between Rape Prevalence in Standardised Populations and Gender Ratios[†].

		Gender Ratios				
		Total Ratio	*MC/FV*	*MC/RV (inv)*	*MR/FV*	*MR/RV*
British	*Rape in the female population (log)*	r=-0.02	rho=-0.20	r=0.02	r=-0.35*	r=-0.25
US	*Rape in the total population*	rho=0.11				

***p<0.001, **p<0.01, *p<0.05.

[†]MC/FV = male competition age/female FV age; MC/RV = male competition age/female FV age; MR/FV = male reproductive age/female FV age; and MR/RV = male reproductive age/female RV age.

Figure 3.1: Pearson's Correlation (r=-0.35) between MR/FV Gender Ratio and Number of Rapes per hundred thousand in the British Data.

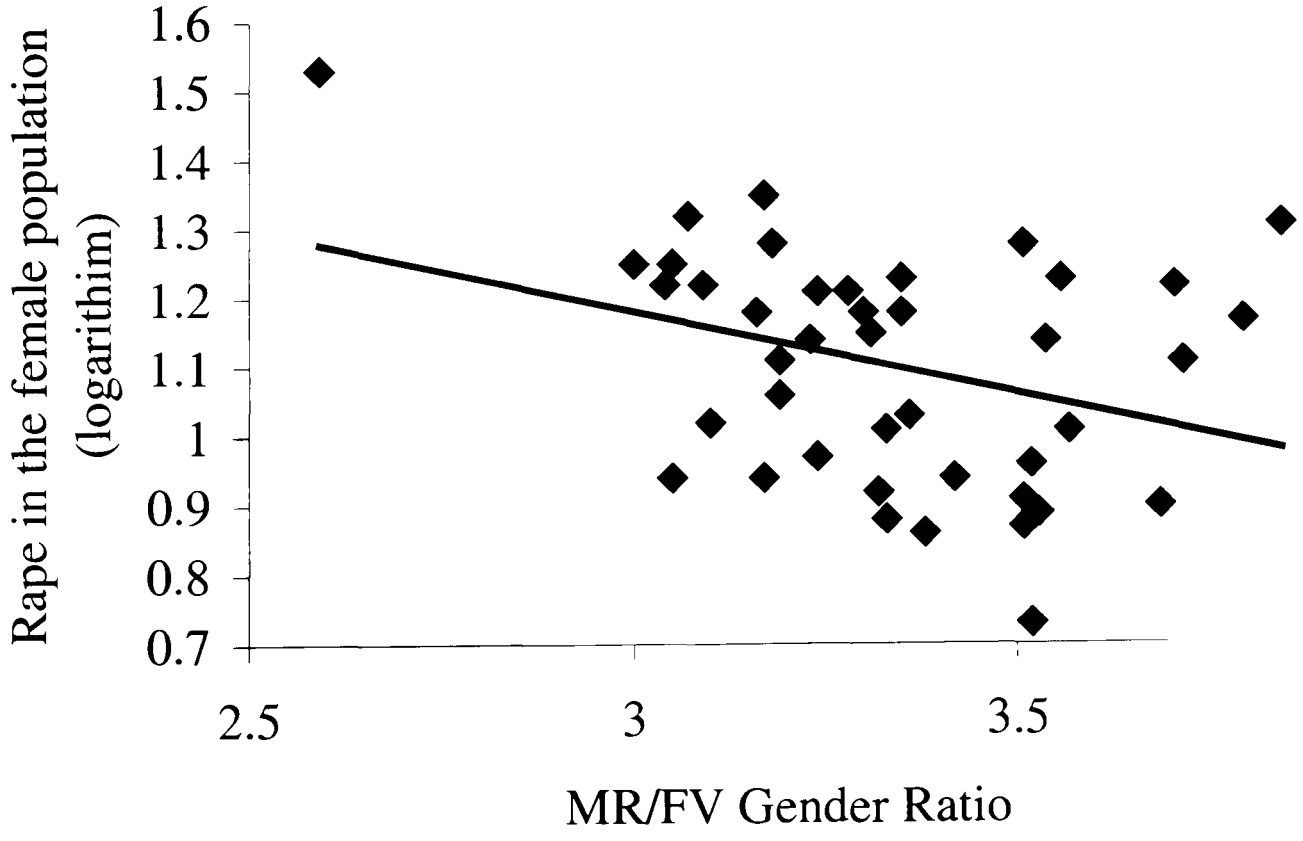


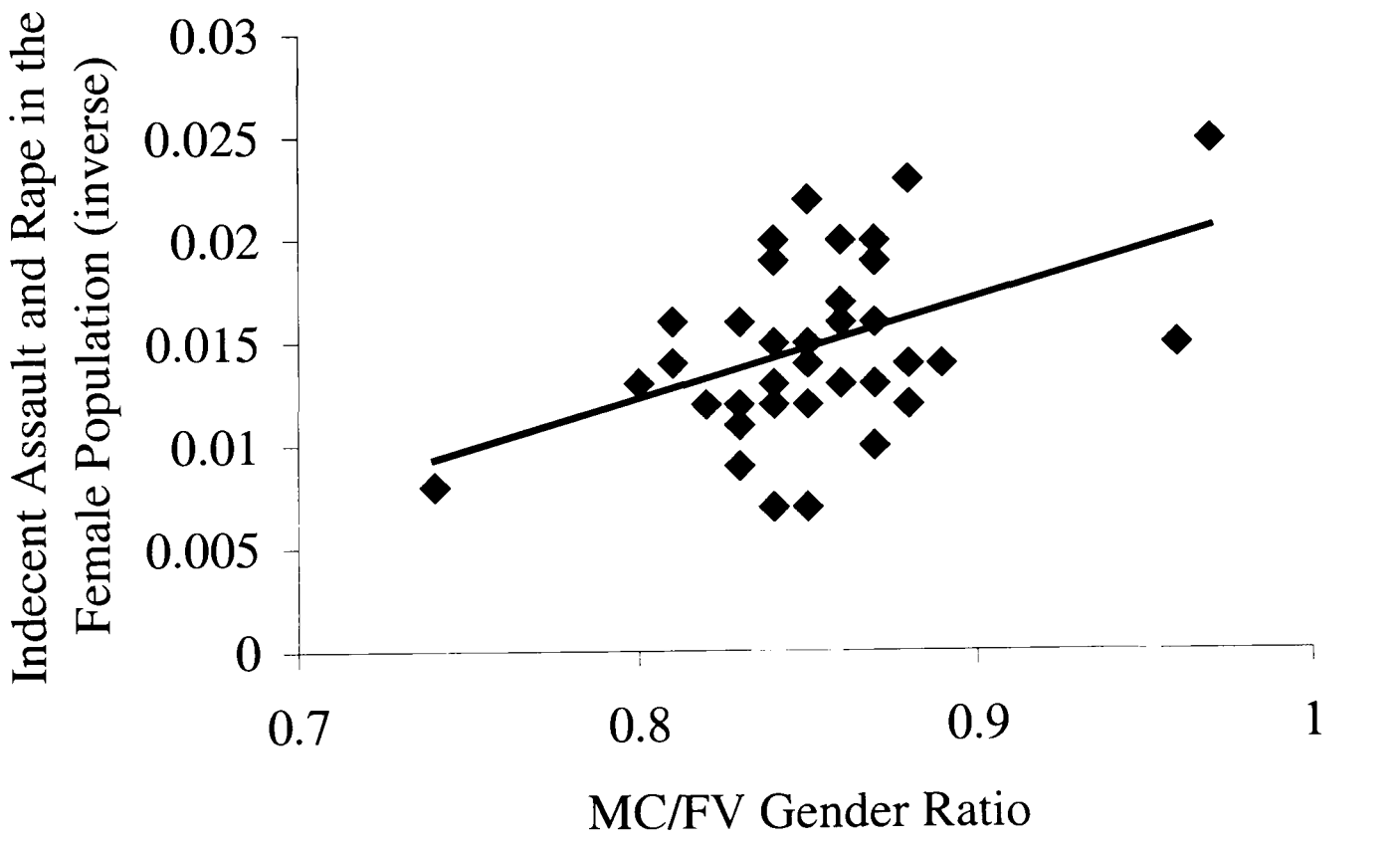
Table 3.2: Indecent Assault and Rape Prevalence correlated with Gender Ratios[†].

		Gender Ratios				
		Total Ratio	*MC/FV*	*MC/RV (inv)*	*MR/FV*	*MR/RV*
British	*Indecent assault and rape in the female population (inv)*	r=0.07	rho=0.34*	r=-0.15	r=0.30	r=0.23

***p<0.001, **p<0.01, *p<0.05.

[†]MC/FV = male competition age/female FV age; MC/RV = male competition age/female FV age; MR/FV = male reproductive age/female FV age; and MR/RV = male reproductive age/female RV age.

Figure 3.2: Spearman's Correlation (rho=0.34) between MC/FV Gender ratio and Number of Rapes and Indecent Assaults per Hundred Thousand in the British Data.



A confounding variable might be population density, as each Police Force Area was a different size. Rape may be higher in dense populations as the number of potential victims and offenders would be higher. To assess this, the population per square hectare was

calculated. This variable was then partialled out of the correlation. The correlations were reduced suggesting that population density was an important variable (see Table 3.3). Most were not reduced by a large factor but the MR/FV (-0.25) was significantly (Fisher's $p<0.01$) smaller than it was originally (-0.35).

Table 3.3: Partial Correlations of Gender Ratios[†] and Population Frequencies with Population Density Partialled Out[7].

		Gender Ratios			
	Population per square hectare (log) partialled out	*Total Ratio*	*MC/RV (inv)*	*MR/FV*	*MR/RV*
British	*Rape in the female population (log)*	0.03	0.05	-0.25	-0.14
	Indecent assault and rape in the female population (inv)	0.04	-0.17	0.28	0.18

[†]MC/FV = male competition age/female FV age; MC/RV = male competition age/female FV age; MR/FV = male reproductive age/female FV age; and MR/RV = male reproductive age/female RV age.

To confirm that population density was an important variable; correlations were performed between population density and rape prevalence for the British data (see Table 3.4). Rape within the female population demonstrated a small correlation with population density; the more dense the area the more likely a rape was to occur. When indecent assault was added to the rapes the correlation was negative and non-significant; because indecent assault was transformed using an inverse transformation then this is read as a positive correlation; again, the more dense the area then the more likely an indecent assault or rape would occur.

[7] A partial correlation for MC/FV with rape and indecent assault prevalence could not be conducted as this was originally a non-parametric test and this is not allowed

Table 3.4: Population Densities correlated with Rape Prevalence.

		Population Density
		Population per hectare (log)
British	*Rape in the female population (log)*	0.25
	Indecent assault and rape in the female population (inv)	-0.16

The gender ratio MR/FV and population density were then regressed onto the number of rapes in the female population. A backward regression was used. It can be seen in Table 3.5 that when the gender ratio and population density were entered in the first step neither significantly predicted rape prevalence but in the second step the gender ratio MR/FV did produce a significant result. This suggests that the gender ratio of male reproductive age by females of fertility age is a more reliable predictor than population density. Where there were more females of a high FV age (19-34 years) than males of reproductive age (15+ years) there were more rapes committed.

Table 3.5: MR/FV Gender Ratio and Population per square hectare Regressed onto the Number of Rapes in the Female Population.

	Beta	β	Semi-partial correlation
MR/FV	-0.26	-0.39	-0.25
Population per square hectare (log)	-2.053E-02	-0.05	-0.03
Intercept	1.99		
R^2=0.12, R^{2adj}=0.08, R=0.35			
MR/FV	-0.24	-0.35	-0.35*
Intercept	1.89		
R^2=0.12, R^{2adj}=0.10, R=0.35*			

***p<0.001, **p<0.01, *p<0.05.

Discussion

It was found that there was a negative correlation between the gender ratio: MR/FV, and rape prevalence in the female population for the British data. Therefore, the incidence of rape increased when the ratio of males of reproductive age to females of a high fertility value age was low. Therefore, when females of a high FV age were in abundance and there were less males of reproductive age (low gender ratio) then there were more acts of rape committed towards females. This is consistent with the family conflict hypothesis that when there is an oversupply of high FV women then this leads to conflict within the home which then leads to aggressive acts in society. The MC/FV and MR/RV gender ratios also found a negative relationship with rape prevalence. Therefore where there were more females of a high FV than males of a high competition age there was a higher number of rapes committed, and where there were more females of a high RV age than males of a reproductive age there were more rapes committed. Whereas the total ratio of men to women and the MC/RV gender ratio were not related to rape prevalence. This suggests that the age of the females in the ratio is important, and that when females who are more fertile are in abundance compared to males of both competition and reproductive age then there is an increase in rape prevalence. Data for the US were analysed and it was found that there was no relationship between the total ratio of men to women and rape prevalence.

Further analysis included indecent assaults and found a slight change in the pattern of relationships. The MC/FV gender ratio produced the strongest relationship with indecent assault and rape prevalence. Where women of a high fertility value age were numerous and males of a competitive age were not, there were a greater number of assaults committed against women. The same pattern occurred for the MR/FV and MR/RV gender ratios. Where there were a higher number of females of a high FV age in comparison to males of a reproductive age there were more assaults, and where there was a higher number of females of a high RV age in comparison to males of reproductive age there were more assaults. There were no relationships found for the total ratio and the MC/RV gender ratio, when women of a high FV and a high RV age are in abundance then this may affect the number

of sexual assaults committed. This is consistent with the family conflict hypothesis, that discord in the family may affect the number of violent acts committed.

One confounding factor in a population study is the density of the population. The prevalence of rape in the British population ranged from 25 to 118 per hundred thousand. When population density was partialled out it reduced all the correlations suggesting that density may be a relevant factor, along with gender ratio. Further examination of population density found it to be related to rape prevalence in the British population. This would indicate that as the population (per hectare) increased then so did the number of rapes (and number of indecent assaults). Barber (2000) found no relationship with population density in his cross-cultural study, i.e. more crowded nations did not have more rapes than less crowded ones. Of course, this is a very general relationship and may not transfer to within-country dynamics.

Population density has been found to be an indicator in violent crimes. Particularly, Wallace & Wallace (1998) found that in areas of New York City where there was overcrowding, the numbers of violent deaths increased. Kposowa *et al* (1995) found that population density predicted both property and violent crime in a US study of county crimes. The violent crime included aggravated assault, rape, robbery, and homicide. Kelley (1985) and Perry & Simpson (1987) found that as population size increased then so did the incidents of rape. It would therefore appear that overcrowding is a factor in the number of crimes committed in both these studies and the current study.

The increase in rape in overcrowded areas may be the result of perpetrators feeling that they are anonymous in the urban setting and therefore that they can escape retribution. From a cost-benefit perspective (Smith, Borgerhoff-Mulder & Hill, 2001), this would entail a decrease in the perceived costs of rape. It may also be the case that density of population would increase the number of potential victims and perpetrators in a given area, which may then increase the incidence of crimes.

The type of person who lives in a particular area may vary. Those who choose to live in urban areas may represent different categories of class, gender, age, etc. as compared to those who live in areas that are more rural. Kposowa *et al*, (1995) found that poverty and divorce were predictors of homicide in rural areas. In addition, Wallace & Wallace (1998)

found that overcrowding, low socio-economic status, and low-weight births correlated with violent death incidence in an inner city area. In particular, the Wallaces (1998) noted that the middle class population moved out of the area, leaving the inner city populated by those with a low socio-economic class. It would seem that poverty and low SES are common themes in any population where there are violent crimes. It may be that the incidence of these crimes is less in low populated areas even though predictors of the crimes are similar.

It would seem that population density and low gender ratios predict rape prevalence. However according to the regression analysis the gender ratio of MR/FV was more predictive of rape prevalence in a given area than population density. This was a low gender ratio; the animal literature has found that there were more forced copulations in high gender ratios environments. The difference in human societies may be due to the social confines that operate within them. Guttentag & Secord (1983) found that in a low gender ratio society, women were valued less and rape was punished by a monetary fine. In addition, promiscuous behaviour and prostitution increased. Women in these societies were also less likely to be pair bonded and so would not be mate guarded. Therefore (as suggested in study 1) being single may increase their risk of being raped. Interestingly the operational gender ratio (the average ratio of fertilisable females to sexually active males which is akin to MR/FV) produced the most significant relationship with rape prevalence. This suggests that the ratio of specific age groups is important. Previous research failed to find consistent patterns with rape prevalence (Lester, 1974; Singh, 1977; and Svalastoga, 1962), which might be due to not using an operational gender ratio.

Limitations

There were some limitations to this study, the first was that the only rapes included in the analysis were those, which had been reported and then reached conviction. Ruback & Menard (2001) found that rape is in fact higher in more rural areas but reported less and Russell (1984) has noted that the rape prevalence in her study was 24 times higher than that reported by national statistics. Although this is a problem, there was no other way that the data could be collected.

The second problem was that information on specific rapists within each area was not obtained. For instance, one area may have contained more unmarried rapists than another. This would therefore be a confounding factor which may effect why people rape.
Another problem was that all female rape victims were included in the analysis. A variation of the study may have only considered single women, who are often raped more than married women (Thornhill & Palmer, 2000). However, the current data did not differentiate rape victims in any way.

One way to repeat the study would be to conduct a cross-sectional survey of rapes from different areas in both Britain and the US. This would then eradicate the biases in only analysing data from convicted samples.

Conclusion

This study found that both population density and a low gender ratio predicted rape prevalence, although the stronger predictor was the gender ratio. This was consistent with Barber's (2000) family conflict hypothesis. However, the gender ratio most predictive was where there were more females of FV age than males of a reproductive age, which is consistent with an operational gender ratio. Previous research did not find consistent relationships with rape prevalence and gender ratios but they did not incorporate the operational gender ratio.

Summary – Study 3

The aim of this study was to assess the relationship between gender ratios and rape prevalence. The mate deprivation hypothesis suggests that men will be more likely to rape if there are a limited number of females available (high gender ratio). Alternatively, the

family conflict hypothesis suggests that an oversupply of women leads to family conflict, which then leads to more aggression in society (low gender ratio). Statistics were obtained for 42 English and Welsh Police Force Areas and 51 US States. There was a relationship between the gender ratio (MR/FV) and rape prevalence, and the gender ratio (MR/FV) and prevalence of indecent assault and rape. These relate to an operational gender ratio and suggest that when women of a high fertility value age were in abundance compared to men of a reproductive age then there are more sexual assaults committed against women. Population density was a contributing factor to rape prevalence, i.e. where the area was denser there were more rapes committed. However, this was not as predictive as MR/FV.

PART 3: PARTICIPANT DATA - STUDIES 4-7

STUDY 4: OFFENDER SOCIO-ECONOMIC STATUS AND VICTIM FERTILITY VALUE IN RAPE OFFENCES.

Introduction

Studies 1-3 tested hypotheses using archival data the next four studies assessed participants' attitudes. Two types of methods were used in order to give a broad analysis of the hypotheses. Study 1 found that victims of rape were more likely to have a high RV than FV, and study 2 found that rape offences were more likely committed by lower status individuals. Study 3 however found that rape was more prevalent when there was an abundance of women of FV age in comparison to men of reproductive age, which did not support the view that men who were deprived would rape. The current study has attempted to assess the attitudes towards victims with different FVs and offenders of different status.

The high status male is afforded high status by his ability to control key resources (Buss, 1999), namely those that would have enhanced survival and reproduction. This has been discussed in the Literature Review. Females are one of the key resources that high status males can control. One would expect high status males to be the most reproductively successful within their group, both in the ancestral past and modern society (although modern contraception may reduce the effect). The value of females may alter depending on their age. As discussed in the Literature Review young females have a high reproductive value (RV), which tends to make them valuable as long-term partners. Females in their twenties have a high fertility value (FV) which makes them valuable as a short term partner (Williams, 1975). Overall, therefore, males are valued for their high status and females are valued for their high FV.

It has been suggested that males who are at the lower end of the social hierarchy would have a reduced choice of females and less access to survival resources. Thornhill & Palmer (2000) have argued that it is these males who are more likely to rape. However, Paul & Hirsch (1996) have suggested from their research that both low and high socio-economic status men are as likely to follow a quantity strategy, i.e. short-term strategy which would increase their chances of reproduction. Shields & Shields (1983) also suggested that the most successful male would be one who used honest, deceptive, and forced copulatory mating strategies but these operate regardless of status. It was found in study 2 that even when base rates were controlled for, there were more lower status offenders than higher status ones. This is because either high status males rarely offend or that they are rarely convicted. Judgments of a rape account, in a US study, showed that being a celebrity resulted in less disapproval for a White defendant, whereas for a Black defendant it was considered a liability (Knight *et al,* 2001). Often high status males are rarely convicted, e.g. fraternities (see Literature Review) it is therefore expected that high status males will be perceived as less culpable of a rape offence.

A general principle of high fitness (Dawkins, 1976) is that when women cannot attract a mate to invest in their children they compromise by mating with males who will not invest but who have good genes. High status males might have 'good genes'. Therefore females will be more accepting of a rape by a high status male as the rape may provide good genes even though nothing else. According to the theory of status-striving (as reviewed in the Literature Review) males are constantly trying to achieve high status. It is therefore expected that male respondents will accept a high status rape more than a low status one as they themselves are striving to be high status (Weisfeld, 1994) and so may identify with and excuse the rape by a high status male.

If rape is a short-term strategy, victims should have a high FV, however rape may also be a long-term strategy (as found in study 1 that rape prevalence was related to RV). It has been found that women of a reproductive age (12-44 years) are more traumatised by rape than older women or girls, and Thornhill & Thornhill (1990a) have interpreted this to be a consequence of their higher FV (however it may be more specifically related to their RV Thornhill & Thornhill (1990a) only used a very crude measure of FV). Calhoun, Selby, Long & Laney (1980) found that respondents perceived 6 year old victims to be less

responsible for a rape than 18 or 26 year old victims. Therefore, people's perceptions of rapes would vary according to the FV of the victim. The results of Calhoun *et al,* (1980) suggested that females with a high FV were perceived as more responsible than a child with a high RV, however this is confounded by general expectations of children's behaviour as being less responsible. The current study predicted that perceptions of rapes would differ according to the age of the victim. Specifically that the rape of a victim with a high FV will be perceived as more serious as this would be this would be more likely to lead to reproduction and therefore limit female choice.

It has been found that males often have more negative attitudes towards rape victims than females (e.g. White & Robinson-Kurpius, 1999). It is therefore expected that males will perceive the rape as less serious than female respondents will.

The current study has assessed the perceived seriousness of an acquaintance rape. This was chosen, as it is neither a short- or long-term strategy, but rather a medium-term strategy. Perceived seriousness was assessed by the Rape Disapproval Scale (see Table 4.2), which was developed for this study. The scale consisted of items such as: How responsible is Adam for what happened to Karen? The scale had a high internal consistency, which meant it was reliable.

Assessing the perceived seriousness of a rape offence may be confounded by personal opinions of the respondent. Perhaps most notably would be the respondent's opinion of rape in general, i.e. do they think that rape is a normal behaviour and would they be likely to commit a sexual assault? Another confound would be their experience of sexual aggression, if they had been the victim of a sexual assault then this may heighten their condemnation of sexual aggression. In addition, if they had committed various forms of sexual aggression, this may construct an opinion of normality towards sexual aggression. Another confound may be the perception of partner status. If this is perceived as important then respondents might rate the high status male as less culpable, this was therefore controlled for. A final confounding variable may be the age preference of partners for respondents. Those who are more attracted to a younger person may perceive the rape of a young person as more serious than the rape of an older victim, and vice versa. Therefore attitudes towards rape, experience of sexual aggression, importance of partner status and

the preference for younger partners were controlled for, to eradicate the influence of these confounds.

The current study assessed the perceived seriousness of an acquaintance rape with different offender and victim characteristics using scenarios. It was predicted that a rape committed by a high status offender would be rated as more acceptable than a rape committed by a low status offender. The second prediction was that the acceptance of a rape would change when the FV of the victim was altered. Specifically the higher the FV, the more disapproval as this may have the greatest effect on the female's choice of reproduction. It was also expected that males would be more accepting of rape than females. If rape is a short-term strategy then there should be no difference between perceived seriousness when the victim either has a high or low RV as this is related to a long-term strategy, which was found in study 1.

Method

Design

This was a 2x4x2 between subjects design. The factors included offender status with two levels:

1) High; and
2) Low.

Fecundity with four levels:

1) 29 year old victim = low RV - high FV;
2) 20 year old victim = high RV - high FV;
3) 16 year old victim = high RV - low FV; and
4) 50 year old victim = low RV – low FV.

The third was respondent's gender:

1) Male; and

2) Female.

There were therefore sixteen conditions with 15 participants in each one.

A second analysis incorporated FV and RV together in order to assess the constructs together. The second analysis divided fecundity into FV and RV therefore this was a 2x2x2x2 between subjects design.

FV with two levels:

1) High FV = 29 and 20 year old victims; and
2) Low FV = 16 and 50 year old victims.

RV with two levels:

1) High RV = 20 and 16 year old victims; and
2) Low RV = 29 and 50 year old victims.

Participants

Two hundred and forty participants were recruited from the University of Central Lancashire. There were an equal number of males and females with an average age of 23 years (range 18-57 years). The majority of the sample were either single (43%) or dating (40%) with 17% married or cohabiting. Most of the sample were White (76%) with 18% Asian, 1% Black, and 2% of a mixed race. Ninety-four percent were heterosexual, 3% were homosexual, 1% bisexual and 1% were not sure of their sexuality.

Materials

Scenarios

There were eight written acquaintance rape scenarios of approximately 300 words. Each scenario had a male offender attacking a female victim. Each scenario was manipulated according to both offender status and victim fertility. Whereas the definition for status in

study 2 was broad, here the definition is more specific from both ends of the continuum. This was so any difference was due to status and there could be no overlap between the two definitions. The high status male was described as a company director who earned £100,000 p.a. and the low status offender was described as a builder earning £10,000 each year. See Table 4.1 for two examples of the scenarios.

List of Scenarios:

1) High status offender and 20 year old victim;
2) High status offender and 29 year old victim;
3) High status offender and 16 year old victim;
4) High status offender and 50 year old victim;
5) Low status offender and 20 year old victim
6) Low status offender and 29 year old victim;
7) Low status offender and 16 year old victim; and
8) Low status offender and 50 year old victim.

Assessment Tools

1) ***Rape Disapproval Scale*** – created by the researcher. This was used to assess the disapproval of each rape. It included items concerned with the responsibility of the rape and the amount of punishment the male should receive. There were 11 items, which were measured on a Likert Scale from 1 to 9. There was a twelfth question, which ascertained whether the respondent believed the incident to be a rape. Reliability analysis was performed on the scale. It was found that Cronbach's alpha was 0.73, which meant the scale can be regarded as highly reliable (males=0.72; females=0.75). A copy of the scale is shown in Table 4.2.

Table 4.1: Examples of High and Low Status Scenarios*.

Scenarios	
High Status and 16 year old Rape Scenario	*Low Status and 20 year old Rape Scenario*
Adam is a white male company director who earns £100,000 per year. He owns his own home and has a degree. During the week he goes to the local pub with his friends and at weekends he spends time with his family.	**Adam is a white male builder who earns £10,000 per year. He rents his home and has a BTEC qualification.** During the week he goes to the local pub with his friends and at weekends he spends time with his family.
Karen is a white female and **16** years old. She spends time socialising with both her friends and family. In particular, she likes to go walking and cycling at the weekend.	Karen is a white female and **20** years old. She spends time socialising with both her friends and family. In particular, she likes to go walking and cycling at the weekend.
Karen and Adam had met two weeks ago at a party that a mutual friend had organised. Since then they had been out twice, once to the movies and once for dinner. Although their relationship was becoming more intimate, they had not yet had sexual intercourse.	Karen and Adam had met two weeks ago at a party that a mutual friend had organised. Since then they had been out twice, once to the movies and once for dinner. Although their relationship was becoming more intimate, they had not yet had sexual intercourse.
One night Karen walked home after spending some time with her friends. When she arrived at home the phone rang, it was Adam, he asked her if he could come over. She tried to deter him as it was late but he insisted on seeing her so she agreed. When he arrived she took his coat and made him a drink. He said that he needed to see her as he was missing her. Although she was initially hesitant about Adam coming so late Karen was pleased that he had arrived.	One night Karen walked home after spending some time with her friends. When she arrived at home the phone rang, it was Adam, he asked her if he could come over. She tried to deter him as it was late but he insisted on seeing her so she agreed. When he arrived she took his coat and made him a drink. He said that he needed to see her as he was missing her. Although she was initially hesitant about Adam coming so late Karen was pleased that he had arrived.
After an hour had passed they were both becoming tired. Adam then began to kiss Karen passionately, which she enjoyed. Adam indicated that he wanted to have sex with Karen, however she ignored his proposition assuming he would not attempt to go any further. A few minutes later he pushed her to the floor where he held her and then had sexual intercourse with her. Karen tried to stop him but he was too strong for her and wouldn't listen. After, Adam left saying he would call next week. Karen still bruised and shaken, gathered her thoughts and decided what to do next.	After an hour had passed they were both becoming tired. Adam then began to kiss Karen passionately, which she enjoyed. Adam indicated that he wanted to have sex with Karen, however she ignored his proposition assuming he would not attempt to go any further. A few minutes later he pushed her to the floor where he held her and then had sexual intercourse with her. Karen tried to stop him but he was too strong for her and wouldn't listen. After, Adam left saying he would call next week. Karen still bruised and shaken, gathered her thoughts and decided what to do next.

*Sections in bold were altered depending on the factors used.

Table 4.2: Rape Disapproval Scale.

Rape Disapproval Scale

For questions 1-11 answers were given on a 9 point scale.
For question 12 answers were given on a 2 point scale.

1) To what extent do you agree with this statement: Karen was sexually assaulted by Adam.
Don't agree at all (1) – Agree very much (9)

2) How responsible do you think Karen is for what happened to her?
Not at all responsible (1) – Very responsible (9)

3) How emotionally upset do you think Karen is?
Not very upset (1) – Very upset (9)

4) How long will it take Karen to recover physically from this incident?
1 day (1) – 1 week (2) – 1 month (3) – 6-12 months (4) – 1-2 years (5) – 5 years (6) - 10 years (7) – 20 years (8) – A lifetime (9)

5) How long will it take Karen to recover emotionally from this incident?
1 day (1) – 1 week (2) – 1 month (3) – 6-12 months (4) – 1-2 years (5) – 5 years (6) - 10 years (7) – 20 years (8) – A lifetime (9)

6) Would you expect Karen to report this incident as a crime to the police?
Not at all (1) – Very likely (9)

7) How responsible is Adam for what happened to Karen?
Not at all responsible (1) – Very responsible (9)

8) Should Adam be punished for what happened to Karen?
Not at all (1) – Very much (9)

9) If Adam is punished what sentence do you think he should he receive?
Fine (1) – Community service (2) – Suspended sentence (3) – 6 months imprisonment (4) – 1 year imprisonment (5) – 5 years imprisonment (6) – 10 years imprisonment (7) – 20 years imprisonment (8) – Lifetime imprisonment (9)

10) Do you think that Adam thought he was sexually assaulting Karen?
Not at all (1) – Very much (9)

11) Should Adam be considered a threat to other women?
Not at all (1) – Very much (9)

12) Did Adam rape Karen?
Yes (1) – No (2)

2) ***Attraction to Sexual Aggression Scale (ASA)*** – Malamuth (1989a; 1989b) - This assesses the attraction to sexual aggression of an individual. The original 14 item scale had an internal consistency of 0.91. It was adapted to include males and females as both victims and offender by

McConaghy, Zamir & Manicavasagar (1993). Internal consistency for the current study was 0.83 (males=0.82; females=0.86). See Table 4.3 for the scale.

Table 4.3: Attraction to Sexual Aggression Scale.

Attraction to Sexual Aggression Scale

Questions 1, 2, and 6 refer to rape; forcing a female to do something sexual she didn't want to; and forcing a male to do something sexual he didn't want to.
Questions 3, 4, and 5 refer to rape; forcing a female to do something sexual she didn't want to; forcing a male to do something sexual he didn't want to; and being forced to do something sexual they didn't want to.
Each question is answered on a different scale and then standardised.

1) People frequently think about different activities even if they never do them. For each kind of activity listed, please indicate whether or not you have ever thought of trying that activity.
Have thought of it – Have never thought of it

2) Whether or not you had ever thought of it, do you find the idea:
Very unattractive – Somewhat unattractive – Somewhat attractive – Very attractive

3) What percentage of males do you think would find the following activities sexually arousing?
0% - 10% - 20% - 30% - 40% - 50% - 60% - 70% - 80% - 90% - 100%

4) What percentage of females do you think would find the following activities sexually arousing?
0% - 10% - 20% - 30% - 40% - 50% - 60% - 70% - 80% - 90% - 100%

5) How sexually arousing do you think you would find the following sexual activities if you engaged in them (even if you have never engaged in them)?
0% - 10% - 20% - 30% - 40% - 50% - 60% - 70% - 80% - 90% - 100%

6) If you could be assured that no one would know and that you could in no way be punished for engaging in the following acts, how likely, if at all would you be to commit such acts?
This was answered on a 5 point scale: Not at all (1) – Very likely (5)

3) ***Sexual Experiences Survey (SES)*** – Koss & Oros (1982) - This assesses actual experience of sexual aggression. Koss & Gidycz (1985) found an internal consistency of 0.74 among women and 0.89 among men. It has been adapted to include both males and females as both victim and offender by McConaghy, Zamir & Manicavasagar (1993) and was scored according to their method. Therefore, there were two subscales used in the research the victim subscale and the offender subscale. Internal consistency for the current study was 0.72 (males=0.61; females=0.75). The offender subscale had an internal consistency of 0.36, 0.32 for males and 0.46 for females. The victim subscale

had a KR20 (Kuder-Richardson) of 0.76, 0.56 for males. and 0.77 for females. See Table 4.4 for the survey.

4) ***Importance of Partner Status Scale*** – Bailey. Gaulin. Agyei & Gladue (1994). This assesses the importance that both genders place on the status of a romantic partner. This controls for respondent's status evaluation. Internal consistency was 0.82 in women and 0.68 for men. Internal consistency for the current study was 0.62 (males=0.56; females=0.64). See Table 4.5 for the scale.

5) ***Preference for Younger Partners Scale*** – Bailey *et al* (1994). This assesses the attraction of both genders towards a younger partner. This controls for respondent's age preference. Internal consistency for women was 0.80 and 0.63 for men. Two questions were not used (4 and 5) as the majority of respondents failed to complete these correctly. Internal consistency for the current study was 0.74 (males=0.70; females=0.71). See Table 4.6 for the scale.

Procedure

Participants read the scenario and then completed the assessment tools. Thirty minutes was allowed for all parts to be finished.

Respondent Rate

Three hundred and sixty-three questionnaire packs were distributed. Three hundred and forty-nine were returned. This was a 96% response rate. One hundred and nine participants were removed from the study as they failed to complete the questionnaires fully; therefore, 66% of the original sample was used in the analysis (240).

Table 4.4: Sexual Experiences Survey.

Sexual Experiences Survey

Each question was answered either yes (man), yes (woman) or no.

Have you ever:

1) Had sexual intercourse with a man/woman when you both wanted to?

2) Had a man/woman misinterpret the level of sexual intimacy you desired?

3) Been in a situation where you became so sexually aroused that you could not stop yourself even though the man/woman didn't want to?

4) Been in a situation where a man/woman became so sexually aroused that you felt it was useless to stop him/her even though you did not want to have sexual intercourse?

5) Had sexual intercourse with a man/woman even though he/she didn't really want to because you threatened to end your relationship otherwise?

6) Had sexual intercourse with a man/woman even though you didn't really want to because he/her threatened to end your relationship otherwise?

7) Had sexual intercourse with a man/woman when he/she didn't really want to because he/she felt pressured by your continual arguments?

8) Had sexual intercourse with a man/woman when you didn't really want to because you felt pressured by his/her continual arguments?

9) Obtained sexual intercourse by saying things you didn't really mean?

10) Found out that a man/woman had obtained sexual intercourse with you by saying things he/she didn't really mean?

11) Been in a situation where you used some degree of physical force (twisting his/her arm, holding him/her down, etc.) to try to make a man/woman engage in kissing or petting when he/she didn't want to?

12) Been in a situation where a man/woman used some degree of physical force (twisting your arm, holding you down, etc.) to try to make you engage in kissing or petting when you didn't want to?

13) Been in a situation where you tried to get sexual intercourse with a man/woman when he/she didn't want to by threatening to use physical force (twisting his/her arm, holding him/her down, etc.) if he/she didn't cooperate, but for various reasons sexual intercourse did not occur?

14) Been in a situation where a man/woman tried to get sexual intercourse with you when you didn't want to by threatening to use physical force (twisting your arm, holding you down, etc.) if you didn't cooperate, but for various reasons sexual intercourse did not occur?

15) Been in a situation where you used some degree of physical force (twisting his/her arm, holding him/her down, etc.) to try to get a man/woman to have sexual intercourse with you when he/she didn't want to, but for various reasons sexual intercourse did not occur?

16) Been in a situation where a man/woman used some degree of physical force (twisting your arm, holding you down, etc.) to try to get you to have sexual intercourse with him when you didn't want to, but for various reasons sexual intercourse did not occur?

17) Had sexual intercourse with a man/woman when he/she didn't want to because you threatened to use physical force (twisting his/her arm, holding him/her down, etc.) if he/she didn't cooperate?

Sexual Experiences Survey

18) Had sexual intercourse with a man/woman when you didn't want to because he/she threatened to use physical force (twisting your arm, holding you down, etc.) if you didn't cooperate?

19) Had sexual intercourse with a man/woman when he/she didn't want to because you used some degree of physical force (twisting his/her arm, holding him/her down, etc.)?

20) Had sexual intercourse with a man/woman when you didn't want to because he/she used some degree of physical force (twisting your arm, holding you down, etc.)?

21) Been in a situation where you obtained sexual acts with a man/woman such as anal or oral intercourse when he/she didn't want to by using threats or physical force (twisting his/her arm, holding him/her down, etc.)?

22) Been in a situation where a man/woman obtained sexual acts with you such as anal or oral intercourse when you didn't want to by using threats or physical force (twisting your arm, holding you down, etc.)?

23) Have you ever raped a man/woman?

24) Have you ever been raped by a man/woman?

Table 4.5: Importance of Partner Status Scale.

Importance of Partner Status Scale

Each question was rated on a 7 point scale from Strongly disagree (1) – Strongly agree (7).

1. Ideally, I want a romantic partner who is at least as highly educated as I.

2. It would be important to me if my partner were highly respected in the community.

3. If I found that a potential romantic partner made substantially more money than I, it would make her/him more attractive to me.

4. I would not mind being seriously involved with someone whose career ambitions were noticeably lower than mine.

5. Although I don't necessarily expect it, having the other person pay for the date makes me feel good.

6. It can be very romantic to get a very expensive gift.

7. I would not want to get romantically involved with someone who did not have a job.

8. I sometimes fantasize about being in a relationship with someone who is socially powerful and wealthy.

9. I would like my partner to be from a higher social class background than I.

10. I wouldn't like it if my partner made more money than I.

11. The prospect of a romantic partner who was well enough established so that I didn't have to work if I didn't want to would be very attractive.

12. I don't really care whether a potential romantic partner spends money on me.

Table 4.6: Preference for Younger Partners Scale.

Preference for Younger Partners Scale

Questions 1-3 and 6-11 were rated on a 7 point scale: Strongly disagree (1) – Strongly agree (7).
Questions 4 and 5 were answered with an exact age.

1. Facial wrinkles in a potential partner would be a real turn-off to me.

2. I find grey hair to be somewhat sexy in a potential romantic partner.

3. I could imagine being romantically and sexually involved with someone 20 years older than I.

4. If I had to choose someone other than my current romantic partner as a long-term romantic partner I would choose someone aged_____.

5. If I had to choose someone other than my current romantic partner as a one-time sexual partner I would choose someone aged_____.

6. I am turned off by bodies that show signs of aging (such as sagging skin or varicose veins.

7. I am most sexually attracted to younger adults (aged 18-25).

8. If someone showed definite physical signs of aging, it would be difficult for me to be very easily attracted to them.

9. I find attractive adolescents (16-18) particularly sexy.

10. I would be comfortable having a mate considerably older than I.

11. It is hard for me to understand why anyone would have a strong preference for younger rather than older partners.

Manipulation Check

The respondents were asked if the male character had raped the female character. Ninety-five percent agreed that she was raped, while 4% said no and 1% did not answer. This suggests that most of the sample perceived the incident as a rape, which means the Rape Disapproval Scale can be correctly interpreted.

Results

The assessment tools were examined to see if they met the requirements for a normal distribution. The Rape Disapproval Scale, the Importance of Partner Status scale and the Preference for Younger Partners scale all the met the assumptions of a normal distribution. The Attraction to Sexual Aggression scale did not, and was therefore transformed using a logarithm. The Sexual Experiences Survey – Offender subscale was transformed by an inverse method and the Sexual Experiences Survey – Victim subscale was transformed using a logarithm.

The correlation matrix in Table 4.7 shows the relationships between the covariables and the Rape Disapproval Scale.

First Analysis – Offender Status x Victim Age x Respondent Gender

A 2x4x2 ANCOVA was conducted on the Rape Disapproval Scale. The Attraction to Sexual Aggression Scale, the Sexual Experiences Survey – offender and victim subscales, the Importance of Partner Status, and the Preference for Younger Partner Scales were entered as covariables. The Sexual Experiences Survey – offender and victim subscales and the Preference for Younger Partners Scale failed to make a significant impact on the dependent variable: these were removed from the analysis. This meant that experience of sexual aggression and a preference for younger partners did not affect the perceived seriousness of the rape offences, whereas attraction to sexual aggression and importance of partner status did.

Table 4.7: Correlation Matrix between the Rape Disapproval Scale and the Covariables: Attraction to Sexual Aggression Scale, Sexual Experiences Survey, Importance of Partner Status scale and the Preference for Younger Partners Scale.

	Attraction to Sexual Aggression Scale (log)	Sexual Experience Survey – offender (inv)	Sexual Experiences Survey – victim (log)	Importance of Partner Status Scale	Preference for Younger Partners Scale
Rape Disapproval Scale	-0.30***	0.10	-0.12	-0.21**	0.07
Attraction to Sexual Aggression Scale (log)		-0.25***	0.19**	0.14*	-0.09
Sexual Experience Survey – offender (inv)			-0.29***	-0.02	-0.14*
Sexual Experiences Survey – victim (log)				0.12	-0.21**
Importance of Partner Status Scale					-0.05

***p<0.001, **p<0.01, *p<0.05.

Table 4.8 shows the results of the ANCOVA. It can be seen that there was almost a main effect of offender status. There were no other main effects or interactions. Rape by low status offenders was less accepted than rape by high status offenders: this is shown in Figure 4.1. This finding supported the prediction. The two covariables were controlled for in the analysis. As the covariables were significant, the analysis adjusted the means on the Rape Disapproval Scale as if attraction to sexual aggression and importance of partner status were equal among respondents.

Table 4.8: ANCOVA by Offender Status, Victim Age, and Gender for Rape Disapproval Scale.

	df	Mean Square	F
Attraction to Sexual Aggression Scale (log)	1	1417.27	16.13***
Importance of Partner Status Scale	1	736.20	8.38**
Offender Status	1	292.35	3.33†
Victim Age	3	53.67	0.61
Gender	1	40.16	0.46
Offender Status x Victim Age	3	158.86	1.81
Offender Status x Gender	1	1.62	0.02
Victim Age x Gender	3	87.48	1.00
Offender Status x Victim Age x Gender	3	88.99	1.01
Error	222		

***p<0.001, **p<0.01, *p<0.05, †p<0.10.

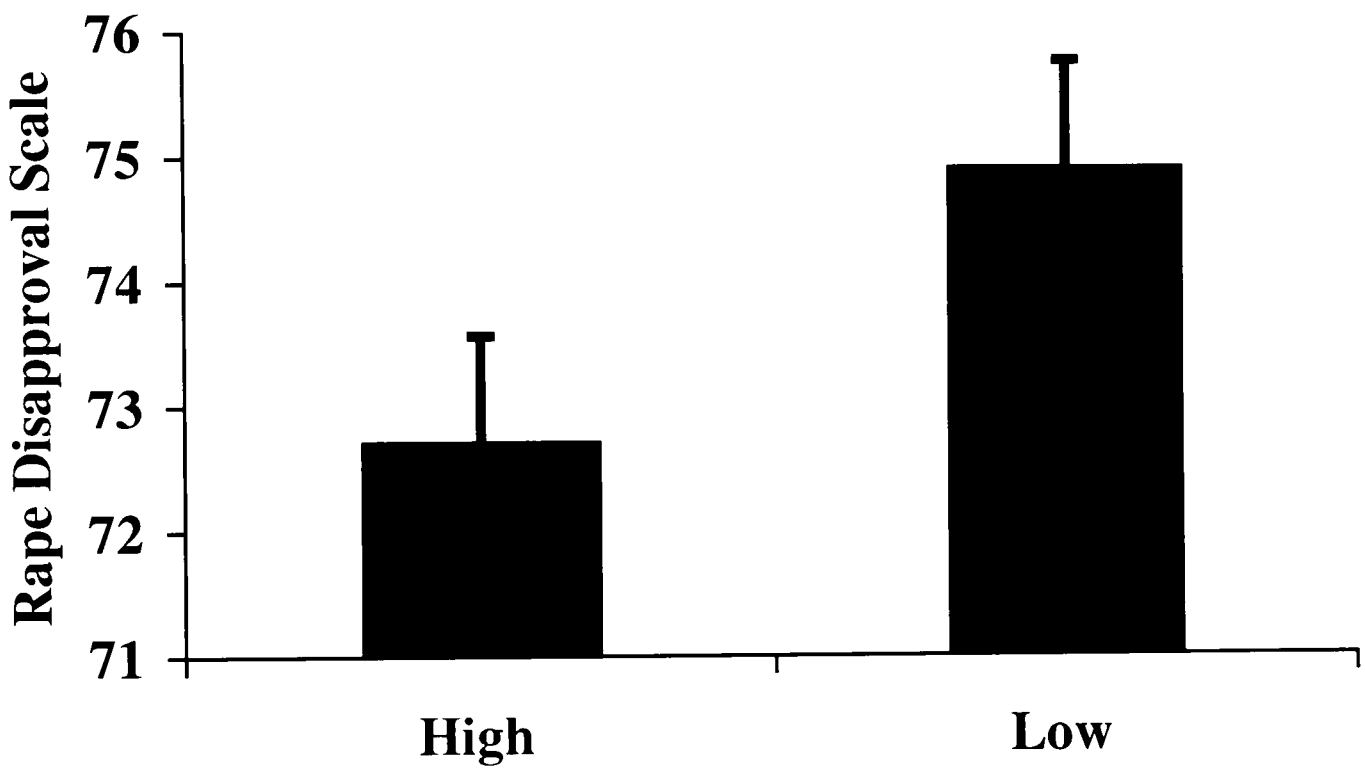
Second Analysis – Offender Status x Fertility Value x Reproductive Value x Respondents' Gender

The analysis was conducted again with the victim age group divided into four different categories: high and low FV and high and low RV. The first analysis considered victims according to age whereas this analysis considered victims according to either their FV or RV. The first analysis was conducted in order to assess the individual effects of age.

A 2x2x2x2 ANCOVA was performed on the Rape Disapproval Scale. Again, the Attraction to Sexual Aggression, the Sexual Experiences Survey – offender and victim subscales, the Importance of Partner Status and the Preference for Younger Partners scales were entered as covariables. The Sexual Experiences Survey and the Preference for Younger Partners scales again failed to make a significant impact on the dependent variables and were therefore removed from the analysis. Again, experience of sexual aggression and preference for younger partners did not confound the perceived seriousness

of a rape offence, whereas attraction to sexual aggression and importance of partner status did and were therefore controlled for.

Figure 4.1: Adjusted Means (and Standard Error Bars) of Rape Disapproval Scale by Offender Status.



The results for the second ANCOVA are shown in Table 4.9. Two covariables significantly affected the results; these were therefore controlled for in the analysis and altered the means of the Rape Disapproval Scale as if the covariables were equal among participants. There was almost a main effect of Offender Status in which low status offenders were afforded more disapproval than high status ones. This was identical to the first analysis as there was no change in the status factor. There was almost a significant interaction between offender status and reproductive value (RV): here a low status offender who raped a victim with a low RV was more disapproved of than both high status offenders and low status offenders who had raped a victim with high RV. Therefore low status

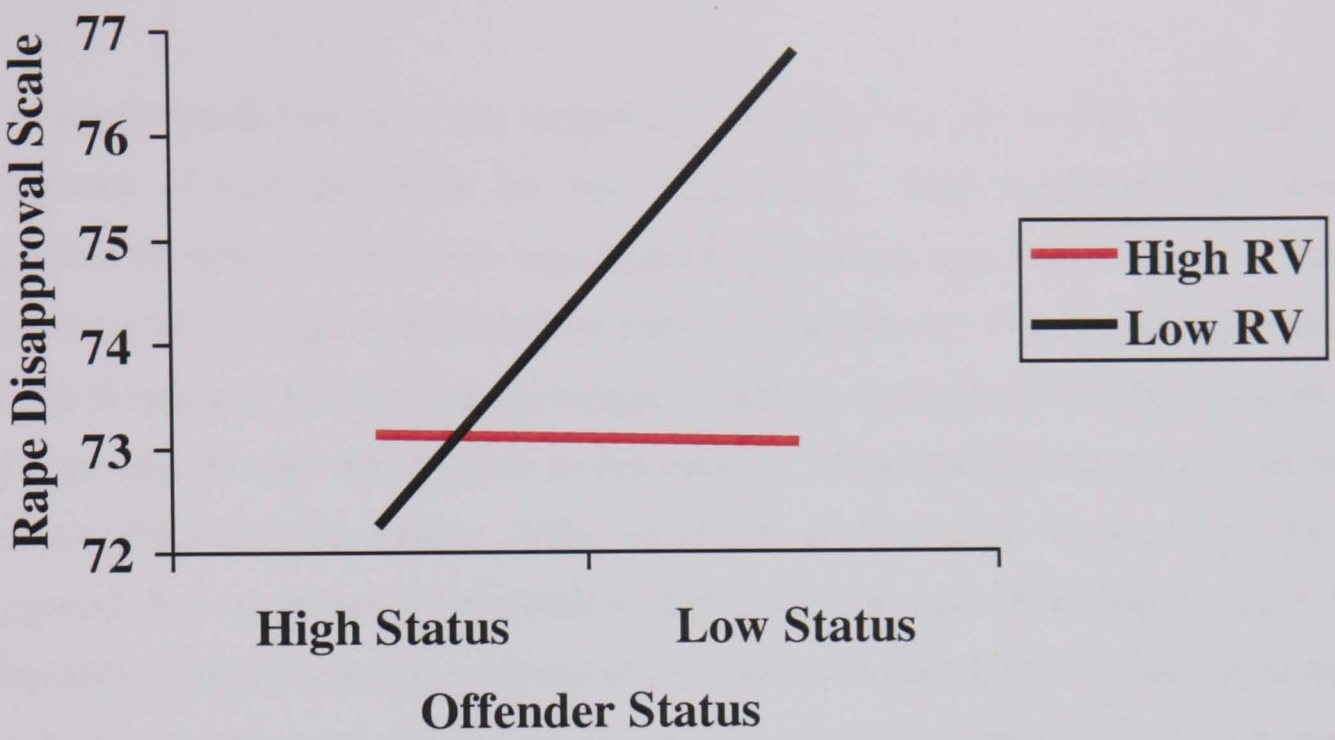
offenders who raped a 29 or 50 year old were disapproved of more than low status offenders who raped a 16 or 20 year old. This is shown in Figure 4.2.

Table 4.9: ANCOVA of Rape Disapproval Scale with Attraction to Sexual Aggression Scale and Importance of Partner Status as Covariables.

	df	Mean Square	F
Attraction to Sexual Aggression Scale (log)	1	1417.27	16.13***
Importance of Partner Status Scale	1	736.20	8.38**
Offender Status	1	292.35	3.33†
RV	1	120.68	1.37
FV	1	41.96	0.48
Gender	1	40.16	0.46
Offender Status x RV	1	312.20	3.55†
Offender Status x FV	1	62.16	0.71
Offender Status x Gender	1	1.62	0.02
RV x FV	1	0.22	0.00
RV x Gender	1	77.63	0.88
FV x Gender	1	33.39	0.38
Offender Status x RV x FV	1	99.03	1.13
Offender Status x RV x Gender	1	64.24	0.73
Offender Status x FV x Gender	1	0.88	0.01
RV x FV x Gender	1	148.46	1.69
Offender Status x RV x FV x Gender	1	199.45	2.27
Error	222		

***p<0.001, **p<0.01, *p<0.05, †p<0.10.

Figure 4.2: Interaction between Offender Status and Victims' RV on the Rape Disapproval Scale with Adjusted Means.



Discussion

Several covariates were controlled for in the study: only attraction to sexual aggression and importance of partner status had an effect. Both produced negative correlations with the Rape Disapproval Scale. Participants who were not attracted to sexual aggression were more disapproving of the depicted rape and those who did not place importance on partner status were more disapproving of the depicted rape. The first finding is self-explanatory and expected; the second finding is difficult to explain.

It was found that hypothetical rapes were more accepted if the offender was of high status than if he was of low status, although this was a trend and did not reach significance. This applied when attraction to sexual aggression and the importance of partner status was controlled for, so although attraction to sexual aggression and importance of partner status

were related to the Rape Disapproval Scale, the analysis controlled for these by adjusting the means as if they were equal. This suggested that the student sample considered the rape by a low status offender to be more distressing for the victim and to deserve more punishment than that by a high status offender.

The second prediction was not supported, as there was no overall difference in the acceptance of rape dependent on the victim's age. This suggested that participants perceived all rape to be the same regardless of the victim's age, even though a self-reported preference for a younger partner had no effect on disapproval. The finding that respondents did not distinguish between the ages suggests that the claim that FV is important in rape is not generally the case with regards to perceptions. These findings fail to support previous research (Thornhill & Palmer, 2000; Thornhill & Thornhill, 1990a; study 1), which suggested that victim age is important in the context of rape. It should be noted that the Thornhills' (1990a) research analysed the difference in actual victim pain and accordingly found reproductive aged victims (15-45 years) to be more distressed by the rape than non-reproductive aged victims. Study 1 found that victims with a high RV were more likely to be represented among rape victims. The second analysis divided victim age into high and low fertility value (FV) and reproductive value (RV). There was no difference found between high (29 and 20 years) and low (16 and 50 years) FV or high (20 and 16 years) and low (29 and 50 years) RV. This suggested that neither of these constructs individually affected the approval of rape.

There were no differences between males and female respondents. This is inconsistent with previous research, which found that males showed more attitudes that are negative on the Attitudes Toward Rape Victims Scale (White & Robinson-Kurpius, 1999). Males were more disapproving of rape in the current study than would be expected. It might be that anti-rape campaigns have had a positive effect on the males in the current sample. As they were British students, they may have been more aware of the issues surrounding rape myths.

Throughout history, high status men have been able to control key resources, particularly those that increase survival or reproduction. The present results suggest that this extends to the acceptance of rape by a sample of young people under modern Western conditions.

even controlling for the importance of partner status. The current study found that when a low status male rapes he is likely to be disapproved of more than his high status counterpart (of course extremes of status were used in this study).

Study 2 found that higher status men were less likely to rape than lower status men. Paul & Hirsch (1996) have suggested that if high status men do rape then it tends not to be defined as rape. As Betzig (1993) noted, Roman Emperors had sex with whoever they pleased, and it was only defined as rape in later centuries. It may well be then that high status men are still to some extent perceived as being more entitled to rape. Wettlaufer (2000) has examined the occurrence of 'jus primae noctis' (one man's privilege of sexual access to a woman before another man's). Wettlaufer (2000) has suggested that this is evidence of a male power display, with symbolic gestures of coercive social dominance. It would therefore suggest that even if high status men were to rape, there is less disapproval of it as it is something that has long been a part of our cultural heritage. This is the opposite of Thornhill & Palmer's (2000) suggestion that low status men rape because they have no other 'choice'.

The second analysis found an interaction between offender status and RV. It would appear that a rape committed by a low status offender on a victim with a low RV (29 or 50 years old) was disapproved of more than if the rape was committed against a victim with a high RV. There was no difference in disapproval for a high status offender for victims with either a high or low RV. Therefore, if a victim is raped by a low status offender and she is 29 or 50 years old, this is more disapproved of than the rape by a high status offender or the rape by a low status offender of a 16 or 20 year old. It may be that victims with a high RV are considered to be more blameworthy for the crime (16 and 20 year olds) as they are younger and perceived as more responsible if they associate with low status men. It may be that it is seen as more excusable to rape a high RV age group as it is seen as more 'natural' or that they may be more available, more attractive and less likely to be in a long-term relationship (and so would not have a bodyguard: Wilson & Mesnick, 1997). Twenty-nine and 50 year olds may be seen as more respectable, e.g. likely to be married and may therefore be perceived as another man's property. The low disapproval of high status offenders has been discussed above.

As the study assessed the impact of an acquaintance rape, it is interesting that the interaction was almost significant for the victims with RV. Study 1 found that acquaintance rape is more associated with victims with a high RV than a high FV. This suggests that offenders are targeting victims who will be reproductively capable in the future – long-term strategy. Perhaps this effect only occurs with acquaintance rape, future studies would investigate other types of victim-offender relationships. For instance, the FV/RV interaction with status may differ for stranger, step-relative, and partner rapes. As study 1 found non-stranger rapes to be more related to RV and stranger rapes to be related neither to FV nor to RV. In addition, study 2 found that there were more rapes of strangers by lower status offenders and more rapes of step-relatives and partners by higher status offenders.

Limitations

One limitation of this study was that respondents' status was not controlled for. Although it was a student sample not all students come from middle class backgrounds, which may be a confounding variable. However, actual and desired sexual aggression was controlled, as was the importance of partner status and preference for a younger partner. This meant only age and status were considered in the analysis.

Conclusion

The study assessed the acceptance of a rape dependent on the victim's age and the status of the offender. Victim age did not affect acceptance overall, which suggests that rape is perceived as equally unacceptable regardless of age. However, when the offender had high status, a rape was more accepted than when the offender had low status. (Unlike other studies, the respondent's gender did not affect acceptance levels.) The rape of a victim with low RV by a low status offender was more disapproved of than the other combinations of offender status and victim age.

Summary – Study 4

Evolutionary theory predicts that males are valued according to their status and females are valued for their fertility (Betzig, 1993; Symons, 1979). It has been suggested that rape is a short term mating strategy in which males bypass female choice and male competition (Thornhill & Palmer, 2000). This study investigated the relationship between offender socio-economic status and the victim's fertility value (FV) through the respondent's degree of disapproval of the rape. Two hundred and forty participants completed a Rape Disapproval Scale after reading a scenario, that included either a high or low status offender and a victim who was either 16, 20, 29 or 50 years old (each had a different fertility and reproductive value: FV/RV). A 2x4x2 ANCOVA showed that there was no significant difference in the acceptance of a rape depending on victim age or respondent's gender. However there was more disapproval of a rape by a low than high status offender. (This suggests that their status allows them some lenience when committing a crime.) A second analysis divided victim age into high and low RV and FV, and a 2x2x2x2 ANCOVA was performed. Again, there was more disapproval of low than high status offenders. There was almost a significant interaction between offender status and RV, wherein a low status offender who raped a victim with low RV attracted more disapproval.

STUDY 5: THE IMPACT OF SOCIOSEXUAL ORIENTATION AND VICTIM-OFFENDER RELATIONSHIP ON DISAPPROVAL OF RAPE.

Introduction

The relationship between the victim and offender has been examined in previous studies of the thesis. Study 1 found that there was a difference between the FV and RV of female victims according to the victim-offender relationship. Victims of non-stranger rape were more likely to have a high RV, whereas neither FV nor RV was related to the prevalence of stranger rape. Study 2 found that the proportion of rapes varied according to the victim-offender relationship. In particular, lower status offenders were more likely to rape a stranger whereas higher status offenders were more likely to rape a step-relative or partner. Study 4 found that the approval of rape differed according to the depicted status of the offender and the RV of the victim. Study 5 has assessed the approval of rape according to the victim-offender relationship and the respondent's reproductive strategy.

Sociosexual orientation (Gangestad & Simpson, 1990) is the difference in individuals' prerequisites to enter a sexual relationship. A restricted sociosexuality refers to wanting to spend more time and needing a stronger attachment and closeness to the partner before engaging in a sexual relationship. An unrestricted sociosexuality refers to needing less time and a weak attachment to the partner before having sex with them (e.g. promiscuity). Sociosexual orientation corresponds to a short- or long-term reproductive strategy as discussed in the Literature Review. Restricted females may have benefited through paternal investment in their offspring, as they are more likely to have sex once they have established some form of commitment. An unrestricted female may have benefited through the quality of her mate's genes, e.g. she may choose mates who do not commit but who

have good genes. Gangestad & Simpson (1990) found that unrestricted females produced more sons than restricted females suggesting that males with good genes are passing these genes onto their sons more than to daughters. Sociosexual orientation can be assessed using a short questionnaire the Sociosexual Orientation Inventory (SOI: Simpson & Gangestad, 1991).

Hirsch & Paul (1996) have distinguished between quantity and quality strategist (short- and long-term respectively). They found that quality courtship involved honest advertisement, resource expenditure, and delay in sexual relations, whereas quantity courtship involved indirect or direct threats, psychological pressure, and talking about sex. These are similar to the restricted and unrestricted definitions of Simpson & Gangestad (1991). Further questionnaire research by Paul & Hirsch (1996) found that there are two kinds of quantity strategists: those that trade resources for sex and predators who exploit.

If an individual is a short-term strategist then it may be that he would be more sympathetic to the actions of a rapist who is pursuing a short-term strategy, as he could 'understand' why the offence was taking place. However, an individual who is a long-term strategist may 'understand' a marital rape or acquaintance rape but could not empathise with a stranger rapist.

Rape has been defined as a short-term strategy. For instance, Thornhill & Thornhill (1983) have suggested that victims of rape would more than likely have a high fertility value (FV), and Buss & Schmitt (1993) have noted that a high FV would be more related to a short-term strategy. Study 1 found that rape might also be a long-term strategy as the prevalence of non-stranger rape was more related to a victim's high RV. In addition, study 4 found that approval of a rape was related to a victim's RV, suggesting that RV is more salient to respondents than FV. Malamuth *et al* (1995) found that rape offenders were more likely to have an impersonal attitude to sex as well as hostile aggression, and they would be more likely to engage in sex as a short-term strategy and hence may rape (there was no differentiation of type of rape in this study). In study 1 rape victims were found to have a high RV, which suggested that they are younger than expected. Stranger rapists were more likely to attack a victim with a lower RV than if the victim was a step-relative or an acquaintance. A partner who was raped was more likely to have a higher FV than kin, a

step-relative, or an acquaintance, which meant they were either younger or older than the partner victims. Therefore, rape may be a long-term strategy in particular cases.

Mealey (1999) has suggested that offenders of different types of rape may subscribe to a different life history strategy. She noted that it is unlikely that stranger and acquaintance rape result from the same set of motivations as discussed in the Literature Review. Previous studies in the thesis would support Mealey's (1999) view that rape is not a generic behaviour, and that it can be subdivided according to victim-offender relationship.

Rape is usually defined as forced sexual intercourse without the consent of the victim. There is no reference to the relationship between victim and offender. It has, however, been found that the degree of relationship towards the victim can affect the perceived crime severity. Quinsey *et al* (1999) have found that sexual coercion is perceived as more severe the closer the genetic relationship. For example, father-daughter intercourse was perceived as more serious than cousin-cousin intercourse. McCormick *et al* (1998) considered the difference in sentence length of convicted rapists. They found that stranger rapists received longer sentences than rapists who attacked acquaintances or partners. Those who raped partners received the shortest sentences. Simonson & Subich (1999) found that of stranger, acquaintance, date and marital scenarios, the marital scenario evoked responses which minimised the seriousness of the situation, was characterised less as rape, and was considered to be less violent, less of a violation, and less psychologically damaging. Similar findings have been shown by Ewoldt *et al* (2000) and Kirkwood & Cecil (2001).

The current study assessed the disapproval of certain types of rape (stranger; acquaintance; marital) in relation to the participant's sociosexual orientation. This was achieved by asking participants to read different scenarios and complete assessments of sociosexual orientation.

It was predicted that males who are short-term strategists would be more accepting of the stranger rape, and more disapproving of the acquaintance and marital rape. Long-term strategists would show more disapproval of the stranger rape and more acceptance of the acquaintance and marital rapes. The stranger rape would be disapproved of more by long-

term strategists. and the acquaintance and marital rapes would be disapproved of more by short-term strategists.

Method

Design

This was a 2x3 between subjects design. There were three conditions of victim-offender relationship:

1) Stranger;
2) Acquaintance; and
3) Marital.

There were two conditions of the Sociosexual Orientation Inventory:

1) Short-term (unrestricted); and
2) Long-term (restricted).

A second analysis was conducted (2x3) using the victim-offender relationship factor and a second short/long-term strategy scale. There were two conditions from the Interest in Uncommitted Sex Scale:

1) Short-term; and
2) Long-term.

Both the short- and long-term divisions of participants were formed using a median split. The dependent variable was the Rape Disapproval Scale, developed in study 4.

Participants

There were 165 male participants with a mean age of 22 years, ranging from 18-60 years. They were all students from the University of Central Lancashire. Ninety-six percent were White, 2% were Asian, and 1% were of a mixed race. Ninety-six percent were heterosexual, 2% were homosexual, 1% were bisexual and 1% did not know their sexuality. Fifty-three percent were single, 38% were dating, 6% were cohabiting, and 4% were married.

Materials

Scenarios

There were three written rape scenarios of approximately 300 words. Each scenario had a male offender attacking a female victim. Each scenario was manipulated according to the victim-offender relationship. The victim was either a stranger (he asked to use the phone), an acquaintance (her date from the previous week) or wife. See Table 5.1 for copies of the three scenarios.

Assessment Tools

1) ***Rape Disapproval Scale*** – (Study 4). This was used to assess the disapproval of each rape. It included items concerned with the responsibility of the rape and the amount of punishment the male should receive. There were 11 items, which were measured on a Likert Scale from 1 to 9 with a score ranging from 9-99. There was a twelfth question, which ascertained whether the respondent believed the incident to be a rape. Cronbach's alpha was 0.73 for a previous sample (study 4): the value for males was 0.72, and for females 0.75. Internal consistency for the current study was 0.63 for males. See Table 4.2 for the scale.

Table 5.1: Scenarios of Stranger, Acquaintance, and Marital Rape*.

Scenarios		
Stranger Rape Scenario	***Acquaintance Rape Scenario***	***Marital Rape Scenario***
Adam is a white male. He likes to go to the pub with his friends and usually spends time with his family at the weekend. In particular, he likes to watch motor racing and boxing.	Adam is a white male. He likes to go to the pub with his friends and usually spends time with his family at the weekend. In particular, he likes to watch motor racing and boxing.	Adam is a white male. He likes to go to the pub with his friends and usually spends time with his family at the weekend. In particular, he likes to watch motor racing and boxing.
Karen is a white female. She enjoys spending time with her family and friends. In particular, she likes to go walking, and cycling. Quite often, she will go to the pub for a night out.	Karen is a white female. She enjoys spending time with her family and friends. In particular, she likes to go walking, and cycling. Quite often, she will go to the pub for a night out.	Karen is a white female. She enjoys spending time with her family and friends. In particular, she likes to go walking, and cycling. Quite often, she will go to the pub for a night out.
One night after spending some time with her friends, Karen walked home on her own. On arriving at her door, she felt the presence of someone behind her. When she turned around it was Adam, **someone she didn't recognise. They exchanged greetings. Adam asked to use her phone as his car had broken down. She invited him in and made some coffee whilst they chatted.** After approximately an hour, Adam began to indicate that he wanted sexual intercourse. Karen however ignored his proposition assuming he would not attempt to go any further. A few minutes later he pushed her to the floor where he held her and then had sexual intercourse with her. Karen tried to stop him but he was too strong for her and wouldn't listen. Then Adam left whilst saying that he enjoyed it and hoped she did too. Karen still bruised and shaken, gathered her thoughts and decided what to do next.	One night after spending some time with her friends, Karen walked home on her own. On arriving at her door, she felt the presence of someone behind her. When she turned around it was Adam, **her date from the previous week. They had enjoyed a meal together but no sexual intimacy. They exchanged greetings. She invited him in and made some coffee whilst they chatted.** After approximately an hour, Adam began to indicate that he wanted sexual intercourse. Karen however ignored his proposition assuming he would not attempt to go any further. A few minutes later, he pushed her to the floor where he held her and then had sexual intercourse with her. Karen tried to stop him but he was too strong for her and wouldn't listen. Then Adam left whilst saying that he enjoyed it and hoped she did too. Karen still bruised and shaken, gathered her thoughts and decided what to do next.	One night after spending some time with her friends, Karen walked home on her own. On arriving at her door, she felt the presence of someone behind her. When she turned around it was Adam, **her husband. Adam and Karen had been married for five years but lately their sex life had begun to dwindle. They exchanged greetings and went in. Then she made some coffee whilst they chatted.** After approximately an hour, Adam began to indicate that he wanted sexual intercourse. Karen however ignored his proposition assuming he would not attempt to go any further. A few minutes later, he pushed her to the floor where he held her and then had sexual intercourse with her. Karen tried to stop him but he was too strong for her and wouldn't listen. Then Adam left whilst saying that he enjoyed it and hoped she did too. Karen still bruised and shaken, gathered her thoughts and decided what to do next.

*Sections in bold are those that were altered.

2) ***Sociosexual Orientation Inventory*** – Simpson & Gangestad (1991). This was used to assess the amount of restricted and unrestricted sociosexual orientation each participant showed. A restricted orientation can be related to a long-term mating strategy, and an unrestricted orientation can be considered a short-term mating strategy. There were 7 items, each item was weighted differently (number of partners in past year x 5; number of partners foreseen x 1; number of one night stands x 5; frequency of sexual fantasy x 4; and attitudes toward engaging in casual, uncommitted sex x 2). In Simpson & Gangestad's (1991) sample the results ranged from 10-216 with a mean of 68.51 for men. Cronbach's alpha was found to be 0.73 by Simpson & Gangestad (1991). Internal consistency for the current study was 0.58 for males. See Table 5.2 for the inventory.

Table 5.2: Sociosexual Orientation Inventory.

Sociosexual Orientation Inventory

Questions 1-3 were answered with an exact number.
Question 4 was answered on an 8 point scale (see question 4).
Questions 5-7 were answered on a 9 point scale: I strongly disagree (1) – I strongly agree (9).

1. With how many different partners have you had sex (sexual intercourse) within the past year?
_____

2. How many different partners do you foresee yourself having sex with during the next five years? (Please give a specific, realistic estimate.)_____

3. With how many different partners have you had sex on one and only one occasion?
_____

4. How often do you fantasize about having sex with someone other than your current dating partner? (Circle one.)
This was answered on an 8 point scale: Never (1) – Once every two or three months (2) – Once a month (3) – Once every two weeks (4) – Once a week (5) – A few times each week (6) – Nearly every day (7) – At least once a day (8).

5. Sex without love is OK.

6. I can imagine myself being comfortable and enjoying "casual" sex with different partners.

7. I would have to be closely attached to someone (both emotionally and psychologically) before I could feel comfortable and fully enjoy having sex with him or her.

3) ***Interest in Uncommitted Sex Scale*** – Bailey *et al* (1994). This was used to assess the amount of impersonal sex that participants were attracted to. There were 10 items scored on a Likert scale of 1-7, where 1 referred to strongly disagree and 7 corresponded to strongly agree. The Cronbach's alpha for heterosexual males was 0.89 (Bailey *et al*, 1994). Internal consistency for the current study was 0.86 for males. See Table 5.3 for the scale.

Table 5.3: Interest in Uncommitted Sex Scale.

Interest in Uncommitted Sex Scale
Questions were answered on a 7 point scale: Strongly disagree (1) – Strongly agree (7).
1. I would consider having sex with a stranger, if I could be assured that it was safe and s/he was attractive to me.
2. I like the idea of participating in a sex orgy.
3. I would not enjoy sex without any emotional commitment at all.
4. I do not need to respect or love someone in order to enjoy having sex with him/her.
5. I can't imagine spending the rest of my life with one sex partner.
6. Sometimes I'd rather have sex with someone I didn't care about.
7. Monogamy is not for me.
8. I believe in taking sexual opportunities when I find them, as long as no one gets hurt.
9. I could easily imagine myself enjoying one night of sex with someone I would never see again.
10. If an attractive person (of my preferred sex) approached me sexually, it would be hard to resist, no matter how well I knew him/her.

Procedure

Participants read the scenario and then completed the assessment tools. This took approximately 15 minutes.

Respondent Rate

Two hundred and twelve questionnaire packs were distributed and all were returned to the researcher. However only 183 were completed correctly. This gave a respondent rate of 86%.

Results

Eighteen outliers were removed from the sample, which therefore reduced skewness and kurtosis and led to a normal distribution of the variables.

Table 5.4: Means and Standard Deviations for the Rape Disapproval Scale by Victim-Offender Relationship, Sociosexual Orientation Inventory, and Interest in Uncommitted Sex Scale.

		Means	Standard Deviations	N
Victim-Offender Relationship	Stranger	80.75	7.02	53
	Acquaintance	82.31	5.92	62
	Marital	72.94	8.68	50
Sociosexual Orientation Inventory	Short-term	80.50	6.62	80
	Long-term	77.52	9.28	85
Interest in Uncommitted Sex Scale	Short-term	79.28	7.60	81
	Long-term	78.67	8.80	84

Table 5.5: ANOVA of Rape Disapproval Scale by Interested in Uncommitted Sex Scale and Victim-Offender Relationship.

	Sum of Squares	Mean Square	df	F Ratio
Victim-Offender Relationship	2531.17	1265.58	2	24.74***
Interest in Uncommitted Sex Scale	2.82	2.82	1	0.06
Victim-Offender Relationship x Interest in Uncommitted Sex Scale	254.25	127.13	2	2.49
Error	8134.17	51.16	159	

***p<0.001, **p<0.01, *p<0.05.

A 2x3 ANOVA was conducted with the Rape Disapproval Scale as the DV, and the Interest in Uncommitted Sex Scale and Victim-Offender Relationship as IVs. Table 5.5 shows that there is a main effect of victim-offender relationship, but no main effect of interest in uncommitted sex and no significant interaction. Post-hoc Tukey tests revealed that a stranger rape was significantly more disapproved of than a marital rape ($p<0.001$) and that the rape of an acquaintance was significantly more disapproved of than a marital rape ($p<0.001$) as predicted from previous studies, see Table 5.4 for the means.

Table 5.6: ANOVA of Rape Disapproval Scale by Victim-Offender Relationships and Sociosexual Orientation Inventory.

	Sum of Squares	Mean Square	df	F Ratio
Victim-Offender Relationship	2390.45	1195.23	2	24.67***
Sociosexual Orientation Inventory	304.71	304.71	1	6.29*
Victim-Offender Relationship x Sociosexual Orientation Inventory	425.12	212.56	2	4.39*
Error	7702.33	48.44	159	

***p<0.001, **p<0.01, *p<0.05.

A 2x3 ANOVA was conducted on the Rape Disapproval Scale by the Sociosexual Orientation Inventory and the victim-offender relationship. The results are shown in Table 5.6. There was a main effect of victim-offender relationship. Post-hoc Tukey tests revealed that there was more disapproval of a stranger rape than a marital rape ($p<0.001$) and that there was more disapproval of an acquaintance rape than a marital rape ($p<0.001$), see Table 5.4 for the means. There was a main effect of Sociosexual Orientation Inventory in that those with an unrestricted orientation (short-term) disapproved of rape more than those with a restricted orientation (long-term), see Table 5.4 for the means. In addition, there was a significant interaction, shown in Figure 5.1.

Figure 5.1: Interaction of Rape Disapproval Scale between Victim-Offender Relationship and Sociosexual Orientation Inventory.

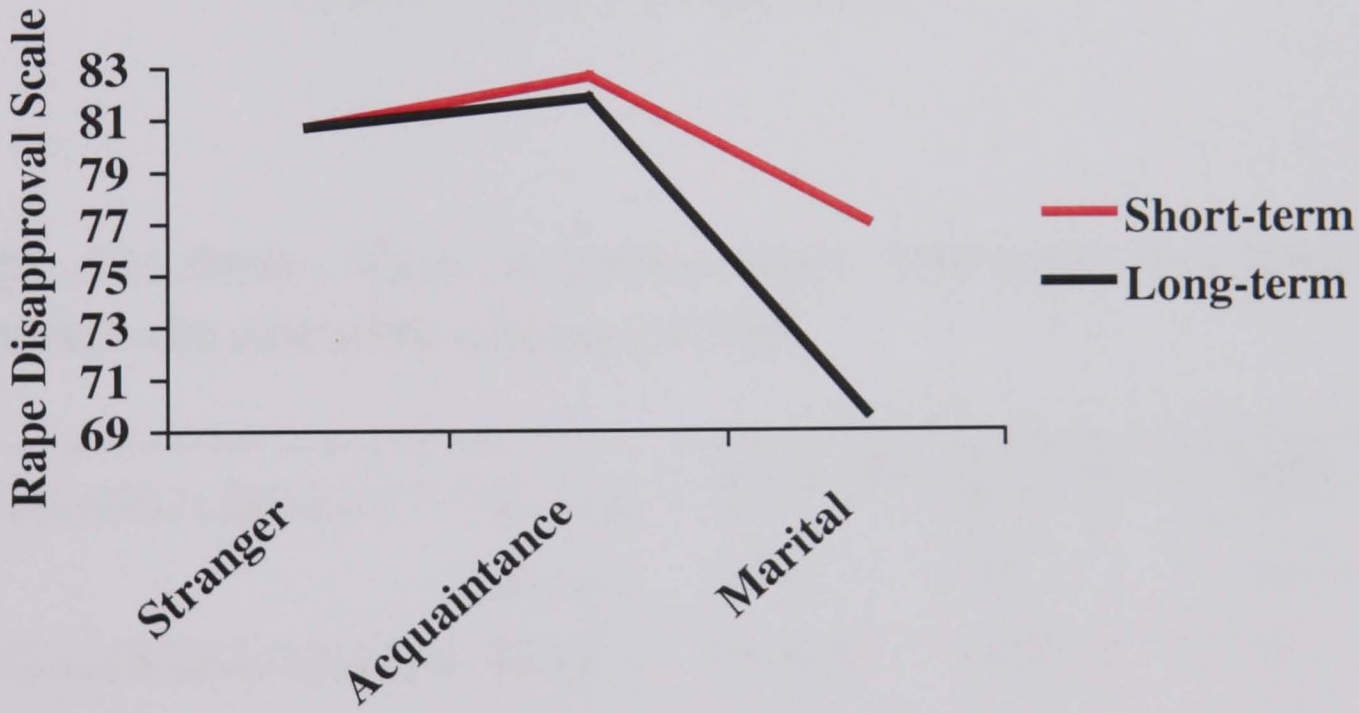


Figure 5.2: Predicted Interaction between Victim-Offender Relationship and Reproductive Strategies on the Rape Disapproval Scale.

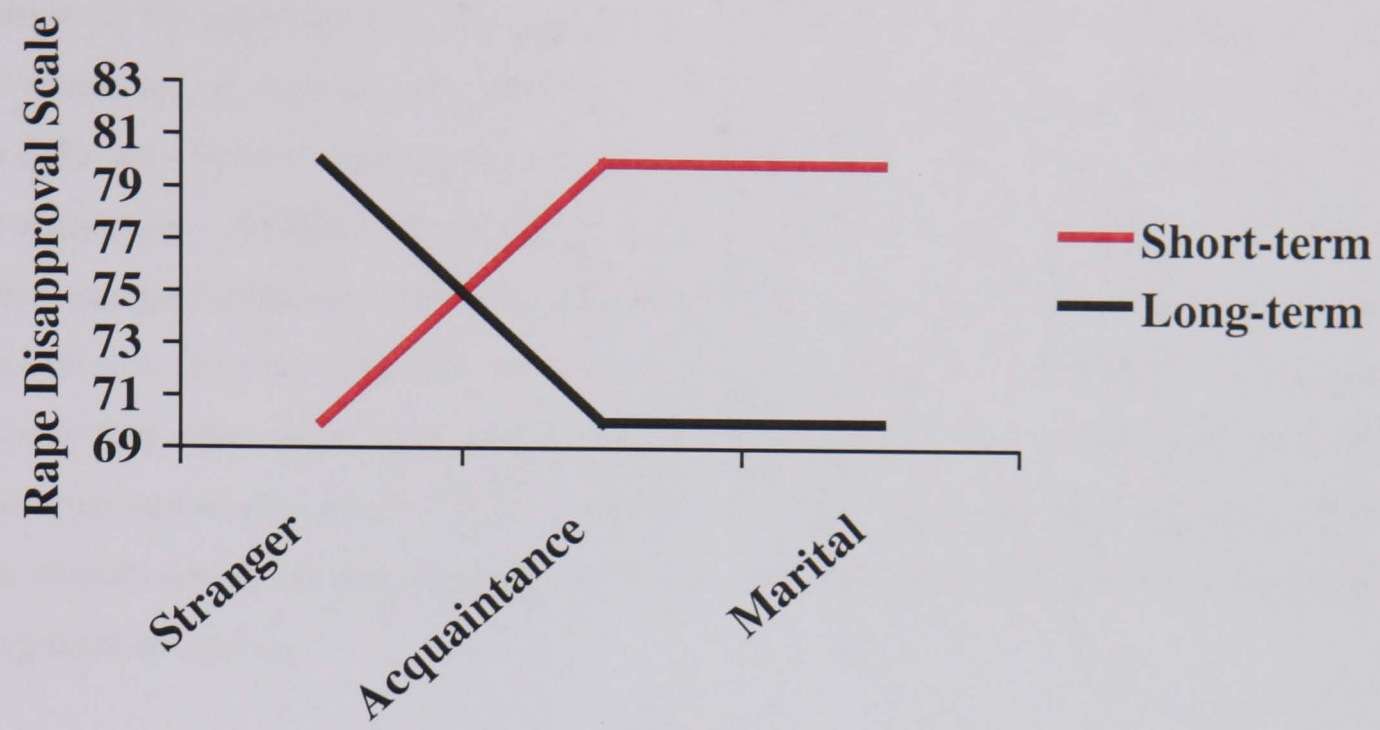


Table 5.7: Simple Effects of Victim-Offender Relationship and Sociosexual Orientation Inventory of Rape Disapproval Scale.

		Sum of Squares	Mean Square	df	F Ratio
Victim-Offender Relationship at	Short-term	408.61	204.31	2	5.16**
	Long-term	2588.51	1294.26	2	22.82***
Sociosexual Orientation Inventory at	Stranger	1.136E-03	1.136E-03	1	0.00
	Acquaintance	10.08	35.43	1	0.29
	Marital	676.90	676.90	1	10.79**

***p<0.001, **p<0.01, *p<0.05.

Table 5.7 shows the analysis of simple effects. Victim-offender relationship was significantly different at both the short-term and long-term levels. Post-hoc Tukey tests revealed that at the short-term level acquaintance rape was disapproved of more than the

marital rape ($p<0.01$). There was no difference between the disapproval of a stranger rape and a marital rape, or between the disapproval of a stranger rape and an acquaintance rape. See Table 5.8 for the means and standard deviations of these comparisons. At the long-term level stranger rape was disapproved of more than the marital rape ($p<0.001$) and that the acquaintance rape was disapproved of more than the marital rape ($p<0.001$). There was no difference between the disapproval of a stranger rape and an acquaintance rape. Short-term strategists disapproved of the acquaintance rape more than the marital rape and long-term strategists disapproved of the stranger/acquaintance rape more than the marital rape. Sociosexual Orientation Inventory was only significant at the marital level. Those with an unrestricted orientation (short-term) disapproved of the rape more than those with a restricted orientation (long-term). See Table 5.8 for the means and standard deviations. For acquaintance and stranger rape there was no significant difference between short- and long-term strategists.

Table 5.8: Table of Means (and Standard Deviations) of the Rape Disapproval Scale by Sociosexual Orientation Inventory (short/long-term) and Victim-Offender Relationship (Stranger; Acquaintance; and Marital).

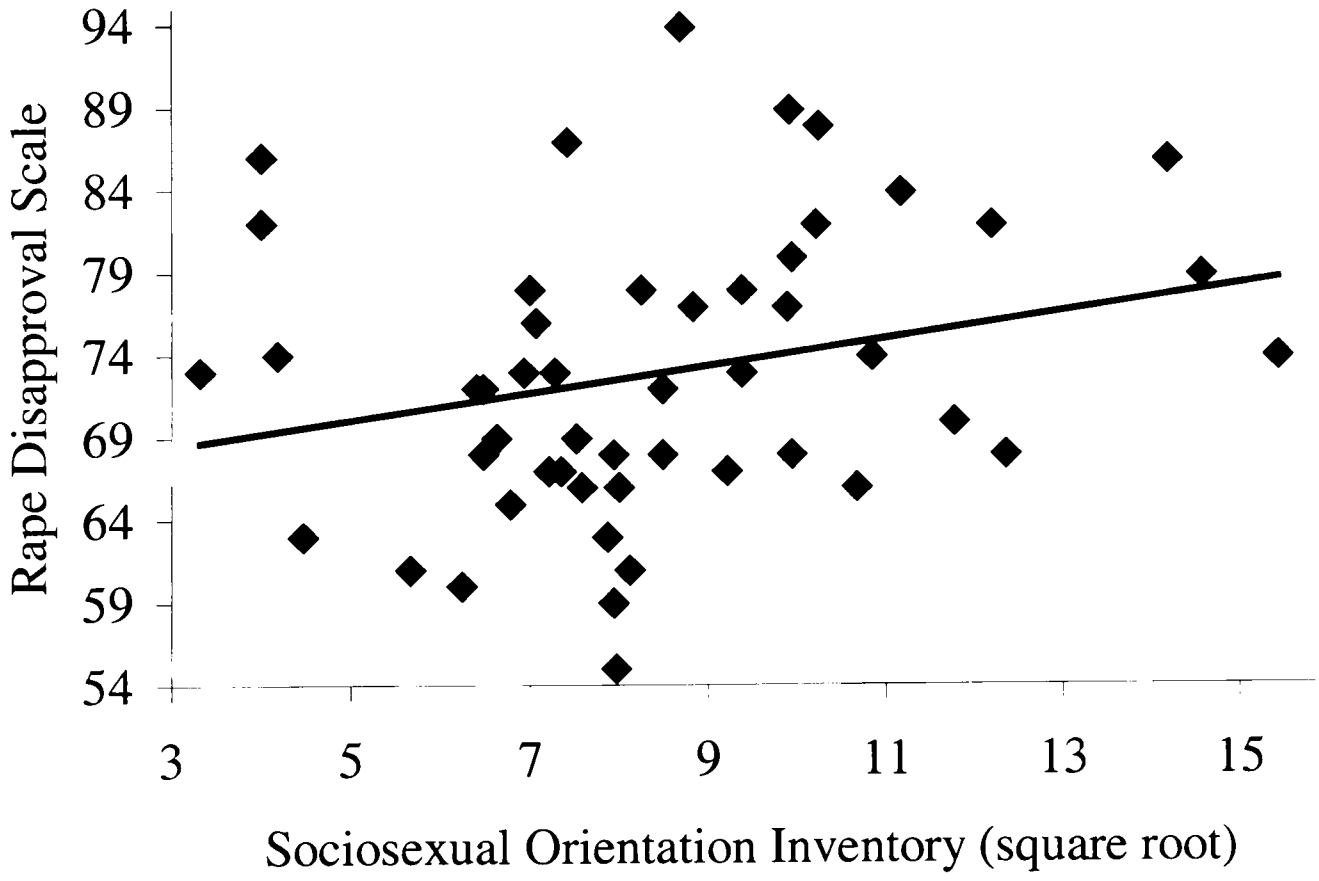
		Victim-Offender Relationship			Total
		Stranger	*Acquaintance*	*Marital*	
Sociosexual Orientation Inventory	*Short-term*	80.75 (6.21)	82.71 (4.94)	77.09 (7.93)	**80.50 (6.62)**
	Long-term	80.74 (7.91)	81.90 (6.82)	69.68 (7.92)	**77.52 (9.28)**
Total		**80.75 (7.02)**	**82.31 (5.92)**	**72.94 (8.68)**	

As sociosexual orientation was determined by a median split, a correlation was also conducted between the individual's sociosexual orientation score and their Rape Disapproval score to assess the relationship between the two for those who judged the marital rape scenario. The Rape Disapproval Scale met the assumptions of a normal

distribution. However, the Sociosexual Orientation Inventory was positively skewed, and it was therefore transformed by a square root.

It was found that there was a significant positive Pearson's correlation between sociosexual orientation and rape disapproval for the marital rape scenario ($r=0.25$, $p<0.05$). The more an individual demonstrated a short-term strategy then the more likely he would disapprove of marital rape, whereas those individuals who demonstrated a long-term mating strategy were less likely to disapprove of the marital rape. The relationship can be seen in Figure 5.3.

Figure 5.3: Correlation between the Rape Disapproval Scale and the Sociosexual Orientation Inventory (square root) for the Marital Rape Scenario.



Discussion

Consistent with previous findings (Ewoldt *et al,* 2000; McCormick *et al*, 1998; Simonson & Subich, 1999) disapproval of a rape depended on the victim-offender relationship. Stranger rape was disapproved of more than marital rape and the rape of an acquaintance was disapproved of more than marital rape, again supporting previous research (Ewoldt *et al* (2000); Kirkwood & Cecil, 2001; Simonson & Subich, 1999). Individuals who had a high interest in uncommitted sex (as measured by Bailey *et al's* (1994) Interest in Uncommitted Sex Scale) and those who were not interested did not differ in the disapproval ratings overall or for any of the three victim-offender relationship categories.

However, a second analysis showed that individuals with a high sociosexual orientation (unrestricted or short-term strategy) disapproved of rape overall more than participants with a low sociosexual orientation (restricted or long-term strategy). In addition, there was a significant interaction between victim-offender relationship and sociosexual orientation. Participants with a short-term strategy disapproved of a marital rape more than those with a long-term strategy, whereas there was no difference in disapproval for the stranger and acquaintance rape.

Therefore, overall, marital rape was considered more acceptable than the other two types of rape, and short-term strategists disapproved of rape more than long-term strategists did. However, long-term strategists accepted the marital rape considerably more than both the stranger and acquaintance rape. Short-term strategists showed a smaller difference

The finding that marital rape was disapproved of more than either stranger or acquaintance rape supported previous research showing that stranger rapists received longer sentences (McCormick *et al*, 1998), and that marital rape is perceived as less serious and less violent (Simonson & Subich, 1999). Quinsey *et al* (1999) have found that the closer the genetic relationship the more serious the crime of heterosexual sexual coercion was perceived to be. The present findings indicated that with regards to non-genetic relationships, the closer the relationship, the less serious the crime of rape is perceived to be.

There was a significant interaction found between victim-offender relationship and sociosexual orientation, therefore simple effects were conducted. There was no support found for the predictions that short-term strategists would disapprove of a marital rape more than a stranger rape and disapprove more of an acquaintance rape than a stranger rape (see Table 5.8). The second prediction stated that long-term strategists would disapprove of a stranger rape more than a marital rape, the study found support for this prediction, which suggested that long-term strategists accept a marital rape more than a stranger rape. There was no support found for the prediction that a stranger rape would be disapproved of more than an acquaintance rape by long-term strategists.

The next prediction hypothesised that a stranger rape would be disapproved of more by a long-term strategist than by a short-term strategist: there was no support for this as all participants equally disapproved of the stranger rape. It was also predicted that an acquaintance rape would be more disapproved of by a short-term strategist than a long-term strategist: there was no difference found for this simple effect. The final prediction suggested that a marital rape would be disapproved of more by a short-term strategist than a long-term strategist: the data supported this prediction. Long-term strategists accepted a marital rape more than short-term strategists. This might be due to long-term strategists empathising with the offender more than a short-term strategist would. These findings suggested that the sexual strategy of an individual has an effect on how they view different types of rape, in particular marital rape. Sexual strategies theory (Buss & Schmitt, 1993) suggested that different individuals engage in a variety of sexual behaviour. The current study found that the sexual strategy engaged in by participants influenced their opinion of marital rape. In addition, the correlation demonstrated that the more an individual possessed a short-term strategy then the more likely they were to disapprove of the marital rape.

The overall acceptance of marital rape suggested that rape education programmes are still needed before this is perceived of as serious, even though its occurrence is high. Russell (1984) found that 43% of rape offences in her sample were committed by a partner. It would seem that stranger rape is always disapproved of, as this is both a violation to the victim, and especially in patriarchal societies, the victim's husband, and her kin. The

disapproval of acquaintance rape may be due to the increased media and public awareness of 'date' rape. The rape by a husband still seems to be entwined within the cultural and legal belief that a wife belongs to her husband, that she is his property. In fact, this legal anomaly still exists in Scotland today, i.e. a husband cannot be convicted of raping his wife (Ferguson, 2001).

The theory of mate-guarding (Wilson & Daly, 1996) suggests that if a husband suspects that his wife is cheating him, he will seek to use some sort of control over her, and this may escalate into violence and rape. Domestic violence research has shown that rape is very common (Mahoney & Williams, 1998) within marital relationships. If the principle of mate-guarding is a commonly held belief among young males, this may explain their acceptance of marital rape.

The findings of the current study suggested that participants perceived a marital rape to be different from an acquaintance or stranger rape, even though the level of violence and interaction between the victim and offender were controlled for. Therefore, it may be that different types of rape develop from different life histories: for example one type of rape may be based on genetic differences in personality style whereas another may result from a life history strategy of remaining unpredictable (Mealey, 1999). Study 5 assessed different life histories indirectly by examining different victim-offender relationships. The lack of seriousness afforded to the marital rape may indicate that this type results from a particular life history strategy that participants can empathise with, for example a life history strategy where the rapist remains unpredictable by raping his wife as well as other victims.

The sociosexual orientation of individuals affected their opinions of rape. Individuals range from being a short-term to long-term strategist (Simpson and Gangestad, 1991). At one end of the continuum, short-term strategists tend to have a large number of sexual partners and believe that sex is possible without love. These people disapproved more of rape overall than long-term strategists who are more likely to have one partner and believe that sex and love are intertwined. This may also indicate different life histories of short- and long-term strategists.

Conclusions

It was predicted that the type of mating strategy an individual male uses would affect his opinion of different types of rape. It was found that marital rape received more acceptance overall than either stranger or acquaintance. Short-term strategists disapproved of rape more than long-term strategists, in particular marital rape, and there were no differences between the strategies for stranger and acquaintance rape. The results from the study partially support the predictions in that the type of mating strategy an individual engages in effects their opinions of different rape. Most notably short-term strategists disapprove of marital rape more than long-term strategists.

Summary – Study 5

This study assessed the interaction between male participants' type of mating strategy and their disapproval of different types of rape. The first was measured by the Sociosexual Orientation Inventory (Simpson & Gangestad, 1991) and an Interest in Uncommitted Sex Scale (Bailey *et al*, 1994). The Rape Disapproval Scale assessed their opinions of the rape. One hundred and sixty-five participants received one of three scenarios depicting a rape, which differed in terms of victim-offender relationship (stranger; acquaintance; or marital). It was found that marital rape was disapproved of less than both stranger and acquaintance. Individuals with a short-term mating strategy disapproved of rape more than those with a long-term strategy. There was a significant interaction between mating strategy and victim-offender relationship: a long-term strategist disapproved of a marital rape less than a short-term strategist.

STUDY 6: LIFE HISTORY AND ITS RELATIONSHIP WITH SOCIOSEXUAL ORIENTATION AND SEXUAL AGGRESSION.

Introduction

Previous studies in the thesis have found that individuals of a low status are more likely to sexually aggress (study 2) and are perceived as more culpable for a rape offence (study 4). In addition it has been found that the prevalence rates of young victims alters depending on the victim-offender relationship (study 1), that there are different prevalence rates according to the victim-offender relationship (study 2), and that there are different opinions of rapes committed by different offenders (study 5). Mealey (1999) suggested that rape is not a generic behaviour but is dependent on the life history of the individual. The current study assessed the relationship between an individual's perceived life history and their level of actual and imagined sexual aggression.

Life history theory is the pattern of birth, growth, and death within different organisms as discussed in the Literature Review. Hill *et al* (1997) have noted the following traits which are important to a life history: size at birth, growth pattern, age and size at maturity, allocation of reproductive effort, age schedules of birth and death, and number and gender ratio of offspring.

Organisms spend their time on either somatic effort or reproductive effort as discussed in the Literature Review (Chisholm, 1993). The balance between the costs and benefits of these behaviours will lead to a variety of life history patterns. This can also account for the differences in life histories among humans: for instance in more primitive societies where nutrition is poor, the onset of puberty is much later than it is in Western societies where

nutrition is good, whereas stress produces early onset. Mortality can determine the type of sexual strategy used. When mortality rates are high, then short-term strategies are the most productive. When mortality rates are low then the long-term strategy of maximising descendents is more productive. Therefore, early experiences with mortality rates may influence how reproductive effort is allocated (Chisholm, 1993).

Risk taking can be either a negative or a positive experience. With regards to life history theory it is generally perceived as acts that could endanger survival (Hill *et al*, 1997). Variables that may influence the taking of a risk include the assessment of the future environment and the individual's future survival. If an individual perceives their future prospects to be poor, he/she will be more likely to take part in risky behaviour. In keeping with this, Hill *et al* (1997) found that risk taking was higher for those individuals who perceived themselves to have a shorter lifespan. Risk taking included smoking, risky drinking, gambling, social risks, health risks, and sexual risks. Sexual behaviour may therefore be an indicator of risk taking: if the person is promiscuous then he/she may be more inclined to take risks. The current study controlled for levels of promiscuity by asking participants about their sexual history. Risk taking behaviour may also be affected by age, as being young may increase the risk taking behaviour. Therefore, age was also controlled in the analysis.

Rape has been discussed in the Literature Review as a short-term strategy committed by low status males. However, Mealey (1999) has suggested that in fact the act of rape depends on the life history of the individual and may vary within species, as discussed in the Literature Review. Previous studies in the thesis have found differences in the disapproval and committing of offences according to the victim-offender relationship. However, it might be that sexual aggression is related to the individual's perceived life history. An individual is likely to take part in a risky behaviour if they do not perceive their future life to be long and successful. Therefore, it may be that if an individual perceives his future life to be unsuccessful then he may take part in risky behaviour (e.g. sexual aggression), which he would not have otherwise.

If sexual behaviour in general is seen as risky, there will be greater risks where the partner is unwilling owing to dangers of retaliation and retribution. The main cost of sexual

aggression would be retribution from the victim and her family, whereas the benefit would be reproductive success. Although there are reports of pregnancies from rape (Holmes *et al*, 1996), these are only estimated at 5%, which suggests that the other 95% are unsuccessful and therefore the costs outweigh the benefits. Therefore, for an individual to take part in sexual aggression the costs would need to outweigh the benefits. If an individual perceived his future to be limited then the benefits of sexual aggression may then outweigh any costs of retribution.

It was predicted that as risky sexual behaviour is related to a perceived shorter lifespan, sexually aggressive behaviour would be related to a limited perception of the future life. In other words individuals who show a propensity, or who have actually sexually aggressed, will be more likely to perceive their future life to be shorter, less healthy, less financially secure and less likely to be happily married, than those with a lower propensity towards sexual aggression.

Method

Participants

Two hundred and fifty-two participants were recruited for this study, of whom 245 returned their questionnaire packs. Of those 114 were completed correctly, this was a 45% response rate. Four participants were removed from the sample due to their results being outliers. This reduced the sample to 110.

All the participants were male with a mean age of 21 years (mode=19 years), ranging from 18-38 years. They were all students from the University of Central Lancashire. Of the sample 88% categorised themselves as White, 1% as Black, 7% as Asian, 3% as mixed race and 1% were missing data. Ninety-two percent classified themselves as heterosexual, 3% as homosexual, 2% as bisexual, 2% were unsure of their sexuality and 2% were missing

data. One percent were married, 55% were single, 37% were dating, 6% were cohabiting and 1% were missing data.

Materials

There were five assessment tools used in the study:

1) **Sociosexual Orientation Inventory (SOI)** – Simpson & Gangestad (1991). This was used to assess the restricted and unrestricted sociosexual orientation of each participant as used in study 5. An individual with an unrestricted orientation is promiscuous and has liberal attitudes to sex, whereas an individual with a restricted orientation is more inclined to monogamy and believes that love should be associated with sex. There were 7 items, each item was weighted differently (number of partners in past year x 5; number of partners foreseen x 1; number of one night stands x 5; frequency of sexual fantasy x 4; and attitudes toward engaging in casual, uncommitted sex x 2). In Simpson & Gangestad's (1991) sample the results ranged from 10-216 with a mean of 68.51 for men. Cronbach's alpha was found to be 0.73 for men and women by Simpson & Gangestad (1991). Internal consistency for males in study 5 was 0.58; in the current study it was 0.51 for males. See Table 5.2 for the inventory.

2) **Interest in Uncommitted Sex Scale** – Bailey *et al* (1994). This was used to assess the amount of impersonal sex that participants were attracted to as used in study 5. There were 10 items scored on a Likert scale of 1-7, where 1 referred to strongly disagree and 7 corresponded to strongly agree. The scores ranged from 7-70. Internal reliability for heterosexual males was 0.89 as found by Bailey *et al* (1994). Internal consistency for males in study 5 was 0.86 and in the current study it was 0.85 for males. See Table 5.3 for the scale.

3) **Attraction to Sexual Aggression Scale (ASA)** – Malamuth (1989a; 1989b) - This assesses the attraction to sexual aggression of an individual as used in study 4. The original 14 item scale had an internal consistency of 0.91. It has been adapted to include males and females as both victims and offender by McConaghy *et al* (1993). The items were standardised with a scale ranging from 0-10 for each answer. Each item had between three and four sub-items. This resulted in a range of 0-210. Internal consistency was 0.82 for males in study 4. In the current study, Cronbach's alpha was 0.87 for males. See Table 4.3 for the scale.

4) **Sexual Experiences Survey (SES)** – Koss & Oros (1982) - This assesses actual experience of sexual aggression as used in study 4. Koss & Gidycz (1985) found an internal consistency of 0.74 among women and 0.89 among men. It has been adapted moderately to include both males and females as both victim and offender by McConaghy *et al* (1993) and was scored according to their method. Each item received a score if the answer was positive. The first item scored 1 and the last item scored 11, with items increasing by one as they increased in severity. This led to a range of 0-132 for the full scale and a range of 0-66 for the two subscales. Study 4 produced an internal consistency of 0.61 for men and 0.32 for the offender subscale and 0.56 for the victim subscale. In the current study, the KR20 (Kuder-Richardson) was 0.70 for males and 0.30 for the offender subscale and 0.66 for the victim subscale. See Table 4.4 for the survey.

5) **Future Lifespan Assessment** – Hill *et al* (1997) – This measured lifespan estimates on a number of subscales:

1) How likely is it that you will be alive at these ages?
2) How likely is it that you will remain healthy at these ages?
3) How likely is it that you will be financially secure at these ages? and
4) How likely is it that you will be happily married or in a long-term partnership at these ages?

They were then asked to assess the likelihood of each item at 8 ages: 20-29; 30-39; 40-49; 50-59; 60-69; 70-79; 80-89; and 90+. They reported on a scale of 0-10 with 0 as extremely unlikely and 10 as extremely likely. The scores therefore ranged

from 0-80 for each item and 0-80 for the aggregate scale as a mean was taken. The internal consistency for this scale in the current study was 0.63, which is moderate. See Table 6.1 for the assessment schedule.

Table 6.1: Future Lifespan Assessment.

Future Lifespan Assessment
Each question was answered for the following age groups: 20-29; 30-39; 40-49; 50-59; 60-69; 70-79; 80-89; and 90+.
Each question was answered on a 10 point scale: Extremely unlikely (0) – Extremely likely (10).
1) How likely is it that you will be alive at these ages?
2) How likely is it that you will remain healthy at these ages?
3) How likely is it that you will be financially secure at these ages?
4) How likely is it that you will be happily married or in a long-term partnership at these ages?

Procedure

Participants were recruited in the University library. Participants completed the assessment tools privately. This took approximately 20 minutes.

Results

Multiple regression analysis was performed on the assessment tools used. The means, standard deviations, skewness, and kurtosis (to assess the normal distribution) of the variables are shown in Table 6.2.

Table 6.2: Means, Standard Deviations, Skewness, and Kurtosis of the Criterion and Predictor Variables.

		Means	Standard Deviations	Skewness	Kurtosis
Predictor Variables	Sociosexual Orientation Inventory	85.84	51.72	2.06***	5.88***
	Interest in Uncommitted Sex Scale	41.65	12.70	-0.27	-0.24
	Attraction to Sexual Aggression Scale	31.14	21.15	0.84***	0.06
	Sexual Experiences Survey (victim)	4.16	6.67	2.85***	9.79***
	Sexual Experiences Survey (offender)	3.15	3.14	1.11***	2.17***
	Age	21.07	2.92	3.17***	14.37***
Criterion Variables	Future Lifespan Assessment	52.69	10.26	0.17	-0.37
	Alive Subscale	53.35	11.86	-0.41	0.09
	Healthy Subscale	46.79	13.81	-0.06	0.47
	Financial Subscale	54.60	15.72	-0.25	-0.26
	Married Subscale	56.01	17.71	-0.49*	-0.49

***p<0.001, **p<0.01, *p<0.05

All of the predictor variables except the Interest in Uncommitted Sex Scale were transformed. Age was transformed by inversing the scores (1/x). The Attraction to Sexual Aggression Scale was transformed by square root. Sexual Experiences Survey (offender) was transformed by square root. Sexual Experiences Survey (victim) was transformed by logarithm plus one as the constant. The Sociosexual Orientation Inventory was transformed by logarithm.

A correlation matrix for the predictor and criterion variables is shown Table 6.3. It can be seen that there is no association between Future Lifespan Assessment and sexual aggression, or sociosexual orientation or interest in uncommitted sex. However, there are several relationships with the Sexual Experiences Survey. The victim scale is positively

associated with age[8], sociosexual orientation, and attraction to sexual aggression. This suggests that individuals experiencing more victimisation are likely to be older, partake in shorter-term strategies, and have a higher attraction to sexual aggression. In addition, the offender scale was positively associated with sociosexual orientation, an interest in uncommitted sex, and an attraction to sexual aggression. Therefore, an individual who is more likely to offend is also more likely to partake in shorter-term strategies, be interested in impersonal sex, and be attracted to sexual aggression. In addition, the victim and offender subscales were positively correlated: if someone was an offender then they were also more likely to be a victim, as these scales included both male/female offenders and victims.

Each multiple regression was hierarchical with three steps. The first included age as a covariable and the second included the Sociosexual Orientation Inventory and the Interest in Uncommitted Sex Scale as covariables. The third step included the Attraction to Sexual Aggression Scale and the Sexual Experiences Survey (victim and offender subscales). The aggregate Sexual Experiences Survey was not entered, as this was a composite of the two subscales that were used.

The first multiple regression was performed on the Future Lifespan Assessment. It can be seen in Table 6.4 that the Interest in Uncommitted Sex Scale was negatively correlated with the Future Lifespan Assessment in the second step.

The subsequent subscales of the Future Lifespan Assessment were subjected to a multiple regression.

The first was the Alive Subscale: How likely was it that you would be alive in future? The results of the multiple regression analysis can be seen in Table 6.5. It can be seen that none of the predictor variables significantly predicted the Alive subscale.

[8] As age has been transformed by the inverse method then the negative correlation should be read as a positive correlation.

Table 6.3: Correlation Matrix between the Transformed (and Untransformed) Predictor and Untransformed Criterion Variables.

	Sociosexual Orientation Inventory (Log)	Interest in Uncommitted Sex Scale	Attraction to Sexual Aggression Scale (Square root)	Sexual Experiences Survey (victim) (Log + 1)	Sexual Experiences Survey (offender) (Square root)	Future Lifespan Assessment	Alive Subscale	Healthy Subscale	Financial Subscale	Married Subscale
Age (Inv)	-0.13	-0.01	-0.10	-0.23*	-0.13	0.06	0.00	0.03	0.03	0.08
Sociosexual Orientation Inventory (Log)		0.68***	0.15	0.24*	0.46***	-0.02	0.06	-0.12	0.11	-0.09
Interest in Uncommitted Sex Scale			0.08	0.18	0.43***	-0.15	0.03	-0.15	0.01	-0.26**
Attraction to Sexual Aggression Scale (Square root)				0.21*	0.29**	0.01	-0.002	-0.05	0.05	0.01
Sexual Experiences Survey (victim) (Log + 1)					0.52***	0.00	-0.04	-0.02	0.05	0.00
Sexual Experiences Survey (offender) (Square root)						-0.04	-0.09	-0.13	0.10	-0.03
Future Lifespan Assessment							0.71***	0.74***	0.74***	0.60***
Alive Subscale								0.66***	0.37***	0.14
Healthy Subscale									0.44***	0.11
Financial Subscale										0.25**

***p<0.001, **p<0.01, *p<0.05.

The third analysis was conducted on the Healthy subscale: How likely is it that you will be healthy in the future? The results can be seen in Table 6.6. It can be seen that the predictor variables did not significantly predict participants' perception of their future health.

Table 6.4: Multiple Regression Analysis on the Future Lifespan Assessment.

	Beta	β	Semi-partial correlation
Age	109.58	0.06	0.06
Intercept	47.41		
R^2=0.00, R^{2adj}=-0.01, R=0.06			
Age	149.84	0.08	0.07
Sociosexual Orientation Inventory	6.79	0.17	0.12
Interest in Uncommitted Sex Scale	-0.21	-0.26	-0.19*
Intercept	41.69		
R^2=0.04, R^{2adj}=0.01, R=0.20			
Age	162.60	0.08	0.08
Sociosexual Orientation Inventory	6.68	0.17	0.12
Interest in Uncommitted Sex Scale	-0.21	-0.26	-0.19
Attraction to Sexual Aggression Scale	6.225E-02	0.01	0.01
Sexual Experiences Survey (victim)	0.75	0.03	0.03
Sexual Experiences Survey (offender)	-0.14	-0.02	-0.01
Intercept	40.75		
R^2=0.04, R^{2adj}=-0.02, R=0.20			

***p<0.001, **p<0.01, *p<0.05.

The fourth analysis was performed on the Financial subscale: How likely is it that you will be financially secure in the future? Again, there was no significant prediction from the variables, which suggested that these did not effect participants' perception of their financial future (see Table 6.7).

The final analysis was conducted on the Married subscale: the question asked "How likely is it that you will be happily married or in a long-term relationship in the future?" It was found in that the Interest in Uncommitted Sex Scale was negatively correlated to the Married Subscale in both step 2 and 3 (see Table 6.8). The multiple correlation was

significant in step 2. It is therefore likely that this scale is the main cause of the significance found in the overall scale.

Table 6.5: Multiple Regression Analysis of the Alive Subscale.

	Beta	β	Semi-partial correlation
Age	0.77	0.00	0.00
Intercept	53.31		
R^2=0.00, R^{2adj}=-0.01, R=0.00			
Age	24.58	0.01	0.01
Sociosexual Orientation Inventory	3.77	0.08	0.06
Interest in Uncommitted Sex Scale	-2.098E-02	-0.02	-0.02
Intercept	46.01		
R^2=0.00, R^{2adj}=-0.02, R=0.07			
Age	-2.62	-0.00	-0.00
Sociosexual Orientation Inventory	5.73	0.12	0.09
Interest in Uncommitted Sex Scale	1.308E-02	0.01	0.01
Attraction to Sexual Aggression Scale	0.14	0.02	0.02
Sexual Experiences Survey (victim)	0.18	0.01	0.01
Sexual Experiences Survey (offender)	-1.64	-0.16	-0.12
Intercept	43.65		
R^2=0.02, R^{2adj}=-0.04, R=0.15			

***p<0.001, **p<0.01, *p<0.05.

Table 6.6: Multiple Regression Analysis of the Healthy Subscale.

	Beta	β	Semi-partial correlation
Age	66.42	0.03	0.03
Intercept	43.59		
R^2=0.00, R^{2adj}=-0.01, R=0.03			
Age	53.73	0.02	0.02
Sociosexual Orientation Inventory	-1.65	-0.03	-0.02
Interest in Uncommitted Sex Scale	-0.14	-0.13	-0.10
Intercept	53.25		
R^2=0.02, R^{2adj}=-0.00, R=0.16			
Age	57.72	0.02	0.02
Sociosexual Orientation Inventory	-0.39	-0.01	-0.01
Interest in Uncommitted Sex Scale	-0.12	-0.11	-0.08
Attraction to Sexual Aggression Scale	-0.17	-0.02	-0.02
Sexual Experiences Survey (victim)	1.88	0.06	0.05
Sexual Experiences Survey (offender)	-1.22	-0.10	-0.08
Intercept	51.59		
R^2=0.03, R^{2adj}=-0.03, R=0.18			

***p<0.001, **p<0.01, *p<0.05.

Table 6.7: Multiple Regression Analysis of the Financial Subscale.

	Beta	β	Semi-partial correlation
Age	91.20	0.03	0.03
Intercept	50.21		
R^2=0.00, R^{2adj}=-0.01, R=0.03			
Age	171.67	0.06	0.06
Sociosexual Orientation Inventory	12.96	0.21	0.15
Interest in Uncommitted Sex Scale	-0.17	-0.14	-0.10
Intercept	29.19		
R^2=0.02, R^{2adj}=-0.00, R=0.15			
Age	202.34	0.07	0.06
Sociosexual Orientation Inventory	11.24	0.18	0.13
Interest in Uncommitted Sex Scale	-0.19	-0.16	-0.11
Attraction to Sexual Aggression Scale	0.18	0.02	0.02
Sexual Experiences Survey (victim)	8.343E-02	0.00	0.00
Sexual Experiences Survey (offender)	1.12	0.08	0.06
Intercept	29.34		
R^2=0.03, R^{2adj}=-0.03, R=0.17			

***p<0.001, **p<0.01, *p<0.05.

Table 6.8: Multiple Regression Analysis on the Married Subscale of the Future Lifespan Assessment.

	Beta	β	Semi-partial correlation
Age	279.91	0.08	0.08
Intercept	42.54		
R^2=0.01, R^{2adj}=-0.00, R=0.08			
Age	349.39	0.10	0.10
Sociosexual Orientation Inventory	12.07	0.17	0.13
Interest in Uncommitted Sex Scale	-0.52	-0.37	-0.27**
Intercept	38.32		
R^2=0.09, R^{2adj}=0.06, R=0.30*			
Age	392.97	0.11	0.11
Sociosexual Orientation Inventory	10.16	0.15	0.10
Interest in Uncommitted Sex Scale	-0.55	-0.39	-0.28**
Attraction to Sexual Aggression Scale	9.271E-02	0.01	0.01
Sexual Experiences Survey (victim)	0.87	0.02	0.02
Sexual Experiences Survey (offender)	1.17	0.08	0.06
Intercept	38.41		
R^2=0.09, R^{2adj}=0.04, R=0.31			

***p<0.001, **p<0.01, *p<0.05.

Discussion

This study assessed the relationship between short-term sexual strategies and the propensity towards sexual aggression and the participants' perception of their future. Of these variables, it was found that only the covariable Interest in Uncommitted Sex Scale predicted the Future Lifespan Assessment. This was a negative correlation indicating that a

promiscuous ideology was associated with a view that the future was limited. This finding is consistent with the study of Hill *et al* (1997) who found that more risk-prone individuals perceived their future life to be shorter. When the individual items were analysed, no predictive relationship was found for the Alive, Healthy, or Financial subscales. Only The Married subscale produced a negative relationship with the Interest in Uncommitted Sex Scale. This is not surprising, as individuals who were more promiscuous in their sexual behaviour perceived themselves as less likely to be happily married or in a long-term partnership in the future. Interestingly, age did not account for a large amount of the variance in this analysis.

The main prediction of this study was that sexually aggressive individuals would perceive their future life to be shorter since they would be more likely to adopt the most risk-prone short-term mating strategy. There was no support found for this prediction, suggesting that proneness to sexual aggression is not a product of a belief that the future is unpredictable. This would therefore not support Mealey's (1999) opinion that sexual aggression is dependent on different life histories, as perception of the future did not differ between those who sexually aggress and those who do not.

The correlation matrix produced some interesting positive correlations between the variables. The Sexual Experiences Survey victim subscale was positively related to age, sociosexual orientation, and the Attraction to Sexual Aggression Scale. Therefore the older a participant was then it was more likely that they had been a victim of sexual aggression. The more victimisation an individual had experienced then the more likely they were to subscribe to a short-term mating strategy and be more attracted to sexual aggression. It may be that men who in the past have been sexually aggressed against may need to reassert their sexuality by taking part in promiscuous behaviour and sexually aggressive behaviour. Of course, this is speculation as cause and effect is not known. It was also found that those who reported high levels of offender sexual experience were also likely to take part in short-term mating strategies, be inclined towards impersonal sex, and be attracted to sexual aggression. This may support an ideology of sexual aggression and impersonal sex, where those who are more likely to be promiscuous regard sexual aggression as less serious than it is. Malamuth (1996) found that impersonal sex was a factor, which increased the likelihood of sexual aggression. In addition, the current study found that victimisation rates

were related to offender rates, it may be that those who have been victimised are then more likely to sexually aggress, or it may be that sexually aggressive men are then more likely to become victims of both men and women.

Therefore, sexually aggressive individuals are just as likely to perceive their future as predictable or unpredictable, demonstrating that the perpetrators' perception of their future is not related to their level sexual aggression. However, the perception of a happy married life is related to the mating strategies that the participants use, which would be predicted. Those who pursue short-term strategies will be less likely to perceive themselves as happily married in the future, whereas those who use long-term strategies do see themselves as happily married in the future.

Summary – Study 6

Life history theory suggests that organisms differ in their patterns of birth, growth, and death. These differing patterns then lead to different amounts of effort being spent on reproduction and mating. Since risk taking is an act, which may endanger survival, it will depend on the costs and benefits of the act and the perception of the future for each organism. Hill *et al* (1997) found that individuals who perceived their future life to be short took part in riskier behaviour. Sexual aggression is a risky behaviour (i.e. it is likely to have high future costs). It was predicted that those who perceived their life history to be limited would be more likely to take part in, or be attracted to sexual aggression. One hundred and ten male participants completed a battery of assessments including the Future Lifespan Assessment, the Sociosexual Orientation Inventory, the Interest in Uncommitted Sex scale, the Attraction to Sexual Aggression Scale and the Sexual Experiences Survey. It was found that those who had a promiscuous ideology also perceived their future life to be limited, in particular the likelihood of being happily married. However there was no support for the prediction that the risky behaviour of sexual aggression was related to an individual's perception of the future.

STUDY 7: FLUCTUATING ASYMMETRY, 2D:4D DIGIT RATIO, AGGRESSION, SOCIOSEXUAL ORIENTATION, AND RAPE PROCLIVITY.

Introduction

Previous studies in the thesis have found that low status males are more likely to rape (study 2) and low status males are more disapproved of in a depicted rape (study 4). This supported the evolutionary hypothesis that rape is resorted to by males who cannot successfully compete for females against more higher status males. However study 3 found that rape was more prevalent in a population where there was an abundance of females with a high FV, which suggested that rape offenders are not those who cannot successfully acquire a female through honest courtship. The current study has attempted to examine the relationship between physical indicators of fitness (FA and 2D:4D digit ratio) and rape proclivity. It is expected that males with low fitness will be more likely to sexually aggress.

Study A: Fluctuating Asymmetry

It has been suggested that deviation from perfect bodily symmetry indicates developmental instability (Møller & Swaddle, 1997). Fluctuating asymmetry (FA) is the measurement of bilateral traits, as discussed in the Literature Review. This has been used to assess developmental instability as the two traits have been subjected to the same developmental stress. The larger the deviation from symmetry, the more likely it is that that individual has suffered from some developmental stress. Fluctuating asymmetry has been shown to be inconsistent across age groups. FA is a trait that has been found to vary with age (at least

among children). Wilson & Manning (1996) have found that in a cross-sectional sample, FA reduces until age 11, then it rises until 13 years in males and 14 years in females, then there is a reduction from 15 to 18 years. The authors suggested that this is due to the rapid growth and metabolic rate of children. This study suggested that FA is subject to change but the study would need repeating longitudinally. Therefore, age may be a confounding factor, which would need to be controlled in analysis of FA. FA has also been found to be a heritable trait (Livshits & Kobyliansky, 1989). It was found that there were significant positive correlations (0.25-0.30) between parents and their children on the total FA of eight traits.

Directional asymmetry (Van Valen, 1962) is the propensity for one side of a trait to develop more than the other, e.g. the coiling in the shells of snails. Another type of symmetry is anti-symmetry (Van Valen, 1962), this is where one side of a trait will be larger than the other, but there is no necessary indication of which that will be, e.g. fiddler crabs have one claw larger than the other.

Measurement of FA is achieved by comparing the measurements of two bilateral traits, e.g. finger length. Measurements should be made at least twice. This is because environmental conditions, which may cause developmental stress on these traits, will be constant for them both. Of course, there will be some degree of asymmetry as lower asymmetry is traded off for fitness in other traits (Møller & Swaddle, 1997). The distribution of FA should pertain to a normal distribution with a mean of zero; otherwise, it may be that directional or anti-asymmetry are being measured. These can be assessed by one sample t-tests. Measurements must then be checked for measurement error, repeated ANOVAs can be used. (See Møller & Swaddle, 1997, for an overview of methods). There have been several indexes of FA used in the literature (Palmer & Strobeck, 1986). These vary as to whether they are determined by population or individual parameters, and if they are based on absolute or relative symmetry. Often though they produce similar results if the difference in FA is a stable feature (Manning, 2001, pers. comm.).

Kowner (2001) noted that with regard to asymmetry in humans, the right side often demonstrates more variations from symmetry than the left side. He also suggested that FA may be related to sexual selection as suggested by other researchers, but the variations in

subtle differences in FA by actual participants categorising as attractive has not yet been conducted, only when the differences in FA are obvious have they been tested. Kowner (2001) has criticised the study of FA because:

- Firstly, where there is a weak relationship between FA in two traits, interpretation of an individual's developmental stability may therefore be limited;
- Secondly, not all asymmetry is due to developmental instability as ideal FA produces a normal distribution;
- Thirdly the FA of a single trait must lead to negative outcomes, rather than relating to negative outcomes as it is an indirect measure of maladaptation, and;
- Finally, the heritibility estimates of true FA are low and may differ from trait to trait.

Asymmetry has been related to mate choice and sexual selection. Simpson *et al* (1999) reported the finding of Gangestad & Thornhill (1998) that sociosexuality and FA were negatively related in men (r=-0.20): unrestricted men tend to be more symmetrical. However Simpson *et al* (1999) did not find a significant relationship between FA and sociosexuality (r=-0.14), but it was in the same direction as Gangestad & Thornhill's (1998) sample.

It has been found that age of first copulation is positively correlated with FA (r=0.42) and number of lifetime partners is negatively correlated (r=-0.32) (Thornhill & Gangestad, 1994) with FA. Therefore, individuals who are symmetrical are more likely to lose their virginity younger and have more lifetime partners. This could be associated with the attractiveness that symmetry brings. This has been found by Gangestad *et al* (1994) who found that facial attractiveness negatively correlated with fluctuating asymmetry (r=-.20). so those who were more asymmetrical were perceived as less attractive than their symmetrical counterparts.

Aggression has been found to be associated with FA in boys. Manning & Wood (1998) found there to be a negative correlation with ankle FA (r=-0.45). Therefore, symmetrical boys were more likely to be aggressive than asymmetrical boys. This FA was soft tissue and therefore may be dependent on hormonal change. Furlow *et al* (1998) found that

among male students FA was negatively correlated with the number of fights they participated in (r=-0.25) and the propensity to escalate agonistic encounters to physical violence (r=-0.49). Therefore, adults were found to be more aggressive if they were symmetrical than if they were asymmetrical.

The success of rape as a reproductive strategy has been discussed within the evolutionary literature. It has been suggested that rape is either an adaptive mating strategy or a by-product of another strategy as discussed in the Literature Review. Thornhill & Thornhill (1983) suggested that rape was an adaptive short-term mating strategy. Palmer (1991) concluded that there was not enough evidence to suggest that it was either adaptive or a by-product. In the more recent publication by Thornhill & Palmer (2000), both sides are presented without reaching a conclusion.

It has been suggested that males who are of a low status would be more likely to rape (Thornhill & Palmer, 2000). Study 2 found that there were a large proportion of lower status offenders. According to this hypothesis, they rape because they cannot compete with males that are more successful. This mate deprivation hypothesis has been tested indirectly by asking males to express their experience of sexual coercion and their self-perceived mating success. Lalumiere *et al* (1996) found that men who felt deprived were not more sexually coercive than others.

The good genes theory of mate selection suggests that if females cannot choose a male who will invest in their future offspring (Trivers, 1972) then they will want to copulate with a male who has good genes (Dawkins, 1976). Males who are more symmetrical will have succeeded in avoiding any genetic effects that would have increased their fluctuating asymmetry; these males would therefore possess 'good genes'. Males who do show a marked degree of asymmetry would therefore have been affected by some developmental instability and the genes that they possess would be less than perfect. It would therefore be expected that, according to the mate deprivation hypothesis, males with a high FA would be more likely to rape.

The current study attempted to investigate the relationship between FA and rape proclivity. It was predicted that symmetrical males would be more aggressive, and more likely to

possess an unrestricted sociosexuality (short-term mating strategy), as these have already been found. If rape is a by-product of aggression and promiscuous behaviour, it was predicted that symmetrical males would be likely to exhibit a rape proclivity and demonstrate experience of sexual aggression. However, the mate deprivation hypothesis suggests the opposite that low status males (who would have a high FA) would be more excluded from consensual sex and therefore more likely to rape.

Study B: 2D:4D Digit Ratio

The ratio of the 2nd to 4th digit (finger) is a sexually dimorphic trait and these differences in digit length are determined as early as the 7th week of the foetus' development. Phelps (1952) originally found that 2<4 was most common among males and 2>4 was more common among females. It has been found that digit length is fixed in the foetus by week 14 (Garn *et al*, 1975). It has been suggested that there is a positive correlation between adult and prenatal testosterone, which are then related to 2D:4D digit ratio. This is based on the evidence that males have a lower 2D:4D digit ratio than females and the ratio does not alter over the lifespan, as discussed in the Literature Review. According to Robinson & Manning (2000) low 2D:4D ratios may indicate high prenatal testosterone and low oestrogen, and high 2D:4D ratios may correlate with low prenatal testosterone and high oestrogen. This proposition was based on evidence of gender differences and adult hormone levels (Manning *et al,* 1998) as discussed in the Literature Review.

Differences have also been found between populations for 2D:4D digit ratio (Manning, Barley, Walton, Lewis-Jones, Trivers, Singh, Thornhill, Rohde, Bereczkei, Henzi, Soler & Szwed, 2000). It has been found that Finnish and Jamaican people have the lowest 2D:4D (males=0.93) digit ratio and Polish people have the highest (females=1.00). Explanations for these have yet to be investigated. Therefore, it is important to control for ethnicity in analysis of 2D:4D digit ratio.

More specifically 2D:4D digit ratio has been examined in relation to sexuality. Williams, Pepitone, Christensen, Cooke, Huberman, Breedlove, Breedlove, Jordan, & Breedlove

(2000) found that homosexual women have a lower 2D:4D digit ratio than heterosexual women. However there was no difference found between homosexual and heterosexual men. They also found that men who had more than one older brother were more likely to have a low 2D:4D digit ratio than men with one or no older brothers. This finding was particularly significant for homosexual men. Following from this research Robinson & Manning (2000) have found that homosexual men had a lower 2D:4D digit ratio than controls. Therefore, sexuality would need to be controlled for in an analysis of 2D:4D digit ratio.

It has been suggested that 2D:4D digit ratio is related to traits that are sexually selected for. Slumming & Manning (2000) found that musicians have a significantly lower ratio than controls and within the orchestra, those with a high rank had a lower 2D:4D digit ratio. Testosterone enhances the growth of the right hemisphere and may facilitate musical ability: if so, male musical ability might be a signal for a male's fitness. Manning & Taylor (2001) found that professional male football players had lower 2D:4D digit ratios than controls. Manning & Taylor (2001) suggested that 2D:4D digit ratio is a predictor of male competitiveness.

Rape has also been deemed a short-term mating strategy (Thornhill & Thornhill, 1983; Thornhill & Palmer, 2000). However, study 1 suggested that rape might be a long-term strategy depending on the number of occurrences and the relationship with the victim. Due to hormonal influence, it has been suggested that men are more likely to sexually coerce than women (Ellis, 1991). It has been suggested that men who are low status are more likely to rape (Thornhill & Thornhill, 1983; Study 2) as they cannot compete and gain a mate through honest courtship. The mate deprivation hypothesis has not been supported by self-report measures: men who were sexually coercive viewed their sex life to be satisfactory (Lalumiere *et al.* 1996). Study 3 found that rape prevalence increased when there were more women of high FV age than men of reproductive age, which does not support the mate deprivation hypothesis.

As discussed in the Literature Review rape may be a by-product of other adaptive mechanisms. In particular, Malamuth (1996) noted that it might be the product of a desire for impersonal sex and a hostility towards women. The current study has assessed

sociosexual orientation and aggressive behaviour, in order to examine the relationship with rape proclivity. Study 6 found that sociosexual orientation was positively related to actual sexual aggression. Males who were more promiscuous had also committed more sexual aggression.

The current study investigated the relationship between 2D:4D digit ratio and rape proclivity. It was predicted that if rape were an adaptive strategy then males with a high 2D:4D digit ratio would be more likely to express an attraction to sexual aggression and have experience of sexual coercion, as they would not be as successful as low 2D:4D digit ratio males. However if sexual aggression is a by-product then males with a low 2D:4D digit ratio would be expected to be more aggressive and demonstrate a more unrestricted sociosexual orientation, which would then lead to an increase in sexual aggression.

Method

Design

This involved a regression analysis where there were five predictor variables: the Attraction to Sexual Aggression Scale, the Aggression Questionnaire (physical aggression, verbal aggression, anger and hostility subscales), and the Sexual Experiences Survey (victim and offender subscales). The criterion variables were the FA composites and the 2D:4D digit ratios. In addition, age was controlled for.

Participants

There were 160 male participants in this study. Eight were removed due to identifying themselves as non-White, nine were removed as they identified themselves as non-

heterosexual, and eight participants were removed due to missing questionnaire data. The non-White and homosexual participants were excluded due to previous findings that ethnicity and sexuality affects the 2D:4D digit ratios of those groups. Outliers of the questionnaire data were then identified, 10 participants were then removed. This left 125 participants in the study.

The participants were recruited from the University of Central Lancashire. Of these their age ranged from 18 to 60 years old with a mean of 23 years (mode = 19 years). Five percent were married, 52% were single, 36% were dating, and 7% were cohabiting.

Materials

1) **Aggression Questionnaire** – Buss & Perry (1992) – This assesses the personality traits of aggression. There was an internal consistency of 0.80 in Buss & Perry's (1992) sample. There are 29 items that are recorded on a five point scale. The maximum score was 145 and the minimum score was 29, a high score indicated more aggressive behaviour. There were four subscales: physical aggression with nine items; verbal aggression with five items; anger with seven items; and hostility with eight items. Internal consistency in the current study was 0.89 for males, 0.84 for the physical aggression subscale, 0.78 for the verbal aggression subscale, 0.78 for the anger subscale, and 0.79 for the hostility subscale. See Table 7.1 for the questionnaire.

2) **Attraction to Sexual Aggression Scale (ASA)** – Malamuth (1989a; 1989b) - This assesses the attraction to sexual aggression of an individual. The original 14 item scale had an internal consistency of 0.91. It has been adapted by McConaghy *et al* (1993), so offenders can be either male or female. Internal consistency for males in study 4 was 0.82 and in study 6 was 0.87. In the current study the Cronbach's alpha was 0.85. See Table 4.3 for the scale.

Table 7.1: Aggression Questionnaire.

Aggression Questionnaire

Each question was answered on a 5 point scale: Very often applies to me (1) – Often applies to me (2) – Sometimes applies to me (3) – Usually does not apply to me (4) – Never or hardly ever applies to me (5).

Physical Aggression = PA
Verbal Aggression = VA
Anger = A
Hostility = H

1) I get into fights a little more than the average person. - PA

2) There are people who push me so far that we come to blows. - PA

3) Sometimes I fly off the handle for no good reason. - A

4) I can think of no good reason for ever hitting a person. - PA

5) I often find myself disagreeing with people. - VA

6) Some of my friends think I'm a hothead. - A

7) Given enough provocation, I may hit another person. - PA

8) I am sometimes eaten up with jealousy. - H

9) I have threatened people I know. - PA

10) When people are especially nice, I wonder what they want. - H

11) When people annoy me, I may tell them what I think of them. - VA

12) I am suspicious of overly friendly strangers. - H

13) Other people always seem to get the breaks. - H

14) I flare up quickly but get over it quickly. - A

15) If I have to resort to violence to protect my rights, I will. - PA

16) I wonder why sometimes I feel so bitter about things. - H

17) I sometimes feel like a powder keg ready to explode. - A

18) I know that "friends" talk about me behind my back. - H

19) I am an even-tempered person. - A

20) I tell my friends openly when I disagree with them. - VA

21) When frustrated, I let my irritation show. - A

22) I have trouble controlling my temper. - A

23) I can't help getting into arguments when people disagree with me. - VA

Aggression Questionnaire
24) At times I feel I have gotten a raw deal out of life. - H
25) I sometimes feel that people are laughing at me behind my back. - H
26) Once in a while I can't control the urge to strike another person. - PA
27) I have become so mad that I have broken things. - PA
28) My friends say I'm somewhat argumentative. - VA
29) If somebody hits me, I hit back. – PA

3) **Sexual Experiences Survey (SES)** – Koss & Oros (1982) - This assesses actual experience of sexual aggression. Koss & Gidycz (1985) found an internal consistency of 0.74 among women and 0.89 among men. It has been adapted to include both males and females as both victim and offender by McConaghy *et al* (1993) and was scored according to their method. Internal consistency in study 4 was 0.61 for males, 0.32 for the offender subscale, and 0.56 for the victim subscale. In study 6 the KR20 (Kuder-Richardson) was 0.70, 0.30 for the offender subscale and 0.66 for the victim subscale. In the current study internal consistency was 0.60, 0.39 for the offender subscale and 0.40 for the victim subscale. See Table 4.4 for the survey.

4) **Sociosexual Orientation Inventory** – Simpson & Gangestad (1991). This was used to assess the amount of restricted and unrestricted sociosexual orientation each participant showed. There were 7 items, each item was weighted differently (number of partners in past year x 5; number of partners foreseen x 1; number of one night stands x 5; frequency of sexual fantasy x 4; and attitudes toward engaging in casual, uncommitted sex x 2). In Simpson & Gangestad's (1991) sample the results ranged from 10-216 with a mean of 68.51 for men. Cronbach's alpha was found to be 0.73 by Simpson & Gangestad (1991). In study 5 the internal consistency was 0.58 for males, and 0.51 in study 6. In the current study Cronbach's alpha was found to be 0.54 for males. See Table 5.2 for the inventory.

Apparatus

There was one pair of digital callipers for measuring bilateral traits. These were precise to 0.01mm.

Procedure

Participants were informed of the study procedure and were asked if they would take part. Participants had nine traits measured by the researcher. These were ear height, ear width, wrist width, elbow width, hand width, second digit, third digit, fourth digit, and fifth digit. Each trait was measured twice, first all of the right traits then the left, then the right and finally the left traits again. The ear height was measured from the top to the bottom of the ear at the longest point. Ear width was measured from the top of the tragus to the outside of the ear. Wrist width was measured from the styloid process of the radius to the styloid process of the ulna. Elbow width was measured from the lateral epicondyle to the medial epicondyle. Hand width was measured from the base of the second digit to the base of the fifth digit. Each digit was measured from the basal crease to the tip. (For method see Gangestad *et al*, 1994; Martin *et al*, 1999; Manning & Wood, 1998; Simpson *et al*, 1999; Thornhill & Gangestad, 1994; and Wilson & Manning, 1996.) Participants were then asked if they had ever broken or damaged the traits in any way, these were then noted by the researcher. The participants then completed the assessment tools.

Preliminary Analysis

Study A: Fluctuating Asymmetry

Initially two FA scores were calculated for each trait, subtracting the left trait from the right side, for both the first and second measurements (1^{st} R-L; 2^{nd} R-L) (Manning, 2001, pers.

comm.). These two measurements were then tested for reliability using a repeated measures ANOVA (between subjects F ratio) and an intraclass correlation coefficient (r_1). The results for each of the nine traits can be seen in Table 7.2.

Table 7.2: Intraclass Correlation Coefficient (r_1) and F Ratios for the Nine Bilateral Traits.

Trait	r_1	F ratio
Ear Height	0.81	9.30**
Ear Width	0.67	5.08**
Wrist Width	0.57	3.68**
Elbow Width	0.46	2.70**
Hand Width	0.66	4.91**
Second Digit	0.67	5.05**
Third Digit	0.75	7.12**
Fourth Digit	0.83	11.06**
Fifth Digit	0.81	9.62**

***p<0.001, **p<0.01, *p<0.05.

A mean of the two FA scores was then calculated for each trait. To assess the normality of the distribution of the traits each trait was tested for skewness and kurtosis. The results are shown in Table 7.3.

Before fluctuating asymmetry can be assessed, the possibility of directional asymmetry first needs to be determined. If one side of a trait is larger than the other for an adaptive reason (i.e. not due to developmental instability: Møller & Swaddle, 1997) then this is directional asymmetry. To test for this, a one-samples t-test was performed on each trait's FA score, with the mean set at zero. The results of this analysis can be seen in Table 7.3. Six traits were significantly different, which means that they suffer from directional asymmetry.

Table 7.3: Assessment of Normal Distribution and Directional Asymmetry of the Nine Traits.

Trait	Skewness	Kurtosis	t-test
Ear Height	-0.15	0.27	-0.66
Ear Width	-0.12	0.05	-7.30***
Wrist Width	0.17	-0.06	-4.21***
Elbow Width	0.59**	2.09***	-0.06
Hand Width	-0.62**	3.70***	4.97***
Second Digit	0.58*	0.49	-9.74***
Third Digit	-0.14	-0.54	-1.89
Fourth Digit	-0.02	-0.15	2.10*
Fifth Digit	-0.28	0.58	4.91***

***p<0.001, **p<0.01, *p<0.05.

Only three traits did not demonstrate directional asymmetry. An FA composite was made of ear height, elbow width, and third digit (FA3 Composite), as these were not directional. In addition, a composite was made of all nine traits (FA9 Composite). Missing data were replaced by the means of the sample.

Study B: 2D:4D Digit Ratio

2D:4D digit ratio was calculated by dividing the second digit length by the fourth digit length. This was completed for the right hand and the left hand. As measurements were repeated, there were two ratios for both the left and right hands. These two ratios were subjected to repeatedibility tests, a repeated measures ANOVA and an intraclass correlation coefficient. The results of these can be seen in Table 7.4. It can be seen that the reliabilities were high.

Table 7.4: Intraclass Correlation Coefficients (r_1) and F Ratios for the Right and Left Hand 2D:4D Digit Ratios.

Trait	r_1	F ratio
Right 2D:4D	0.91	19.00**
Left 2D:4D	0.93	20.00**

**p<0.01.

A mean of the two measurements was then calculated which resulted in one 2D:4D digit ratio for the left hand and one for the right hand. These were then tested for the assumption of a normal distribution. Table 7.5 shows the skewness and kurtosis of the right and left 2D:4D digit ratios. These met the assumptions of a normal distribution. Missing data of the 2D:4D digit ratios were then replaced by the means of the sample.

Table 7.5: Skewness and Kurtosis of the Right and Left 2D:4D Digit Ratios.

Trait	Skewness	Kurtosis
Right 2D:4D	-0.05	0.45
Left 2D:4D	0.28	-0.55

Results

Hierarchical multiple regressions were performed on the FA3 composite, the FA9 composite, and the two 2D:4D digit ratios. The predictor variables were the Attraction to Sexual Aggression Scale, the Sexual Experiences Survey (victim and offender subscales) Sociosexual Orientation Inventory, Aggression Questionnaire, and age of respondent.

The means and standard deviations of the predictor variables, the FA composites. and the 2D:4D digit ratios can be seen in Table 7.6.

Table 7.6: Means, Standard Deviations, Skewness, and Kurtosis of the Predictor Variables, FA3 Composite, FA9 Composite, Left Hand 2D:4D Digit Ratio, and Right Hand 2D:4D Digit Ratio.

		Mean	Standard Deviation	Skewness	Kurtosis
Predictor Variables	Attraction to Sexual Aggression Scale	29.23	20.53	0.99***	0.57
	Aggression Questionnaire	66.47	15.45	0.58**	0.66
	Aggression Questionnaire (Physical Aggression)	19.69	0.56	0.67**	-0.08
	Aggression Questionnaire (Verbal Aggression)	13.26	0.34	0.30	-0.18
	Aggression Questionnaire (Anger)	14.38	0.40	0.80***	0.86*
	Aggression Questionnaire (Hostility)	18.91	0.49	0.26	-0.40
	Sexual Experiences Survey	6.79	0.64	1.17***	0.86*
	Sexual Experiences Survey (offender)	3.54	3.81	1.08***	0.94*
	Sexual Experiences Survey (victim)	3.25	4.35	1.47***	1.71***
	Sociosexual Orientation Inventory	76.28	36.35	1.03***	1.94***
	Age	22.89	6.12	3.04***	12.21***
Criterion Variables	FA3 Composite	0.78	0.32	0.61**	-0.05
	FA9 Composite	0.78	0.21	0.58**	0.10
	Left 2D:4D	0.98	3.114E-02	0.29	-0.42
	Right 2D:4D	0.96	2.825E-02	-0.05	1.07*

***p<0.001, **p<0.01, *p<0.05.

Due to the variables not meeting the assumptions of a normal distribution (see Table 7.6) several were transformed (but not the right and left 2D:4D digit ratios). Age was transformed by inversing the scores (1/x). The Attraction to Sexual Aggression Scale was

transformed by square root. The Sexual Experiences Survey was transformed by square root. Sexual Experiences Survey (offender) was transformed by square root. Sexual Experiences Survey (victim) was transformed by logarithm plus one as the constant. The Aggression Questionnaire was transformed by logarithm. The Aggression Questionnaire (Physical Aggression) was transformed by logarithm and the Anger subscale was transformed by square root; the Hostility and Verbal Aggression subscales were not transformed. The Sociosexual Orientation Inventory was subjected to a square root transformation. The FA3 Composite was transformed using square root and the FA9 Composite was transformed using a logarithm.

Table 7.7 shows the correlation matrix of the predictor variables and the composite variables for both the FA and digit ratio data. There were a number of large correlations, particularly between the Aggression questionnaire, the Attraction to Sexual Aggression scale, the Sexual Experiences Survey, and the Sociosexual Orientation Inventory. These were all in a positive direction. Overall, it suggests that the more aggressive an individual is, the more they have experienced sexual aggression, and demonstrate a rape proclivity, and the more sexually promiscuous they are. Those who are rape prone also have experienced more sexual aggression.

Each multiple regression was hierarchical with two steps. The first included age. The second step included the Attraction to Sexual Aggression Scale, the Sexual Experiences Survey (victim and offender subscales), the Sociosexual Orientation Inventory, and the Aggression Questionnaire (physical aggression, anger, hostility and verbal aggression subscales). The aggregate Sexual Experiences Survey and Aggression Questionnaire were not entered, as these were composites of the subscales entered.

Study A: Fluctuating Asymmetry

The first multiple regression was performed on the FA3 Composite. It can be seen in Table 7.8 that none of the variables significantly predicted the composite.

Table 7.7: Correlation Matrix of Transformed Predictor Variables, Transformed FA Composites, and 2D:4D Digit Ratios.

	Sexual Experiences Survey (Square root)	Sexual Experiences Survey (offender) (Square root)	Sexual Experiences Survey (victim) (Log + 1)	Aggression Questionnaire (Log)	Aggression Questionnaire (physical aggression) (Log)	Aggression Questionnaire (anger) (Square root)	Aggression Questionnaire (verbal aggression)	Aggression Questionnaire (hostility)	Sociosexual Orientation Inventory (Square root)	Age (Inv)	FA3 Composite (Square root)	FA9 Composite (Log)	Left 2D:4D	Right 2D:4D
Attraction to Sexual Aggression Scale (Square root)	0.41***	0.36***	0.33***	0.40***	0.40***	0.29**	0.24**	0.24**	0.09	0.04	-0.02	-0.01	0.06	0.03
Sexual Experiences Survey (Square root)		0.87***	0.84***	0.36***	0.39***	0.30**	0.22*	0.19*	0.42***	-0.13	0.01	0.03	0.06	0.13
Sexual Experiences Survey (offender) (Square root)			0.51***	0.33***	0.31***	0.30**	0.24**	0.17	0.48***	- 0.18*	0.03	0.04	0.00	0.15
Sexual Experiences Survey (victim) (Log + 1)		0.29**	0.36***	0.21*	0.13	0.18*	0.23*	-0.07	0.03	0.02	0.06	0.02		
Aggression Questionnaire (Log)			0.76***	0.80***	0.63***	0.77***	0.18*	0.14	0.10	0.10	0.04	0.05		
Aggression Questionnaire (physical aggression) (Log)				0.49***	0.33***	0.37***	0.24**	0.19*	0.10	0.14	0.03	-0.03		
Aggression Questionnaire (anger) (Square root)					0.39***	0.56***	0.11	0.09	0.02	0.08	0.01	0.11		

	Sexual Experiences Survey (Square root)	Sexual Experiences Survey (offender) (Square root)	Sexual Experiences Survey (victim) (Log + 1)	Aggression Questionnaire (Log)	Aggression Questionnaire (physical aggression) (Log)	Aggression Questionnaire (anger) (Square root)	Aggression Questionnaire (verbal aggression)	Aggression Questionnaire (hostility)	Sociosexual Orientation Inventory (Square root)	Age (Inv)	FA3 Composite (Square root)	FA9 Composite (Log)	Left 2D:4D	Right 2D:4D
Aggression Questionnaire (verbal aggression)								0.34***	0.15	-0.06	0.02	0.05	-0.02	-0.03
Aggression Questionnaire (hostility)									0.04	0.10	0.10	0.04	0.02	0.04
Sociosexual Orientation Inventory (Square root)										-0.12	0.12	0.21*	-0.08	-0.01
Age (Inv)											0.02	0.04	0.16	0.14
FA3 Composite (Square root)										0.60***	-0.02	-0.03		
FA9 Composite (Log)										0.01	0.12			
Left 2D:4D														0.65***

***p<0.001, **p<0.01, *p<0.05.

Table 7.8: Hierarchical Multiple Regression of Predictor Variables and FA3 Composite

	Beta	β	Semi-partial correlation
Age	0.33	0.02	0.02
Intercept	0.85		
R^2=0.00, R^{2adj}=-0.01, R=0.02			
Age	-6.131E-02	0.00	0.00
Attraction to Sexual Aggression Scale	-5.635E-03	-0.06	-0.05
Sexual Experiences Survey (offender)	-5.014E-03	-0.04	-0.03
Sexual Experiences Survey (victim)	-4.150E-03	-0.01	-0.01
Aggression Questionnaire (physical aggression)	0.15	0.11	0.09
Aggression Questionnaire (verbal aggression)	-1.398E-03	-0.03	-0.03
Aggression Questionnaire (anger)	-2.624E-02	-0.08	-0.06
Aggression Questionnaire (hostility)	4.369E-03	0.13	0.11
Sociosexual Orientation Inventory	1.113E-02	0.13	0.11
Intercept	0.65		
R^2=0.04, R^{2adj}=-0.04, R=0.20			

***p<0.001, **p<0.01, *p<0.05.

The hierarchical multiple regression for the FA9 Composite again was entered in two steps. It can be seen in Table 7.9 that only the Sociosexual Orientation Inventory significantly predicted the FA9 Composite. The more asymmetrical a participant was then the more likely they were to be an unrestricted individual, this was the opposite of what was predicted.

Study B: 2D:4D Digit Ratio

Two analyses were performed: one on the left hand and one on the right hand. They were separated, as this has been the practice of previous research (Manning *et al*, 2000; Manning *et al*, 1998; Robinson & Manning, 2000; Slumming & Manning, 2000; Williams *et al*,

2000). The first multiple regression was performed on the Right 2D:4D digit ratio. It can be seen in Table 7.10 that Sexual Experiences Survey (offender) significantly predicted the right hand 2D:4D digit ratio. The more likely that a participant had taken part in a sexual offence then the higher the 2D:4D digit ratio (i.e. less prenatal testosterone). This would support the hypothesis that an offender could not compete with the more competitive low 2D:4D digit ratio males.

Table 7.9: Hierarchical Multiple Regression of Predictor Variables and FA9 Composite

	Beta	β	Semi-partial correlation
Age	0.54	0.04	0.04
Intercept	-0.15		
R^2=0.00, R^{2adj}=-0.01, R=0.04			
Age	0.40	0.03	0.03
Attraction to Sexual Aggression Scale	-3.179E-03	-0.05	-0.05
Sexual Experiences Survey (offender)	-7.041E-03	-0.08	-0.06
Sexual Experiences Survey (victim)	-5.498E-03	-0.02	-0.02
Aggression Questionnaire (physical aggression)	8.919E-02	0.11	0.08
Aggression Questionnaire (verbal aggression)	-2.144E-04	-0.01	-0.01
Aggression Questionnaire (anger)	9.898E-03	0.05	0.04
Aggression Questionnaire (hostility)	-4.624E-05	0.00	0.00
Sociosexual Orientation Inventory	1.278E-02	0.23	0.20*
Intercept	-0.37		
R^2=0.06, R^{2adj}=-0.01, R=0.25			

***p<0.001, **p<0.01, *p<0.05.

Table 7.10: Hierarchical Multiple Regression of Predictor Variables on the Right 2D:4D Digit Ratio.

	Beta	β	Semi-partial correlation
Age	0.48	0.14	0.14
Intercept	0.94		
R^2=0.02, R^{2adj}=0.01, R=0.14			
Age	0.65	0.18	0.17†
Attraction to Sexual Aggression Scale	-2.575E-04	-0.02	-0.02
Sexual Experiences Survey (offender)	6.188E-03	0.28	0.20* p=0.027
Sexual Experiences Survey (victim)	-3.349E-03	-0.05	-0.04
Aggression Questionnaire (physical aggression)	-3.101E-02	-0.15	-0.12
Aggression Questionnaire (verbal aggression)	-4.904E-04	-0.07	-0.06
Aggression Questionnaire (anger)	6.291E-03	0.13	0.10
Aggression Questionnaire (hostility)	4.804E-06	0.00	0.00
Sociosexual Orientation Inventory	-1.017E-03	-0.07	-0.06
Intercept	0.95		
R^2=0.09, R^{2adj}=0.02, R=0.30			

***p<0.001, **p<0.01, *p<0.05, †p<0.10.

The second multiple regression was performed on the Left 2D:4D digit ratio. It can be seen in Table 7.11 that none of the predictor variables were related to the 2D:4D digit ratio. Even though there is a relationship between the two 2D:4D digit ratios (r=0.65), the sexual experiences offender survey did not show a significant regression onto the left hand as it did on the right hand

Table 7.11: Hierarchical Multiple Regression of the Predictor Variables of the Left 2D:4D Digit Ratio.

	Beta	β	Semi-partial correlation
Age	0.62	0.16	0.16†
Intercept	0.95		
R^2=0.03, R^{2adj}=0.02, R=0.16†			
Age	0.64	0.17	0.16†
Attraction to Sexual Aggression Scale	6.773E-04	0.04	0.04
Sexual Experiences Survey (offender)	7.981E-04	0.03	0.02
Sexual Experiences Survey (victim)	5.574E-03	0.08	0.06
Aggression Questionnaire (physical aggression)	-6.065E-03	-0.03	-0.02
Aggression Questionnaire (verbal aggression)	-5.654E-05	-0.01	-0.01
Aggression Questionnaire (anger)	-6.512E-04	-0.01	-0.01
Aggression Questionnaire (hostility)	-2.678E-05	-0.01	0.00
Sociosexual Orientation Inventory	-1.300E-03	-0.09	-0.07
Intercept	0.96		
R^2=0.04, R^{2adj}=-0.04, R=0.20			

***p<0.001, **p<0.01, *p<0.05, †p<0.10.

Discussion

Study A: Fluctuating Asymmetry

Fluctuating asymmetry is the deviation from symmetry of bilateral traits. The greater the deviation, the more likely the organism has been exposed to some developmental instability. The current study investigated the relationship between FA and various

psychological traits connected with proneness to sexual aggression. These traits were regressed onto FA in order to see which formed the most predictive relationship.

Asymmetry may be the result of directional asymmetry (i.e. one side is adaptively bigger than the other). In this study the traits chosen should not have been affected by directional asymmetry. However perhaps due to measurement error all but three traits were. This led to the calculation of two FA composites one consisted of only the three non-directional traits and one comprised of all nine traits. Directional asymmetry has been found in other studies (Manning & Wood, 1998; Wilson & Manning, 1996) but is not always found (Manning, 1995; Martin *et al*, 1999). This suggests that it is dependent on the researcher and not that certain human traits demonstrate directional asymmetry.

None of the variables predicted the FA3 composite. This suggested that rape proclivity, sexual aggression, aggression and sociosexual orientation are not related to the symmetry of individuals. The largest correlation was with the Sociosexual Orientation Inventory. When the analysis was repeated on the FA9 composite, it was found that the Sociosexual Orientation Inventory positively predicted the composite. This suggested that males who were more asymmetrical were more likely to be unrestricted in their sexual orientation, i.e. they were more likely to want a short-term sexual relationship or had actually had several. This finding was in the opposite direction to that of Gangestad & Thornhill (1998), who found that unrestricted men tended to be more symmetrical.

The results did not support the predictions: that symmetrical men would be more likely to be aggressive - there was no relationship with any type of aggression; have an unrestricted sociosexuality - symmetrical men were more likely to have a restricted (long-term) sexuality; or be more sexually aggressive - again there were no relationships found with sexual aggression.

The lack of predictive relationships found suggest that FA is not a trait that can be predicted from these psychological variables. Therefore, males who have a low FA do not necessarily aggress more, be more sexually active than males without good genes, or show a proclivity towards rape. This finding suggested that any possible biological determinant for sexual aggression does not involve the symmetry of an individual.

The study did find that attraction to sexual aggression was associated with actual experience of sexual aggression, aggression and sociosexual orientation. Those who were more likely to rape had both been the offender and victim of sexual aggression, and were more aggressive (studies 4 and 6 also found that rape proclivity was positively related to offender and victim sexual aggression experience and sociosexual orientation). Those who had committed some form of sexual offence were more likely to be a victim of sexual aggression (as found in studies 4 and 6), to be aggressive and were more likely to possess an unrestricted (short-term) sociosexual orientation (as found in study 6). Victims of sexual aggression were more likely to be aggressive and possess a short-term sociosexual orientation (as found in study 6). Physical aggression was associated with a short-term sociosexual orientation. Sexual aggression has been predicted by a promiscuous attitude and an aggressive nature (Malamuth *et al.* 1995) in Malamuth's (1996) Confluence Model of sexual aggression. This was therefore tested in this study. Sociosexual orientation and the four subscales of the Aggression questionnaire (physical aggression; verbal aggression; anger; and hostility) were regressed onto the Attraction to Sexual Aggression scale and the Sexual Experiences Survey (offender) subscale. It was found that physical aggression predicted an attraction to sexual aggression (R^2=0.16, R^{2adj}=0.15, R=0.40; physical aggression – Beta=5.65, β=0.40, Semi-partial correlation=0.40, $p<0.001$). This partially supports Malamuth's model that aggression predicts sexual aggression. The second analysis considered the participant's actual experience of sexual aggression as an offender. Sociosexual orientation and the four aggression subscales were regressed onto the Sexual Experiences Survey (offender) subscale. It was found that sociosexual orientation and anger predicted the actual occurrence of sexual aggression (R^2=0.29, R^{2adj}=0.28, R=0.54; sociosexual orientation - Beta=0.28, β=0.45, Semi-partial correlation=0.45, $p<0.001$; anger - Beta=0.54, β=0.25, Semi-partial correlation=0.25, $p<0.01$). This supported Malamuth's (1996) model that aggression and promiscuity predict sexual aggression: however, it should be noted that Malamuth (1996) predicted that hostility towards women would predict sexual aggression and not necessarily an anger component of general aggression. It is interesting that rape proclivity was predicted by physical aggression whereas actual aggression was predicted by anger. Perhaps there is a change in the aggressive nature of the individual, which transforms their likelihood to sexually aggress into an actual occurrence of sexual aggression. Another explanation is that anger and physical aggression

are similar and the difference between actual and imagined sexual aggression extracted one more than the other.

There are some limitations to this study. The most prominent of course is measurement error. Reliabilities ranged from 0.46-0.83, which are quite low compared to a perfect measurement of 1.00. Other studies have found slightly higher reliability scores (0.64-0.77 - Manning, 1995; 0.51-0.89 – Manning & Pickup, 1998; 0.72-0.98 - Manning & Wood, 1996; 0.65-0.86 - Scutt & Manning, 1996; and 0.67-0.78 – Wilson & Manning, 1996).

Another problem with FA is that there may have been biased sampling in that Møller & Swaddle (1997) have noted that humans find symmetrical objects more aesthetically pleasing. It may well have been that the researcher recruited those males who were more symmetrical than a non-face to face recruitment method may have produced. Ideal FA has a parametric mean of zero, which is tested for with a t-test set at zero. The current study found that several traits did not demonstrate ideal FA, i.e. six of the nine traits were affected by directional asymmetry. Other studies have also failed to demonstrate ideal FA on certain traits e.g. Manning & Pickup, 1998 – ears; Manning & Wood, 1996 – ears, 3rd digit; and Wilson & Manning, 1996 – wrists, hand span, 1st digit, 2nd digit, nostrils. It may be that obtaining ideal FA is not possible due to human error rather than selection of participants.

Study B: 2D:4D Digit Ratio

2D:4D digit ratio is the relationship between the second and fourth digit. A low 2D:4D digit ratio indicates that the fourth digit is longer than the second, whereas a high 2D:4D digit ratio would indicate that the second digit was longer than the fourth. Due to the significant difference between men and women (Manning *et al*, 1998) and the fact that it seems to be a trait that lasts through the lifespan (Manning *et al*, 1998), a long fourth digit has been associated with a high prenatal testosterone level (Robinson & Manning, 2000).

It was therefore predicted that a low 2D:4D digit ratio might be associated with aggression, sociosexual orientation, and rape proclivity. The regression analysis was performed on both the left and right hands (as this was the standard practice see Manning *et al*, 2000; Manning *et al*, 1998; Robinson & Manning, 2000; Slumming & Manning, 2000; Williams *et al*, 2000). There were no predictive relationships found for the left hand in the current study.

The Sexual Experiences Survey (offender subscale) was found to predict a positive relationship with the right hand 2D:4D digit ratio. The more likely that a participant was to say they had sexually aggressed, the more likely they were to have a high 2D:4D digit ratio (less prenatal testosterone). If their second digit was longer than their fourth then they were more likely to have taken part in some sexual aggression. This may be related to the theory that males who are less able to compete with other males would be more likely to sexually aggress (Thornhill & Palmer, 2000). Perhaps their lack of prenatal testosterone led to a poor competitive ability, which they compensated for, by sexually aggressing. This would therefore support the low status hypothesis of rape offending, i.e. men who were not as competitive were not good sportsmen or good musicians, would be more likely to sexually aggress. Of course, other studies have found that high status men do rape (for example college students Martin & Hummer, 1998), but their levels of prenatal testosterone have not been tested. A further study could compare the relationship of 2D:4D digit ratio with socio-economic status.

The difference between the right and left hand may be the result of the right hand being more dominant in society and the right hand in fact being affected by prenatal testosterone than the left hand. Manning *et al* (2000) found a statistically significant trend between male and females' right hand 2D:4D digit ratio ($p=0.09$) whereas there was no difference between the left hand ($p=0.38$). Manning *et al* (1998) found that the right hand ratio was significantly lower for males than females whereas there was no difference in the left hand. The same pattern was found by Williams *et al* (2000), which suggests that the right hand is more influenced by prenatal hormones than the left hand. If so then this would explain why there was a significant effect on the right hand but not on the left hand.

Although it has been demonstrated, that age does not have an effect on 2D:4D digit ratio (Manning *et al*, 1998) there has yet to be a longitudinal study conducted. Therefore, the current study inputted age as a variable to compare it with the FA data. It was found that both the right and left hands demonstrated a significant trend towards age having an effect on 2D:4D digit ratio. They both showed a positive correlation, i.e. older males had a higher 2D:4D digit ratio, with young males having a lower 2D:4D digit ratio (more prenatal testosterone). This has not been considered before due to the belief that 2D:4D digit ratio does not alter with age. It may be that the soft tissue of the digits is affected by hormones later in life and therefore changes with age. Further investigation is needed to confirm this trend.

This study investigated the relationships between FA and 2D:4D digit ratio with sexual aggression, aggression and sociosexual orientation. Although these were both biological traits that were being measured there were no predictive relationships found in both concepts. FA was weakly related to sociosexual orientation and right hand 2D:4D digit ratio was related to sexual offending.

Summary – Study 7

Fluctuating asymmetry (FA) is the deviation from symmetry of bilateral traits (Møller & Swaddle, 1997). Both sociosexual orientation (Gangestad & Thornhill, 1998) and aggression (Manning & Wood, 1998) have been found to be negatively related to FA. It was predicted that FA would be negatively related to sexual aggression proclivity and behaviour. The second to fourth digit ratio is associated with prenatal testosterone (i.e. a longer 4^{th} digit is related to higher testosterone levels and therefore a low 2D:4D digit ratio). Different cultural groups have been found to differ in their 2D:4D digit ratio (Manning *et al*, 2000) and homosexual men have a lower 2D:4D digit ratio than controls (Robinson & Manning, 2000). The association of this trait with aggression, sociosexual orientation, and sexual aggression has not been investigated. It was predicted that 2D:4D

digit ratio would be associated with aggression, sociosexual orientation, and rape proclivity. One hundred and twenty-five male participants took part in this study. They completed four questionnaires: the Attraction to Sexual Aggression Scale, the Aggression Questionnaire, the Sexual Experiences Survey, and the Sociosexual Orientation Inventory. In addition, they had nine bilateral traits measured with digital callipers. It was found that an FA composite of all nine traits was predicted by the Sociosexual Orientation Inventory, in that those who had a more unrestricted orientation were more likely to be asymmetrical. The right hand 2D:4D digit ratio was significantly predicted by the Sexual Experiences Survey (offender subscale). Males with a high 2D:4D digit ratio (i.e. indicative of lower prenatal testosterone) were more likely to have sexually offended.

PART 4: GENERAL DISCUSSION

GENERAL DISCUSSION

Predictions

There were several predictions made in the thesis about the occurrence and characteristics of rape offences:

1) The prevalence of rape would increase as the victims' FV increased. Rape of victims with a low FV would be explained by the offender's sexual preference for non-reproductive ages, or the occurrence of a secondary offence. In addition, these victims would be less likely to be injured.
2) There would be a greater proportion of rapes of strangers by low status men than rapes of strangers by high status men as stranger rape is more costly and so would be less likely to be committed by high status men. There would be a greater number of rapes of acquaintances than rapes of strangers by high status men as an acquaintance rape would have less costs than a stranger rape.
3) It was predicted that in an area with a high gender ratio there would be a greater number of rapes committed in that area.
4) A rape committed by a high status offender would be more accepted than a rape committed by a low status offender by females as status may indicate good genes and it would be accepted by males as they strive for high status and so accept the behaviour of a high status male. The acceptance of a rape would change when the FV of the victim was altered, i.e. the rape of a female with a high FV would be disapproved of more than the rape of a female with a low FV.
5) It was predicted that males who are regarded as short-term strategists would be more accepting of the stranger rape, and more disapproving of the marital rape as they would identify with the stranger rapist which is also a short-term strategy whereas the marital rape is part of a long-term strategy. Long-term strategists would show more disapproval of stranger rape and more acceptance of a marital

rape as they would identify with the marital rapist which is part of a long-term mating strategy whereas they would not identify with the stranger (short-term) rape.

6) It was predicted that as risky sexual behaviour is related to a perceived shorter lifespan, sexually aggressive behaviour would also be related to a poorer perception of future life prospects as predicted by life history theory.

7) It was predicted that symmetrical males would be more aggressive, and more likely to possess an unrestricted sociosexuality (short-term mating strategy). Aggressiveness and promiscuity were predicted to lead to sexual aggression by Malamuth's (1996) Confluence Model. According to the Confluence Model, it was predicted that symmetrical males would be more likely to exhibit a rape proclivity and to have experience of sexual aggression. However, the mate deprivation hypothesis suggests the opposite, that low status males (who would have a high FA) would be more excluded from consensual sex and therefore more likely to rape. It was predicted that males with a high 2D:4D digit ratio would be more aggressive, possess an unrestricted sociosexual orientation, and express a likelihood to rape. This was because the mate deprivation hypothesis would predict that males with a high 2D:4D digit ratio (who may have low fitness) would be more likely to sexually aggress, as they cannot compete with their low 2D:4D digit ratio counterparts.

Empirical Findings

It was found in study 1 that there was a positive relationship between FV (fertility value) and rape prevalence (prediction 1), which supported the view that rape was a short-term strategy where victims with a current reproductive capability would be targeted (Thornhill & Palmer, 2000; Thornhill & Thornhill, 1983). However there was a stronger relationship found with RV (reproductive value), which suggested that rape may be a long-term strategy where victims are targeted for their future reproductive capability and rape is used as a method of mate-guarding. Further analysis found that RV was related to rape prevalence among victims of acquaintances, step-relatives, and kin. This strengthens the argument that

rape may be a long-term strategy, for example Ethiopian females who are abducted and raped in order to become the wife of the abductor (Getahun, 2001). Rape prevalence of stranger victims was not related to either FV or RV. This was an unexpected finding, as it would be predicted that stranger rape would be a short-term strategy related to FV. In addition, it was found that partner rape was equally related to FV and RV, which suggested that partners who are targeted have both a high FV and RV. It was found that victims of female homicide had a high RV. This may indicate that homicides are committed against partners who might be attempting to mate guard a mate with a high RV, which might be similar to domestic violence. Shackelford *et al* (2000) found that younger women are more likely to be killed by their husbands. Victims with a low FV were targeted by those offenders who had a sexual preference for that age group (prediction 1), and offenders who committed a secondary offence were more likely to rape a victim with a high FV (prediction 1). In addition, victims were just as likely to be injured regardless of the FV or RV (prediction 1). This does not support original findings that there would be a difference in the amount of injury inflicted on victims (Felson & Krohn, 1990; Ruback & Ivie, 1988; Thornhill & Palmer, 2000; Thornhill & Thornhill, 1983). Therefore, the only identifying characteristic of the rape of low FV victims was the sexual preference of the offender, which would be expected.

It was predicted that the number of rapes committed would differ according to the status of the offender and the victim-offender relationship (prediction 2). Study 2 found that there were significantly more rapes committed by lower status offenders (even when base rates were controlled for), which supported previous research (Clark, 1987; Thornhill & Thornhill, 1983). In addition, it was found that there were fewer stranger and partner rapes, and a larger number of offences against step-relatives and acquaintances. There was support for prediction 2 as there were more offences committed against strangers by lower status men, and more offences committed against step-relatives and partners by higher status men. This finding suggested that the status of an offender does affect the type of victim he chooses. This is particularly interesting as in study 2 the definition of higher status was very broad. It would seem that studies 1 and 2 have found evidence that the characteristics of rape offences differ according to the victim-offender relationship, which would support Mealey's (1999) proposition that rape is not a generic mechanism.

It was predicted that a high gender ratio (more men than women) would lead to an increase in rape prevalence (prediction 3). This was a test of the mate deprivation hypothesis. It was found that an operational gender ratio was more predictive of rape prevalence, but this was a low gender ratio. Therefore, where there were more women of a high FV than men of reproductive age then there was an increase in rape prevalence. This finding did not support the mate deprivation hypothesis or the animal literature (Barash, 1977; Evans & Magurran, 1999; and Fox, 2001), but it did support findings that rape increased as the gender ratio decreased (Barber, 2000; Singh, 1977). Guttentag & Secord (1983) found that in a society with a low gender ratio then women were valued less and there was often a promiscuous attitude with women turning to prostitution. Therefore, if women are valued less then this may explain why rape increases in these places. Another explanation may be the misinterpretation by men of women's promiscuous attitude. Men may presume that in a low gender ratio society all women are promiscuous and that 'no means yes', therefore the incidence of rape would increase. Study 3 found that the proportion of women with a high FV was more important than women with a high RV, whereas study 1 found that rape was actually committed more against women with a high RV. It would seem that both these constructs are important in assessing the occurrence of rape. Study 2 found that lower status men were more likely to rape, which is support for the mate deprivation hypothesis, in that men who cannot compete are more likely to rape. However, in study 3 there was no support for the mate deprivation hypothesis from the population data analysed.

Study 4 assessed participant's opinions of an acquaintance rape scenario. It was predicted that disapproval would alter depending on the status of the offender and the FV/RV of the victim (prediction 4). It was found that a rape by a low status offender was disapproved of more than the rape by a high status offender. This supported previous findings that high status affords the offender leniency (Knight *et al,* 2001; Mazzella & Feingold, 1994). It was also found that a low status offender who raped a victim with a low RV (29 and 50 year olds) received the most disapproval. This suggested that participants might perceive high RV (16 and 20 year olds) victims as more responsible for the attack. However there was no effect of age as a construct. This finding does not support the suggestion that FV is the important construct in rape offences (Thornhill & Thornhill, 1983). Study 4 found that participants' perceptions of rape depended on the RV of the victim and not the FV. In study 2 it was found that higher status offenders were less likely to offend, and study 4

found that they are perceived as less responsible if they do offend, which may result in a lower conviction rate for them as found by Martin & Hummer (1988). Study 1 found that RV was more related to rape prevalence rather than a high FV, particularly with an acquaintance rape. Therefore, according to studies 1 and 4 RV may be a more important construct than FV, which suggested that a discussion on rape needs to consider it as a long-term strategy as well as a short-term strategy.

In study 5, it was predicted that a participant's mating strategy would be related to their opinion of one type of rape (prediction 5). It was found that a marital rape was disapproved of less than a stranger or acquaintance rape, which supported previous research (Cowan, (2000; Kirkwood & Cecil, 2001; McCormick *et al*, 1998; Monson *et al*, 2000; Simonson & Subich, 1999). Short-term strategists disapproved of rape overall more than long-term strategists. It was also found that long-term strategists disapproved of a marital rape less than short-term strategists. This supported the prediction that the particular mating strategy that a participant uses would affect their opinion of the different types of rape. It would seem that long-term strategists could empathise most with the offender of a marital rape. This supported studies 1 and 2, which suggested that there is a difference in rape according to the victim-offender relationship, which might also be related to the mating strategy of the offender. This would support Mealey's (1999) suggestion that rape is a variety of behaviours dependent on the differing life histories of the offender.

In study 6, it was predicted that a participant's perception of their future life history would be related to their rape proclivity (prediction 6). It was found that there was no relationship between the perception of future life history and either rape proclivity or actual sexual aggression. This did not support previous research, which suggested that those who took part in risky behaviour would have a limited perception of their future life (Hill *et al*, 1997). There was though a relationship between promiscuous behaviour and the perception of future life. Those who felt they had a limited lifespan were more likely to incorporate short-term mating strategies. This was particularly so for whether they felt they were likely to marry in the future. Those who were promiscuous were less likely to perceive themselves as happily married in the future, whereas those who preferred long-term partners were also more likely to perceive themselves as happily married in the future. This finding is what would be expected from those with short- and long-term strategies.

Although it was expected that those who sexually aggress would perceive their future to be limited, this was not found in this study. Study 5 found that short-term strategists were more likely to disapprove of a rape, interestingly study 6 found that the more promiscuous an individual was then the more likely they were to have actually sexually aggressed, this supported part of Malamuth's (1996) Confluence Model.

The final study considered the relationship between rape proclivity and biological measurements (prediction 7). It was found that participants who possessed a short-term mating strategy were more likely to have asymmetrical traits. This did not support previous research, which found that those who were more symmetrical were more promiscuous (Gangestad & Thornhill, 1998). There was no support for the prediction that those with a high FA would be more likely to sexually aggress (prediction 7). Therefore, study 7 (FA) did not support the mate deprivation hypothesis as males with poor fitness (high FA) were not more likely to sexually aggress as predicted by Thornhill & Thornhill (1983). Males with a high right hand 2D:4D digit ratio were more likely to have sexually offended, which supported the mate deprivation hypothesis that it would be males who could not compete with more reproductively successful males (Thornhill & Palmer, 2000; Thornhill & Thornhill, 1983). Study 2 found that low status males were more likely to rape and study 4 found that low status males were more disapproved of in a depicted rape. These findings were supported by study 7 where low status males, i.e. those with a high 2D:4D digit ratio, were more likely to sexually aggress, although a similar pattern did not emerge for FA. Therefore, the thesis has found partial support for the mate deprivation hypothesis.

General Implications for an Evolutionary Theory of Rape

The explanation of rape from an evolutionary perspective has been addressed by Thornhill & Thornhill (1983). This paper presented hypotheses on the characteristics and occurrences of rape offences. The Thornhills (1983) suggested that rape was a short-term

strategy committed against victims with a high FV by low status offenders. The thesis addressed these hypotheses. It was found that rape was a short-term strategy but that it may also be a long-term strategy as victims with a high RV were targeted (study 1). In addition, the rape of victims with a low RV was disapproved of more than high RV victims when raped by a low status offender (study 4). The offence of rape was more disapproved of by a low status offender (study 4) and there were more lower status offenders (study 2). It would seem that the Thornhills were supported by this finding. It was found in study 7 that males with poor fitness (high 2D:4D digit ratio) were more likely to rape, which supported the Thornhills (1983) prediction that offenders would be of a low status. However, study 3 assessed the mate deprivation hypothesis using population data. It was found that rape increased when there was an abundance of women of high FV than men of reproductive age, this suggested that rape prevalence may be the result of a low gender ratio (Guttentag & Secord, 1983) where women are valued less. The current thesis has therefore provided empirical evidence for the Thornhills' prediction that rape offenders would be of a low status and less able to compete, but it has not found conclusive evidence that victims would have a low Fertility Value.

Malamuth (1996) suggested that for someone to commit rape then they needed to have an impersonal attitude to sex and a hostility towards women. This was a by-product hypothesis of rape. The thesis examined an impersonal attitude to sex in studies 4, 5, 6, and 7. It found that a promiscuous attitude was related to less disapproval of rape scenarios and a poor perception of the future. More importantly, study 7 found that aggression and promiscuous behaviour were predictive of sexual aggression (studies 4 and 6 also found that rape proclivity was related to promiscuity). Therefore, the thesis has also found support for the by-product hypothesis of rape.

Mealey (1999) suggested that rape should not be perceived as one type of behaviour but that it is in fact a group of similar behaviours. She suggested that rape was dependent on the life history of the offender. The thesis assessed this by considering differences between rape offences according to the victim-offender relationship and the mating strategies of males. It was found that the prevalence of stranger rape was not related to FV or RV, whereas non-stranger rape was related to RV (study 1), which suggested that stranger rape is based on the availability of the victims and not on their fecundity as in addition victims

of stranger rape were probably single women (see Figure 1.9). There were more rapes committed against step-relatives and acquaintances than against strangers and partners (study 2). Marital rape was disapproved of more than stranger or acquaintance rape (study 5). These findings provide support for the hypothesis that different types of rapes need to be investigated rather than rape as one type of behaviour. which the Thornhills (1983) assessed. In addition, it was found that men who possess short-term mating strategies were more likely to disapprove of a rape than long-term strategists (study 5). Short-term strategists also perceived their future life to be limited (study 6). These differences between the two types of strategists also suggested that rape characteristics might depend on offender life histories.

Limitations

Attempting to examine evolutionary hypotheses of rape is a very difficult task. The studies within the thesis assessed a number of hypotheses, which if supported would have suggested that rape might have been an adaptive mechanism. Rape was initially considered a single type of behaviour however the main finding of the thesis has been that rape is a number of different behaviours, which may have been individually selected for.

There were several limitations with the studies in the thesis. These have already been discussed in each study section. The main limitation with the archival data was that it only assessed convicted samples. As already discussed in study 1 the actual occurrence of rape may be greater than those offences that result in a conviction. This problem was inherent in studies 1-3, studies 4-7 therefore used a different methodology in order to avoid this problem.

The main limitation with the participant studies was that the rape proclivity and actual sexual aggression scales. The Attraction to Sexual Aggression Scale assessed the likelihood to rape (Malamuth 1989a; 1989b). This scale asked how likely it would be for a

participant to rape however it did not distinguish between different types of victim-offender relationship. A more informative rape proclivity scale would either assess the likelihood of each type of rape or at least identify the participant's definition of rape. The Sexual Experiences Survey asked several questions regarding sexual coercion on a continuum from verbal coercion to rape. However again it did not differentiate between different types of rape according to the victim-offender relationship.

Future Research

In order to assess rape as an adaptive mechanism then a broader sample would be needed than that used in the current thesis. The studies that considered archival data could be repeated using a cross-sectional survey of rape victims. This would give a more realistic analysis of the rape occurrence and how it relates to evolutionary concepts.

Perhaps the most important change would be the development of a rape proclivity scale, which considered the different types of rape. This would identify those who may be prone to stranger rape or who would be more likely to attack an acquaintance. This would then provide researchers with a tool, which would be more specific than those currently available.

The studies in the thesis did not explain why victims with a low FV and low RV are raped. It was found that perhaps those with a low FV and high RV are raped as part of a long-term mating strategy. However, older women are still raped. Obviously some women who are older than 45 years may not look their age and so are mistakenly believed to be younger. There are still women who are raped who do not look young and do not have any reproductive capacity. There must be an explanation for this type of rape.

Future research could investigate rape trauma in a more precise way. Thornhill & Thornhill (1990a; 1990b; 1990c; 1991a) found that reproductive aged women were more

traumatised by a rape offence. However. they did not examine specific age groups and how these relate to FV and RV. It would be expected that those with a high FV would feel more traumatised by a rape than those with a high RV, as the possibility of rape leading to reproduction was greater for those with a high FV. Therefore, rape victims could be assessed for trauma and then this could be related to their FV and RV.

With the development of a new rape proclivity scale. it would be interesting to repeat study 2 with participants. It could assess whether those with a rape proclivity differed according to the victim-offender relationship and the status of the participant. It would be expected that those high status males would differ in their rape proclivity to low status males.

There is still further research that could be conducted on the evolutionary hypotheses of rape. These would then give a more precise examination of whether certain types of rape are adaptive mechanisms or if they are by-products of other behaviours.

Conclusion

It was found that rape prevalence was related to the victim's FV but more strongly related to the victim's RV. This was most prominent in non-stranger rapes, whereas there was no relationship between stranger rape and FV and RV. This suggested that non-stranger rape might be a long-term strategy as victims are targeted for their future reproductive capacity. Most rapists have been found to have a low social status and this differs according to the victim-offender relationship. High status males were more likely to rape a partner or step-relative. whereas low status males were more likely to rape a stranger. There was found to be an increase in rape in areas where there was a low gender ratio, particularly where there were more women of FV age than men of reproductive age. It was found that rape committed by high status males was approved of more than rape by low status males. In addition, the rape of victims with a low RV (29/50 years) received the most disapproval. Males who use a long-term mating strategy disapproved of a marital rape less than those

who use a short-term mating strategy. A limited perception of the future was not predicted by a rape proclivity but by short-term mating strategies. FA was not related to rape proclivity whereas digit ratio was. Those with a high 2D:4D digit ratio were more likely to have actually sexually aggressed. The thesis has found support for the hypothesis that rape offenders are more likely to be the 'losers' (low status) in society. In addition, that rape may be a long-term as well as short-term strategy. The most prominent finding was that there are different types of rape, which need to be considered in research.

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APPENDICES

APPENDIX 1A

Table 1: Gender Ratios, Rape and Indecent Assault Prevalence and Population Density by each British Police Force Area.

British Police Force	Gender Ratio – total males to females Original	MC/FV Ratio Original	MC/RV Ratio Original	Inv	MR/FV Ratio Original	MR/RV Ratio Original	Rape per Hundred Thousand Females Original	Log	Rape and Indecent Assault per Hundred Thousand Females Original	Inv	Population per Square Hectare Original	Log
Avon & Somerset	0.95	0.89	2.92	1.35	3.54	2.92	13.92	1.14	71.18	0.01	2.86	0.46
Bedfordshire	0.99	0.83	2.60	1.39	3.00	2.60	17.61	1.25	81.94	0.01	4.20	0.62
Cambridgeshire	0.97	0.83	2.73	1.39	3.18	2.73	19.20	1.28	87.96	0.01	1.87	0.27
Cheshire	0.96	0.85	2.73	1.43	3.33	2.73	7.65	0.88	46.34	0.02	4.06	0.61
Cleveland	0.94	0.80	2.46	1.54	3.04	2.46	16.76	1.22	77.38	0.01	9.13	0.96
Cumbria	0.95	0.86	2.97	1.38	3.53	2.97	7.81	0.89	57.57	0.02	0.70	-0.16
Derbyshire	0.97	0.86	2.91	1.35	3.38	2.91	7.29	0.86	58.50	0.02	3.49	0.54

	Gender Ratio – total males to females	MC/FV Ratio	MC/RV Ratio		MR/FV Ratio	MR/RV Ratio	Rape per Hundred Thousand Females		Rape and Indecent Assault per Hundred Thousand Females		Population per Square Hectare	
British Police Force	**Original**	**Original**	**Original**	**Inv**	**Original**	**Original**	**Original**	**Log**	**Original**	**Inv**	**Original**	**Log**
Devon & Cornwall	0.93	0.85	2.97	1.46	3.69	2.97	8.02	0.90	67.65	0.01	1.41	0.15
Dorset	0.92	0.85	3.23	1.39	3.80	3.23	14.95	1.17	71.40	0.01	2.37	0.37
Durham	0.95	0.82	2.80	1.43	3.30	2.80	14.98	1.18	86.52	0.01	2.41	0.38
Essex	0.95	0.86	2.82	1.39	3.36	2.82	10.74	1.03	49.03	0.02	4.11	0.61
Gloucestershire	0.95	0.85	2.89	1.40	3.42	2.89	8.62	0.94	81.29	0.01	1.96	0.29
Greater Manchester	0.94	0.83	2.59	1.42	3.05	2.59	17.83	1.25	83.27	0.01	19.23	1.28
Hampshire (Isle of Wight)	0.95	0.84	2.82	1.38	3.28	2.82	16.29	1.21	85.98	0.01	3.93	0.59
Hertfordshire	0.97	0.84	2.84	1.36	3.24	2.84	9.40	0.97	50.68	0.02	5.87	0.77
Humberside	0.95	0.85	2.70	1.44	3.31	2.70	14.07	1.15	134.91	0.01	2.41	0.38
Kent	0.94	0.86	2.77	1.41	3.35	2.77	15.07	1.18	64.20	0.02	3.97	0.60
Lancashire	0.94	0.84	2.68	1.47	3.32	2.68	8.29	0.92	52.18	0.02	4.41	0.64
Leicestershire	0.96	0.83	2.67	1.44	3.17	2.67	8.70	0.94	61.34	0.02	3.36	0.53

	Gender Ratio – total males to females	MC/FV Ratio	MC/RV Ratio		MR/FV Ratio	MR/RV Ratio	Rape per Hundred Thousand Females		Rape and Indecent Assault per Hundred Thousand Females		Population per Square Hectare	
British Police Force	**Original**	**Original**	**Original**	**Inv**	**Original**	**Original**	**Original**	**Log**	**Original**	**Inv**	**Original**	**Log**
Lincolnshire	0.96	0.87	2.95	1.45	3.72	2.95	12.94	1.11	61.97	0.02	0.97	-0.01
Merseyside	0.91	0.81	2.54	1.49	3.05	2.54	8.71	0.94	62.21	0.02	21.09	1.32
Metropolitan District (Greater London)	0.93	0.74	2.85	1.23	2.59	2.85	33.90	1.53	117.94	0.01	41.69	1.62
Norfolk	0.95	0.88	3.05	1.38	3.71	3.05	16.51	1.22	71.11	0.01	1.36	0.13
Northamptonshire	0.96	0.96	2.62	1.26	3.16	2.62	15.12	1.18	66.65	0.02	2.42	0.38
Northumbria (Northumberland; Tyne & Wear)	0.93	0.81	2.76	1.43	3.19	2.76	12.99	1.11	69.30	0.01	2.75	0.44
North Yorkshire	0.94	0.97	2.98	1.22	3.52	2.98	5.38	0.73	39.66	0.03	.82	-0.08
Nottinghamshire	0.96	0.84	2.80	1.35	3.17	2.80	22.14	1.35	150.21	0.01	4.54	0.66
South Yorkshire	0.95	0.84	2.82	1.34	3.19	2.82	11.56	1.06	65.44	0.02	8.01	0.90
Staffordshire	0.97	0.87	2.93	1.31	3.33	2.93	10.26	1.01	64.05	0.02	3.75	0.57
Suffolk	0.96	0.87	2.85	1.41	3.51	2.85	19.12	1.28	76.49	0.01	1.65	0.22
Surrey	0.95	0.85	3.00	1.37	3.51	3.00	8.04	0.91	45.27	0.02	5.94	0.77

	Gender Ratio – total males to females	MC/FV Ratio	MC/RV Ratio		MR/FV Ratio	MR/RV Ratio	Rape per Hundred Thousand Females		Rape and Indecent Assault per Hundred Thousand Females		Population per Square Hectare	
British Police Force	**Original**	**Original**	**Original**	**Inv**	**Original**	**Original**	**Original**	**Log**	**Original**	**Inv**	**Original**	**Log**
Sussex (East & West)	0.90	0.83	3.12	1.39	3.57	3.12	10.22	1.01	64.12	0.02	3.59	0.56
Thames Valley (Berkshire; Buckinghamshire; Oxfordshire)	0.98	0.84	2.71	1.37	3.10	2.71	10.38	1.02	66.79	0.01	3.30	0.52
Warwickshire	0.97	0.88	2.89	1.38	3.51	2.89	7.40	0.87	42.76	0.02	2.42	0.38
West Mercia (Hereford & Worcester; Shropshire)	0.96	0.87	2.80	1.45	3.52	2.80	9.19	0.96	51.09	0.02	1.44	0.16
West Midlands	0.95	0.85	2.59	1.41	3.09	2.59	16.54	1.22	83.03	0.01	28.09	1.45
West Yorkshire	0.94	0.83	2.59	1.43	3.07	2.59	20.77	1.32	108.62	0.01	9.79	0.99
Wiltshire	0.96	0.84	2.79	1.38	3.24	2.79	16.31	1.21	77.98	0.01	1.59	0.20
Dyfed & Powys	0.95	0.87	2.95	1.49	3.85	2.95	20.20	1.31	95.41	0.01	0.42	-0.38
Gwent	0.95	0.86	2.71	1.45	3.35	2.71	16.95	1.23	79.84	0.01	3.18	0.50

British Police Force	Gender Ratio – total males to females	MC/FV Ratio	MC/RV Ratio		MR/FV Ratio	MR/RV Ratio	Rape per Hundred Thousand Females		Rape and Indecent Assault per Hundred Thousand Females		Population per Square Hectare	
	Original	**Original**	**Original**	**Inv**	**Original**	**Original**	**Original**	**Log**	**Original**	**Inv**	**Original**	**Log**
North Wales (Gwynedd; Clywd)	0.93	0.88	2.80	1.44	3.56	2.80	16.81	1.23	84.38	0.01	1.00	0.00
South Wales (South, Mid & West Glamorgan)	0.94	0.87	2.66	1.39	3.23	2.66	13.85	1.14	52.67	0.02	5.66	0.75

APPENDIX 1B

Table 2: Gender ratio and Rape Prevalence by each US State.

US State	Gender ratio	Rape per Hundred Thousand
Alabama	0.92	32.30
Alaska	1.10	66.20
Arizona	0.98	32.80
Arkansas	0.93	43.50
California	1.00	31.60
Colorado	0.98	43.10
Connecticut	0.94	22.60
Delaware	0.95	65.00
District of Columbia	0.88	41.20
Florida	0.94	51.90
Georgia	0.95	31.10
Hawaii	1.01	31.30
Idaho	1.00	28.90
Illinois	0.95	37.10
Indiana	0.95	32.90
Iowa	0.95	20.30
Kansas	0.97	42.40
Kentucky	0.94	33.40
Louisiana	0.93	41.30
Maine	0.95	20.50
Maryland	0.94	35.60
Massachusetts	0.93	26.90
Michigan	0.95	51.90
Minnesota	0.97	52.20

US State	Gender ratio	Rape per Hundred Thousand
Mississippi	0.92	39.00
Missouri	0.94	28.20
Montana	0.99	19.50
Nebraska	0.96	24.50
Nevada	1.04	59.90
New Hampshire	0.97	33.70
New Jersey	0.94	21.50
New Mexico	0.97	50.40
New York	0.93	22.50
North Carolina	0.94	31.60
North Dakota	0.99	24.80
Ohio	0.93	40.80
Oklahoma	0.95	45.70
Oregon	0.97	40.30
Pennsylvania	0.93	27.40
Rhode Island	0.93	36.80
South Carolina	0.93	48.90
South Dakota	0.97	48.40
Tennessee	0.93	56.90
Texas	0.97	41.20
Utah	0.99	47.50
Vermont	0.97	26.50
Virginia	0.96	27.00
Washington	0.99	51.40
West Virginia	0.93	19.50
Wisconsin	0.97	20.30
Wyoming	1.01	28.50