

Fathers' contribution towards toddlers' aggressiveness

VICTORIA KAIRIS

A thesis submitted to the School of Psychology, Cardiff University, in partial
fulfilment of the requirements for the degree of

Doctor of Philosophy

December 2013

Supervised by

Professor Dale Hay
School of Psychology,
Cardiff University, UK.



Contents

Index of Tables	v
Index of Figures	vii
Acknowledgement	viii
Roles and Responsibilities within the	ix
Cardiff Child Development Study	ix
Summary	x
Chapter 1. Introduction	1
1.1. Aims of the Thesis.....	1
1.2. The Importance of Studying Fathers	2
1.3. The Importance of Studying Antisocial Behaviour in Fathers and Children.....	3
1.4. Violent behaviour in parents and outcomes for children	9
1.5. Is there any difference between outcomes for boys and girls?	13
1.6. Is there a difference between the effects of fathers' antisocial behaviour and mothers' antisocial behaviour?.....	13
1.7. Genetic and Environmental Influences on Antisocial Behaviours.....	15
1.8. Summary and Research Questions	18
1.9. Glossary of terms used in this thesis	38
Chapter 2. The Cardiff Child Development Study Methodology	40
2.1. Aims of the Chapter	40

2.2. Design.....	40
2.3. Participants.....	41
2.4. Demographic characteristics of the sample.....	41
2.5. Procedures.....	43
2.6. Measures.....	46
Chapter 3. Associations between Fathers' and Mothers' Criminal, Antisocial and Violent Behaviour.....	
3.1. Introduction.....	51
3.1.1. Assortative Pairing for Antisocial Behaviours and Criminality.....	51
3.1.2. Objectives.....	54
3.2. Method.....	56
3.2.1. Participants.....	56
3.2.2. Procedures.....	56
3.2.3. Measures.....	56
3.3. Results.....	58
3.3.1. Differences in partners' criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness.....	58
3.3.2. Associations between partners' criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness.....	59
3.3.3. Are the associations between partners' antisocial behaviours due to measures of the couple's environment?.....	61
3.4. Discussion.....	63

Chapter 4. Fathers' Contribution to the Development of Aggression	66
4.1. Introduction	66
4.1.1. Antisocial Behaviour in Fathers and Outcomes for Children.....	66
4.1.2. Rated and Observed use of Aggression in Toddlers.....	69
4.1.3. Aims and Hypotheses	70
4.2. Method	72
4.2.1. Participants	72
4.2.2. Procedures	72
4.2.3. Measures	73
4.3. Results	78
4.3.1 Descriptive Statistics	78
4.3.2. Hypothesis 1: Fathers' Antisocial Symptoms Predict Infants' Precursors to Anger and Aggressiveness.....	79
4.3.3. Hypothesis 2: Fathers' Antisocial Symptoms Predict Toddlers' aggressiveness...	82
4.3.4. Item analysis of the toddler CICS and CBCL measures	87
4.3.5. Does physical aggressiveness in two parents convey more risk than one parent's aggressiveness?.....	91
Chapter 5. Father Absence and Infant and Toddler Behaviour	97
5.1. Introduction	97
5.2. Method	103
5.2.1. Participants	103
5.2.2. Procedure	103

5.2.3. Measures	103
5.3. Results	106
5.3.1. Risk factors for father absence	106
5.3.2. The effect of the father's absence and fathers' physical aggressiveness on toddlers' physical aggressiveness	108
5.3.3. Does infants' early contentiousness predict the father's absence?.....	109
5.4. Discussion	110
Chapter 6. General Discussion.....	114
6.1. Summary of Findings	114
6.2. Limitations	119
6.3. Implications and Directions for Future Research.....	121
6.4. Final Conclusions.....	124
References.....	125
Appendix.....	149

Index of Tables

Table 1.1. Methods and measures used in previous research examining the relationship between parental antisocial behaviour and child behaviour.	21
Table 2.1. Demographic characteristics for the full sample and my thesis sample.	42
Table 2.2. Waves and measures used in each chapter.	50
Table 3.1. Correlations within individuals for measures of antisocial behaviour.	58
Table 3.2. Correlations between study variables and social risk for women and men.	62
Table 4.1. Descriptive statistics for infant, toddler and parent variables.	79
Table 4.2. Correlations between parents' antisocial symptoms and infants' CICS scores.	80
Table 4.3. Prediction of infants' CICS scores from parents' non-violent antisocial symptoms and child gender: Regression analysis.	81
Table 4.4. Prediction of infants' CICS scores from parents' physical aggressiveness and child gender: Regression analysis.	82
Table 4.5. Correlations between parents' non-violent antisocial symptoms and toddler variables.	83
Table 4.6. Prediction of toddler aggressiveness and conduct problems from parents' non-violent antisocial symptoms: Regression Analysis.	84
Table 4.7. Correlations between parents' physical aggressiveness and toddler variables.	85
Table 4.8. Prediction of toddler aggressiveness scores from parents' physical aggressiveness: Regression analysis.	87

Table 4.9. Components matrix for items from toddlers' CICS angry aggressiveness and CBCL aggressive conduct problems.....	89
Table 4.10. Prediction of toddlers' physical aggressiveness factor scores from fathers' physical aggressiveness: A regression analysis.	90
Table 5.1. Correlations between variables (N=282).	107
Table A. Correlations between all variables used in thesis.	149

Index of Figures

Figure 3.1. Percentages of no arrest, arrest for non-violent offences and violent offences for the partners of women and men.	60
Figure 3.2. Percentages of participation in physical fights for the partners of women and men.	61
Figure 4.1. Toddlers' mean physical aggressiveness factor scores in relation to number of physically aggressive parents; error bars are \pm the standard error of the mean.	92
Figure 5.1. Mean toddlers' physical aggressiveness scores for father absence and fathers' physical aggressiveness. Error bars are the standard error of the mean.	109

Acknowledgement

I would like to thank my supervisors Dale Hay and Katherine Shelton for their continued support and guidance throughout this process. Especially to Dale for always being available whenever I have needed anything at all and always having the time to listen to any of my ideas. I have really enjoyed our fast paced conversations and our mutual love of toddlers' behaviours and conversations.

I would also like to thank all of the Cardiff Child Development Study team and the families who took part for all of their hard work and dedication in providing and collecting all of the data. In particular I would like to thank my fellow PhD students on the team: to Becca Phillips, thanks for all of the guidance and encouragement and for having done everything first so that I know how it's supposed to be done. Thanks to Rhiannon Fyfield for being an amazing friend, for always being willing to help me with anything I need and understanding my stress. And thanks to Amy Paine for doing my reliability coding on my time schedule, even though it meant working into the Christmas holidays.

My husband Graham has been my rock; he has helped me whenever and however he can, sometimes even just keeping me company whilst I worked. Thanks to all of my family, but to my brother William in particular for helping me to understand what it is to be a toddler, and for hardly ever complaining whilst I tried out every kind of developmental test I could think of.

Finally, I would like to thank the National Institute for Social Care and Health Research (NISCHR) for funding my studentship. Without which I would never have been able to complete this thesis.

Roles and Responsibilities within the Cardiff Child Development Study

I have been involved in various aspects of data collection within the Cardiff Child Development Study (CCDS). I carried out cognitive assessments on the children at Wave 5, which involved various social and cognitive tasks. During the teddy bear's picnic scenario I played the parts of both the teddy bear and later the birthday lady (for more information on the Wave 5 protocol see Chapter 2). At Wave 6 I have been involved in visiting the families' homes and carrying out assessments on the children when they were between 6.5 and 7.5 years of age.

I have worked with the questionnaire data from all of the waves of assessment, which involved entering the data from the Wave 5 questionnaires and partially entering the Wave 4 questionnaires. I also cleaned all of the data from the questionnaires at all waves of assessment and assisted to create composite scores for various scales. I developed electronic versions of the questionnaires used by the CCDS in order to make data collection and data entry simpler at Waves 5 and 6. I also set up a system for the experimenters to code the child assessments on the spot using these electronic forms at Wave 6, which avoids coding the data at a later date from videos.

I have been involved with the coding of various tasks from the video footage and audio files held by the CCDS. I coded all of the Work Section for the father interviews at Wave 1, 80% of the peer interaction sessions at Wave 5, and infant distress during a restraint task at Wave 2 for all participants (for further information about the father interviews and peer interaction sessions see Chapter 2). Additionally I coded various tasks for reliability including 20% of the peer interaction sessions at Wave 3.

Summary

In this thesis I investigated the relationship between fathers' antisocial and physically aggressive behaviour and toddlers' behaviour. Previous work has largely ignored fathers or seen fathers only as an influence on mothers and little is known about fathers' aggressiveness. Families were recruited for the Cardiff Child Development Study (CCDS), which is a prospective longitudinal study of parents and their children. Parents were interviewed about their own behaviours during pregnancy and the children were assessed at intervals until 33 months of age (Chapter 2 describes the study design).

Chapter 3 examined associations between the antisocial behaviour of the couple. Although men committed more antisocial behaviours than women, there were associations between partners' rates of both violent and non-violent antisocial behaviours.

The relationship between fathers' antisocial behaviours and young children's behaviour was explored in Chapter 4. Fathers' non-violent antisocial symptoms were associated with mothers' reports of toddlers' aggressiveness. Fathers' physical aggressiveness was associated with infants' contentious behaviours, toddlers' aggressiveness and observations of toddlers' use of force against a peer. When physical aggressiveness was considered more closely a component relating specifically to toddlers' physical aggressiveness was identified. Fathers' physical aggressiveness was associated with toddlers' physical aggressiveness, which suggests a homotypic continuity in physical aggressiveness between fathers and toddlers. All of the associations between fathers' and toddlers' behaviours remained significant after controlling for the mothers' behaviours. Thus, fathers'

behaviours provide unique contributions towards toddlers' behaviours independently of the mothers' behaviours.

Since antisocial fathers are more likely to be absent fathers Chapter 5 examined the relationship between fathers' physical aggressiveness and father absence. Although father absence was associated with fathers' physical aggressiveness, it did not explain the association between fathers' and toddlers' physical aggressiveness. Together these findings show that fathers are important to study in their own right, rather than as an influence on mothers.

Chapter 1.

Introduction

1.1. Aims of the Thesis

Fathers are an integral social influence in a child's life, and no child can exist without a father in some shape or form; even if the child never met his or her father, he still provided half of that child's genetic material. However, fathers have been mostly neglected within child development research. In the 1970s several researchers argued that most psychological research was only concerned with the mothers' social influence (Kotelchuck, 1976; Lamb, 1977a; Lewis & Weinraub, 1976). Children are part of large social environments and all members of the child's social network provide some influence on the child's development, not only the mother (Collins, Maccoby, Steinberg, Hetherington & Bornstein, 2000). However, fathers are still ignored in much child development research, although there have been moderate improvements since the problem was identified in the 1970's. The aim of this thesis is to examine the relationship between fathers' antisocial behaviour and the behaviour of their offspring, during the age range when the relationship between fathers' antisocial behaviour and children's problem behaviour can first be observed.

In this introductory chapter I will discuss current research on fathers and what contributions the father brings to the child's social environment. In particular I will consider the associations between fathers' antisocial behaviour and the outcomes for their offspring, both in adulthood and childhood. I will also investigate whether fathers' tendency to use

physically aggressive behaviours (as opposed to non-violent antisocial behaviour such as stealing or dishonesty) has an effect on their children's outcomes.

1.2. The Importance of Studying Fathers

Several researchers have proposed ideas as to why they believe that child development research has ignored fathers. Jaffee, Moffitt, Caspi and Taylor (2003) suggest firstly that in many studies mothers are seen as the primary caregivers of the child and therefore their influence is thought to be of greater importance, and secondly that locating absent fathers is difficult, which results in fewer fathers included in the sample. Pederson & Robson (1969) admitted that they were not willing to "reorient our work schedules to coincide with the availability of fathers" (p. 467-468). This illustrates the fact that fathers are less likely to be available during the working day and additional effort must be made by researchers in order to collect data during evenings and weekends when fathers are more likely to be available.

Early research in the 1970s into fathers' contribution to the child's development focussed mainly on the attachment relationships that infants have with their fathers. Lamb (1976a, 1976b, 1977a, 1977b) showed that infants did not display any difference in attachment to the mother or the father. Additionally infants were more likely to show affiliative behaviours towards their fathers, including smiling, vocalising, looking and laughing. When under stress the infant displayed no difference in attachment behaviour towards the mother or father when investigated separately, although was more likely to display a stronger preference for the mother when both parents were available (Lamb, 1976c, 1976d). Under mild stress infants prefer their mothers, but under moderate stress they show no preference (Feldman & Ingham, 1975), and other researchers have found no difference between the infant's preference for one parent or the other when under stress (Willemssen,

Flaherty, Heaton and Ritchey, 1974). From this evidence it can be supposed that relationships with fathers are at least as important as the mothers to infants, and therefore fathers ought not to be neglected when examining the child's development. However, these studies investigating attachment behaviours with fathers, although well controlled experimentally, used few participants. The majority of studies investigated about 20 infants, which may mean that there was not enough statistical power to detect any significant differences between mothers and fathers. Studies using greater cell sizes and controlling for the effect of mothers to find unique associations with fathers' characteristics are required to understand the relationship between fathers and infants.

Researchers have also investigated the father-child relationship with older children. This research has found that there are very few differences between the way that the children interact with their mothers or with their fathers (Gerritis, Goudena & van Aken, 2005), and physical play, engagement and warmth from fathers was associated with more harmonious peer relationships (MacDonald & Parke, 1984; Youngblade & Belsky, 1992). These findings provide additional evidence that fathers are an integral part of the childhood experiences that influence most children's ability to form social relationships.

1.3. The Importance of Studying Antisocial Behaviour in Fathers and Children

Of particular concern in this thesis is the effect of fathers on the development of antisocial behaviour in childhood. Antisocial behaviour is a serious problem for society. It is estimated that antisocial behaviour costs society £3.4 billion a year in England and Wales (National Audit Office, 2006). However, antisocial behaviour not only costs money but it also often comes with an emotional cost for the victims involved. It is therefore unsurprising that much research examines antisocial behaviour and the factors that are associated with its

development. However, relevant studies differ on a number of dimensions. Characteristics of the studies reviewed in this section are summarized in Table 1.1.

Researchers have identified several risk factors for antisocial and criminal behaviour (Farrington, Tofti et al., 2009; Farrington, Coid & Murray, 2009). Offenders were more likely to have a low family income, parental conflict, father not involved, truancy, hyperactivity, and to be a frequent liar than non-offenders. Persistent offenders were more likely to have even more risk factors which included parental unemployment, low IQ, early school leaving, bullying, regular smoker, aggressive and violent behaviour, hostile to the police and more delinquent friends (Farrington, Tofti et al., 2009).

The prevalence of antisocial behaviour is greater among the family members of those who participate in antisocial behaviour (Farrington, Jolliffe, Loeber, Stouthamer-Loeber & Kalb, 2001; Ferguson, 1952; Kerr, Capaldi, Pears & Owen 2009). Researchers have shown that a small number of families account for a large number of crimes (Beaver, 2013; Farrington, 2000; Farrington et al., 2001) and that roughly a quarter of families account for all crime (Beaver, 2013). Parents' antisocial or criminal behaviour specifically exerts a greater effect on the child's antisocial behaviours than any other family member (Farrington, 2001). This relationship between parents' antisocial behaviour and children's antisocial behaviour exists both for the child's behaviour as an adult (Beaver, 2013; Bessemer, 2011; Farrington, 2000) and as a child or adolescent (Aaron & Dallaire, 2010; Bailey, Hill, Oosterle & Hawkins, 2009; Capaldi, Pears, Kerr, Owen & Kim, 2012; Huesmann, Eron, Lefkowitz & Walder, 1984; Kerr et al., 2009; Murray & Farrington, 2005; Tompsett & Toro, 2010).

It is particularly important to investigate fathers' antisocial and criminal behaviours since researchers have shown that fathers are more likely to commit antisocial and criminal

behaviours than mothers (Coley, Carrano & Lewin-Bizan, 2011; Farrington et al., 2001; Kendler, Davis & Kessler, 1997; Herndon & Iacono, 2005). In fact, fathers have been found to commit around twice as many antisocial acts as mothers (Coley et al., 2011), and Herndon and Iacono (2005) made diagnoses of definite Adult Antisocial Behaviour (AAB) for five times more fathers than mothers. However, there is evidence that criminal behaviour in men reduces when they become fathers (Kerr, Capaldi, Owen, Wiesner & Pears, 2011).

Fathers' criminal behaviour is associated with criminal behaviour in offspring (Besemer & Farrington, 2012; Farrington, Coid & Murray, 2009; Hjalmarsson & Lindquist, 2011; Ramakers, Bijleveld & Ruiter, 2010; Robins, West & Herjanic, 1975; van de Rakt, Nieuwberta & Dirk de Graaf, 2008; van de Rakt, Nieuwberta & Apel, 2009). The effects appear to persist well into adulthood up to middle age (Besemer & Farrington, 2012; Farrington, Coid et al., 2009). There is a dose response relationship between fathers' criminal behaviour and offspring criminal behaviour; the more offences the father has committed the more likely the offspring is to engage in criminal activities (Van de Rakt et al., 2008; Van de Rakt et al., 2009). The offspring of fathers whose offending was described as sporadic were more likely to have criminal convictions than those whose fathers did not offend, but less likely to offend than those whose fathers were described as persistent offenders or high rate offenders (van de Rakt et al., 2008). Chronic offenders were more likely to have a father whose criminal behaviour was described as high rate persistent than those with convictions who participated in crime at a lower rate (van de Rakt et al., 2008). However, Besemer and Farrington (2012) found that there was no significant difference between the children of sporadic offenders and chronic offenders.

Offspring of imprisoned fathers are at an additional risk for criminal convictions (van de Rakt, Murray & Nieuwbeerta, 2012), presumably due to the increased seriousness of the crimes that the father committed and the time the child spent apart from his or her father. A

father's incarceration or criminal sentence after the birth of the child places the child at an increased risk for offending later in life, compared to fathers imprisoned prior to the birth of the child (van de Rakt et al., 2012). However, Roettger and Swisher (2011) found that there was no significant difference between father's incarceration prior to the child's birth or after the child's birth on likelihood of being arrested during early adulthood.

Antisocial behaviours do not necessarily lead to criminal convictions. Broader psychological measures of antisocial behaviour are important to get a more general picture of antisocial behaviour in an individual. These psychological measures of antisocial behaviour in fathers have been found to be associated with offspring behaviour in late adolescence and adulthood (Herndon & Iacono, 2005; Kendler et al., 1997; Verona & Sachs-Ericsson, 2005). Fathers' antisocial symptoms were associated with adolescents' diagnoses of Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD) (Herndon & Iacono, 2005) and Diagnoses of Antisocial Personality Disorder (ASPD) and AAB in adulthood (Kendler et al., 1997; Verona & Sachs-Ericsson, 2005). However, in both of these studies (Kendler et al., 1997; Verona & Sachs-Ericsson, 2005) the participant was asked to report on his or her biological parents' symptoms of antisocial behaviour retrospectively, which reduces the reliability of the parent diagnoses.

In the previous work mentioned, the effects of the fathers' behaviour on the offspring were confined to those who were already adults, or very nearly adults. However, to understand the development of this relationship between father and child antisocial behaviour it is important to look at the offspring at younger ages. Researchers have focussed on the effects of the fathers' criminal behaviour on the children's behaviour and found that criminal behaviours in fathers are associated with juvenile criminal behaviours (Farrington et al., 2001; McCord, 1991; Nijhof, Kemp & Engels, 2009). In the study by Nijhof and colleagues (2009) it was found that the seriousness of children's crimes was associated with the

seriousness of fathers' crimes, and the frequency of the children's crimes was associated with the frequency of fathers' crimes. However, a study by Calley (2012) discovered that parents' criminal behaviour was not associated with rates of recidivism in juvenile offending.

Researchers have also shown that the association between criminal behaviour in fathers and offspring no longer exists when demographic measures and the child's guilt are controlled for (Farrington et al., 2001).

The father's criminal history is not only related to criminal behaviours but also to other troublesome behaviours (Smith & Farrington, 2004; Kinner Alati, Najman & Williams, 2007). In adolescence fathers' criminal history is associated with antisocial behaviours and conduct problems (Smith & Farrington, 2004). In childhood criminal behaviours in fathers are associated with troublesome behaviour (Smith & Farrington, 2004), sometimes referred to as externalising problems (Kinner et al., 2007), which is a global grouping of problems associated with conflict with other people and other inappropriate behaviours, contrasted from internalising behaviours which reflect problems within the self, such as depression and anxiety (Achenbach & Rescorla, 2000).

Fathers' behaviour is also related to younger children's behaviour problems (Blazei, Iacono & McGue, 2008; Capaldi et al., 2012; Coley et al., 2011; Foley, Pickles, Simonoff, Maes, Silberg, Hewitt & Eaves, 2001; Frick, Lahey, Loeber, Stouthamer-Loeber, Christ & Hanson, 1992; Herndon & Iacono, 2005; Jaffee, Moffitt, Caspi & Taylor, 2003; Jaffee, Caspi, Moffitt & Taylor, 2004; Pfiffner, McBurnett & Rathouz, 2001; Smith & Farrington, 2004). Higher externalising problems in childhood have been shown to be associated with fathers' participation in antisocial behaviours (Capaldi et al., 2012; Coley et al., 2011; Herndon & Iacono, 2005; Jaffee et al., 2003). However, Coley and colleagues (2011) found that this relationship only existed for the children when they were 5 years old and not at later ages, and Capaldi and colleagues (2012) discovered that the association was only true of fathers

and daughters, not for fathers and sons. A possible reason for this inconsistency could be that externalising problems comprise a relatively large category of behaviours including angry, aggressive and inattentive behaviours.

The relationship between antisocial behaviour in fathers and children also extends to clinically diagnosed conduct disorder (Frick et al., 1992; Pfiffner et al., 2001). In both of these studies samples of clinically referred children were used, which is fairly unrepresentative of the general population. However, other researchers have used more representative community samples, and observed that fathers who had more antisocial personality symptoms were more likely to have children with conduct disorder symptoms than fathers with fewer antisocial symptoms (Blazei et al., 2008; Foley et al., 2001; Smith & Farrington, 2004).

Not only the father's antisocial behaviour as an adult, but also his behaviour when he was a child is related to his child's behaviour problems (Kerr et al., 2009; Kim, Capaldi, Pears, Kerr & Owen, 2009; Smith & Farrington, 2004; Thornberry, Freeman-Gallant, Lizotte, Krohn & Smith, 2003; van Meurs, Reef, Verhulst & Van der Ende, 2009). The father's adolescent antisocial behaviours predict higher antisocial behaviours in his child during early childhood (Thornberry et al., 2003). Antisocial behaviours in the father's late childhood are associated with his child's difficult temperament in toddlerhood (Kerr et al., 2009). His behaviours during childhood at similar ages to that of his child also predict antisocial behaviours in the child (Kim et al., 2009; Smith & Farrington, 2004; van Meurs et al., 2009). However, some researchers have found little evidence for a relationship between difficult behaviours in fathers as children and their children (Blazei, Iacono & Krueger, 2006). Others have found conflicting evidence for this relationship; for example, Kim and colleagues' (2009) findings suggest that this relationship only extends to daughters and not sons and Kerr

and colleagues (2009) found that the association only existed at the toddler age and not at a later age.

Two studies have looked at the intergenerational transmission of antisocial behaviour across more than two generations (Capaldi et al., 2012; Farrington, Coid et al., 2009; Kerr et al., 2009; Kim et al., 2009; Smith & Farrington 2004). For the sake of clarity, the first generation will be called “grandparents”, the second generation “parents” and the third generation “children”. In the Cambridge Study in Delinquent Development (CSDD) grandparents’ convictions predicted parents’ antisocial behaviour and convictions at all time points, from age eight years to age 32 years. Parents’ antisocial behaviour in childhood did not predict the child’s antisocial behaviour in childhood, but parents’ antisocial behaviour in adulthood did predict children’s antisocial behaviours. There was no significant relationship between grandparents’ convictions and children’s antisocial behaviours (Smith & Farrington, 2004). Other researchers from the Oregon Youth Study (OYS) found significant relationships between grandparents’ antisocial behaviours and parents’ antisocial behaviours, but not between parents’ antisocial behaviours in childhood or adulthood and children’s externalising problems. However, this study did find a significant relationship between grandparents’ antisocial behaviour and children’s externalising problems in middle childhood, but not early childhood.

1.4. Violent behaviour in parents and outcomes for children

There is a strong relationship between violence and other antisocial behaviours; Farrington (2000) discovered that 30% of antisocial individuals were also convicted for a violent offence compared to 5% of those who were not otherwise antisocial, and that 65% of those convicted of violent offences also exhibited other antisocial symptoms. However, the individuals who

engage in violent and physically aggressive behaviours are not necessarily higher on all other measures of delinquency (Lacourse, Baillargeon, Dupéré, Vitaro, Romano, & Tremblay, 2010; Farrington, Tofti et al., 2009; Nagin & Tremblay, 1999). There appear to be different pathways within antisocial and criminal behaviour (Loeber & Hay, 1997), in particular for those who engage in property crimes such as theft and vandalism versus those who engage in violent crimes such as assault and use of weapons and those who engage in both property and violent crimes (Lacourse et al., 2010). It has been suggested that individuals are more likely to commit violent crimes if they are persistent offenders or if they are late-onset offenders and are more likely to commit these crimes during adulthood rather than adolescence (Farrington, Tofti et al., 2009). Theft has been shown to increase between the ages of 12 and 30, whereas violence showed no increase during this time (Barker, Séguin, White, Bates, Lacourse, Carbonneau & Tremblay, 2007). Since there are differences within the individual's propensity to commit certain crimes and the predictors to those crimes, it is important to consider both violent crimes and non-violent crimes separately from one another, to look at the contribution of both types of antisocial behaviour.

Researchers have investigated violent behaviour and possible predictors of those violent behaviours. Of those who had committed crimes, violent adolescents were more likely to have a mother who was depressed during pregnancy and to have had a history of conduct problems in her own adolescence (Hay, Waters, Perra, Pawlby & Sharp, 2010). The fact that there are different predictors to violent behaviour again make it necessary to study violence independently from other antisocial behaviours as the nature and development of violent behaviour is different to other antisocial behaviours.

Physically aggressive/violent behaviour is fairly stable over time. Those individuals that are physically aggressive earlier in life are more likely to also be aggressive later on (Brame, Nagin & Tremblay, 2001; Côté, Vaillancourt, LeBlanc, Nagin & Tremblay, 2006;

Farrington, Ttofi, & Coid, 2009; Nagin & Tremblay, 1999; Olweus, 1979). This has been found to be true even from early childhood; an individual's lack of control and tantrums is related to his or her participation in violent crime in early adulthood (Henry, Caspi, Moffitt & Silva, 1996; Stevenson & Goodman, 2001). However, other researchers have discovered that in almost all individuals the use of physical aggression decreases as children get older (Brame et al., 2001). These findings mean that it is essential to look at aggressive behaviours in children as these early behaviours can provide an indication as to who will become an aggressive adult.

Physical maltreatment of children has the biggest impact on the child in terms of parents' violent behaviour as it directly implicates the child. Researchers have found that children who were physically maltreated were more likely to display antisocial behaviours (Dodge, Bates & Pettit, 1990; Jaffee et al., 2004) and be aggressive towards their peers (Dodge et al., 1990). It has also been shown that the relationship between maltreatment of the child and the child's behaviour problems is not accounted for wholly by measures of parents' general antisocial proclivities (Jaffee et al., 2004).

Children do not have to be the victims of the violent attack in order to be affected by violence. Domestic violence between parents is also associated with children's negative behaviour outcomes (Davies, Sturge-Apple, Cicchetti, Manning & Vonhold, 2012; Jaffee, Moffitt, Caspi, Taylor & Arseneault, 2002; Margolin & Gordis, 2000; Owen, Thompson & Kaslow, 2006). Violence within the community has also been shown to be related to the child's behaviour problems (Margolin & Gordis, 2000; Westbrook & Harden, 2010). However, it has been suggested that the effects of community violence can be explained through the mothers' parenting behaviour (Westbrook & Harden, 2010).

Little is really known about parents' violent behaviour beyond the home environment. Researchers have found that parents' aggressive behaviour is associated with children's behaviour problems (Huesmann et al., 1984). In a study of offenders imprisoned for homicide, it was discovered that offspring were much more likely to commit violent offences themselves than children whose parents were not imprisoned (Putkonen, Ryyänänen, Eronen & Tiihonen, 2002). However, other researchers have found that parents' angry and aggressive behaviour in adolescence is not related to their children's angry and aggressive behaviour (Conger, Neppel, Kim & Scaramella, 2003). In the studies by Huesmann and colleagues (1984) and Conger and colleagues (2003) aggressive behaviour was a broad category and included both verbal aggression and threatening behaviour as well as actual physical violence. Little is currently known about the effects of physically aggressive behaviour on offspring. Studies of violence tend to have very small sample sizes because criminally violent behaviour is relatively rare. In the study by Putkonen and colleagues (2002) only 11 children had parents who had been imprisoned for homicide and Besemer (2011) attempted to look at violence but there were not enough violent parents that had children who had been convicted.

Not surprisingly then there is little evidence on the effects of a father's participation in violent behaviour on his child's behaviour. Again, research has focussed on aggressive behaviour, which includes more than just physically violent behaviour. Aggression in fathers is related to an increased risk of criminal convictions in their offspring; the risk was further increased when the father was both aggressive and had a history of criminal convictions (McCord, 1991). However, other research has suggested that there is a link between the biological father's property crimes and his offspring's criminal activity, but this relationship did not extend to violent behaviour (Mednick, Gabrielli & Hutchings, 1984).

1.5. Is there any difference between outcomes for boys and girls?

Evidence is rather mixed when looking at whether the father's antisocial behaviour has a stronger effect on boys or girls. Some studies report that although boys are more likely to engage in antisocial behaviours there is no difference in the amount girls or boys are affected by the father's antisocial behaviour (Kinner et al., 2007; Van de Rakt et al., 2008; van de Rakt et al., 2012). Other studies report that the relationship is stronger for boys (Foley et al., 2001); whilst others report the relationship is stronger for girls (Capaldi et al., 2012; Hjalmarsson & Lindquist, 2011; Kim et al., 2009). The studies that found that there were no sex differences focused on the fathers' official criminal records and the studies that reported that the relationship was stronger for girls used reports of the father's antisocial behaviour during childhood and adulthood (Capaldi et al., 2012; Kim et al., 2009) as well as official criminal records (Hjalmarsson & Lindquist, 2011). In contrast, in Foley and colleagues' (2001) study, in which the relationship was stronger for boys, diagnoses of psychiatric disorders were used. The rate of conduct disorder in female offspring was 1.33% compared to 4.06% of male offspring; over three times more male than female offspring. Diagnoses of disruptive behaviour disorders are commonly found more often in boys than in girls (Foley et al., 2001; Maughan, Rowe, Messer, Goodman & Meltzer, 2004), greater numbers of males with the disorder than females would provide greater statistical power for boys than for girls. This may mean that relationships between boys' and fathers' behaviours are easier to detect and may account for the relationship being stronger for boys than girls.

1.6. Is there a difference between the effects of fathers' antisocial behaviour and mothers' antisocial behaviour?

The research on the differences of the effects of mothers' and fathers' antisocial behaviour on offspring is rather conflicting. Some researchers suggest that there is no difference between

the effects of mothers' antisocial behaviour or fathers' antisocial behaviour (Besemer et al., 2011; Kendler et al., 1997). In the study by Besemer and colleagues (2011) a cross-sectional method was used whereby children of imprisoned mothers were compared with children of imprisoned fathers and children with both parents imprisoned were excluded from the analysis, and Kendler and colleagues (1997) asked participants to report on the symptoms of their own parents and then compared the odds ratios between mother and participant and father and participant. Neither of these methodologies adequately investigated the extent to which there are differences between mothers' and fathers' antisocial behaviour in the effect on offspring.

However, other research suggests that fathers' antisocial behaviour is a stronger predictor (Farrington et al., 2001; Frick et al., 1992). In both the study by Farrington and colleagues (2001) and Frick and colleagues (1992) the proportion of antisocial fathers with antisocial offspring was higher than in mothers, but mothers' antisocial behaviour was not controlled for when examining fathers' antisocial behaviour and vice versa, meaning that the true magnitude of the differences between the effects of mothers and fathers cannot be truly determined. Often fathers' antisocial behaviour is more predictive because more men display this behaviour than women and therefore more men are included in the analyses, which increases the statistical power of the analysis (Robins et al., 1975).

It is clear however, that fathers' and mothers' antisocial behaviour independently predict child behaviour (Connell & Goodman, 2002; Jaffee et al., 2003). In Connell and Goodman's (2002) meta-analysis externalising problems in children were independently predicted from both mothers' and fathers' antisocial personality disorder, and Jaffee and colleagues (2003) controlled for mothers' antisocial behaviour when looking at the effects of fathers' antisocial behaviour and found that the association between fathers' and children's behaviour still remained statistically significant.

1.7. Genetic and Environmental Influences on Antisocial Behaviours

When an association between parents' antisocial behaviour and children's outcomes is found, that association can be due to genetic factors or environmental factors or a combination of both genetic and environmental factors. Some investigators have therefore studied parents' and offspring antisocial behaviour in the context of genetically informative designs. These studies have focused on the genetic and environmental determinants of these behaviours using designs such as twin studies, adoption studies and molecular genetic studies.

1.7.1. Twin studies

Comparisons between different types of twins enable one to determine the genetic heritability in the incidence of specific disorders. Since monozygotic (MZ) twins share one hundred percent of their genes, and dizygotic (DZ) twins only share about half of their genes with one another, one is able to investigate differences between these two groups to assess the extent to which the disorder is genetically determined. Twin designs have found evidence for both genetic and environmental factors in the development of antisocial behaviour (Burt, Krueger, McGue & Iacono, 2001; Jacobson, Prescott & Kendler, 2002; Schmitz, Fulker & Mrazek, 1995; Vierikko, Pulkkinen, Kaprio & Rose, 2006; Young, Stallings, Corley, Krauter & Hewitt, 2000). It has also been suggested that genetic factors are of greater influence at older ages (Jacobson et al., 2002; Schmitz et al., 1995) and for females (Jacobson et al., 2002), and the influence of the twins' shared environment is important particularly at younger ages (Jacobson et al., 2002; Schmitz et al., 1995).

1.7.2. Adoption studies

Twin studies are confounded by the fact that genes may also affect the environment that the parents provide for their child, which is known as gene environment correlation (rGE). The two main types of rGE are passive and evocative. Passive rGE occurs because the parents of the child provide both their genes and their environment, which is the case where children are brought up by the same parents who gave birth to them (Rutter & Silberg, 2002). Evocative rGE is where individuals elicit certain responses from others because of their genetically influenced characteristics (Rutter & Silberg, 2002). Adoption studies are better able to control for rGE because an adopted child is provided with genes from one set of parents and environment from another set of parents.

Several researchers have used adoption studies to examine the genetic and environmental influences on antisocial behaviour (Burt, Barnes, McGue & Iacono, 2008; Cadoret, Troughton & O’Gorman, 1987; Langbehn, Cardoret, Yates, Troughton & Stewart, 1998; Mednick et al., 1984). The offspring were more likely to engage in antisocial behaviours themselves if their biological parent had a history of antisocial behaviour (Langbehn et al., 1998; Mednick et al., 1984) than those children whose biological parents did not participate in antisocial behaviours. The risk of committing antisocial acts if the adoptive parent had a criminal conviction was similar to that of the biological parents’ conviction, and this risk increased if both the biological and adoptive parents had been convicted (Mednick et al., 1984).

Another study design which is able to control for rGE is the use of assisted reproductive technologies such as *in vitro* fertilisation (IVF) in order to assess the differences between individuals who range in genetic relatedness to their offspring. Both parents may be genetically related or unrelated to the child or just one parent may be genetically related to the child (Harold, Rice, Hay, Boivin, van den Bree & Thapar, 2011). Using this study design

it is possible to investigate the relationship between antisocial behaviour in the fathers and children with regards to the father's genetic relatedness to his child. The association between fathers' antisocial behaviour and children's antisocial behaviour was mediated by parent-to-child hostility for both genetically related and genetically unrelated fathers (Harold et al., 2011), suggesting that there is a considerable environmental influence in the transmission of antisocial behaviour between fathers and offspring.

1.7.3. Molecular genetic evidence

In terms of the gene polymorphisms associated with antisocial and aggressive behaviour the main body of molecular genetic research has implicated both the dopaminergic and the serotonergic systems (Retz & Rösler, 2009). The dopamine receptors DRD2 and DRD4 were found to be associated with antisocial behaviour; however, it was the interaction between the two rather than the individual genes that predicted variation in antisocial behaviour and conduct disorder (Beaver, Wright, DeLisi, Walsh, Vaughn, Boisvert & Vaske, 2007). These dopamine receptor genes have also been associated with comorbid ODD and ADHD (Kirley, Lowe, Mullins, McCarron, Daly, Waldman, Fitzgerald, Gill & Hawi, 2004; Sharp, McQuillin & Gurling, 2009). In the serotonergic system polymorphisms in the Monoamine Oxidase A (MAOA) gene promoter have been shown to be associated with conduct disorder, aggressive behaviour and criminality (Caspi, McClay, Moffitt, Mill, Martin, Craig, Taylor & Poulton, 2002; Foley, Eaves, Wormley, Silberg, Maes, Kuhn & Riley, 2004; Huang, Cate, Battistuzzi, Oquendo, Brent & Mann, 2004; Nilsson, Sjöberg, Damberg, Leppert, Öhrvik, Alm, Lindström & Orelund, 2006; Papova, 2006; Reif, Rösler, Freitag, Schneider, Eujen, Kissling, Wenzeler, Jacob, Retz-Junginger, Thome, Lesch & Retz, 2007). However, this relationship was only significant in the context of a gene environment interaction where the individual also suffered adverse childhood environments, in particular abusive environments (Caspi et

al., 2002; Foley et al., 2004; Huang et al., 2004; Nilsson et al., 2006; Reif et al., 2007).

Specific chromosomal regions have also been shown to be associated with conduct disorder, in particular regions on chromosomes 19 and 2 (Dick, Edenberg, Hesselbrock, Kramer, Kuperman, Porjesz, Bucholz, Goate, Nurnberger & Foroud, 2004).

1.7.4. Other environmental evidence

Studies have looked at the effects of father presence on the child's behaviour in order to investigate whether the environment that the father creates influences the relationship between father and offspring behaviour. Fathers who had a criminal history were more likely to have children who committed criminal offences when the father lived with the child (McCord, 1991). Similarly, when fathers display antisocial behaviours and live with the child, the child is at increased risk of also participating in antisocial behaviours than when the father does not live with the child (Blazei et al., 2006; Coley et al., 2011; Jaffee et al., 2003). These findings indicate that there is indeed some environmental component to the relationship between fathers' antisocial behaviour and children's behaviour problems.

1.8. Summary and Research Questions

Fathers' crime and antisocial behaviour has been shown to be associated with the behaviour of offspring, both in adulthood and in childhood. However, very little is known about the associations between fathers' antisocial behaviour and the behaviour of very young children. In previous research, investigators use a wide variety of different methods and measures. In Table 1.1 I have summarised all of the methods and measures used by all of the studies described above that contain measures of parents' antisocial behaviour and child problem behaviours. For ease of reference, the studies are listed alphabetically by author. In particular

this table shows the ages at which the children are studied, making it clear that only a handful of researchers use preschool children in their analyses. What can also be observed from the table of methods is how few studies use measures pertaining to physically aggressive behaviour specifically.

Since there is so little evidence into the relationship between fathers' antisocial behaviour and violence and the behaviour of very young children, I believe that it is important to document the association in a representative sample of children where the children have been followed from infancy to early childhood, prior to conducting analyses into the causal mechanisms of this relationship. For this reason the following chapters will investigate associations between fathers' and children's behaviour in the Cardiff Child Development Study, which is a longitudinal study from birth to toddlerhood. This thesis aims to address the following questions:

1.8.1. How similar are romantic partners in terms of their antisocial and violent behaviours?

Before investigating the relationship between fathers' antisocial behaviour and children's behaviour it is important to understand the environment that the children are brought up in and the antisocial behaviours that both parents exhibit prior to becoming parents. The relationship between fathers and children may be wholly explained by the general antisocial environment in the home, rather than the specific effect of the fathers' behaviour. In Chapter 3, I aim to investigate the associations between male and female partners' antisocial and violent behaviour in order to look at the similarities between marital partners but also the differences between men and women's expressions of antisocial and violent behaviours.

1.8.2. Does the fathers' antisocial behaviour predict young children's physical aggression and aggressive conduct problems?

Previous research has shown that there are associations between fathers' antisocial and physically aggressive behaviour and offspring problem behaviours. However, this research is largely concerned with older children and adult offspring. Chapter 4 aimed to investigate the relationship between fathers' antisocial behaviour and the development of aggressiveness in infants and toddlers up to age three years, as reported by multiple informants and directly observed in laboratory assessments. Of particular interest is whether there is any difference in the associations with the fathers' physically aggressive behaviour compared to non-violent antisocial behaviours, and whether physically aggressive behaviours in fathers are associated with physically aggressive behaviours in children. I will also be examining whether the fathers' behaviour predicts the child's behaviour independently of the mothers' behaviour.

1.8.3. Are the associations between fathers' antisocial behaviour and children's behaviour explained by the fathers' absence from the home?

It is possible that any associations between fathers' antisocial behaviour and the child's aggressiveness may be because antisocial fathers are more likely to be absent fathers. In the final empirical chapter I aim to investigate whether a fathers' absence from the family home can be predicted by his antisocial behaviour and whether the fathers' absence can predict toddler aggressiveness and infant precursors to aggressiveness. Crucially, I aim to discover whether the fathers' absence predicts the child's aggressive behaviour when parents' antisocial behaviour is taken into account.

Table 1.1. Methods and measures used in previous research examining the relationship between parental antisocial behaviour and child behaviour.

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Aaron & Dallaire (2010)	Children-at-risk program	857 (initial) 670 (follow-up)	10-14 yrs (M = 12.36) 12-16 yrs (M = 14.36)	Both	Both	2	Delinquent behaviours (self-report and parent report).	Child report of family environment (organisation, cohesion, control and conflict). Sibling delinquency.	–	Parental incarceration (81% mothers but due to single parent families)	–	Socio-demographic risk factors, parental absence and family victimisation, child report of family environment and substance abuse
Bailey et al. (2009)	SSDP & TIP	808 (initial) 258 (Participated in G3)	G1 -, G2 10-27 (1-3 yearly), G3 6+	Both	Both	3	Substance use, CBCL (teacher reported)	–	CBCL in adolescence G2	–	–	Socio-demographic risk factors, substance abuse, parental monitoring and harsh discipline
Besemer (2011)	Cambridge Study in Delinquent Development (CSDD) and Transfive	CSDD 411 and Transfive 198	Not given	Both	Both	CSDD - 2, Transfive - 5	Official reports of criminal offences and convictions	–	–	Parental imprisonment	Violent criminal offences	–

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Besemer & Farrington (2012)	CSDD	411 (initial sample) 782 sons and 402 daughters	G1 8-9 yrs (initial) - 50 yrs, G2 no age given	Male	Father	2	Criminal convictions	-	-	Criminal convictions	-	-
Blazei et al. (2008)	Minnesota twin family study (MTFS)	1626 (initial) cohort 1 732 twin pairs, cohort 2 606 twin pairs	Cohort 1 11 yrs, cohort 2 17 yrs	Both	Both	2	Conduct Disorder (CD), Oppositional Defiant Disorder (ODD) and Adult Antisocial Behaviour (AAB) DSM-III-R diagnoses (child and mother report), Delinquent Behaviour Inventory (DBI; child report)	-	family history-research diagnostic criteria and family informant schedule and criteria for fathers (mother reported) mother AAB	-	-	-
Calley (2012)	2 year follow up after release from residential treatment for juvenile offending	166	Between 14 and 21 yrs	Both	Both	2	Recidivism (criminal offence after treatment)	-	-	Parental criminal history	-	Parental support during treatment, termination of parental rights, involvement in child welfare system

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Capaldi et al. (2012)	Oregon Youth Study (OYS)	206 (initial) G2 103 with 185 children (G3)	G2 9-32yrs, G3 21 months (no age given for G1)	G2 male, G3 both	Both	3	G2 antisocial behaviour and criminal convictions. G3 externalising and internalising behaviour measured using CBCL (mean report from father and mother).	–	G1 Antisocial behaviour (self-report). G2 mean antisocial constructs in late childhood and mothers' and fathers' national youth study delinquency scale	G1 Official arrest records. G2 official court records for mothers and fathers	–	G1and G2 depressive symptoms. G2 father contact with child
Cohen et al. (1998)	Random cohort born between 1965 and 1975 in 2 counties in New York	977 (initial) 776 participated	Parent (mean) 7, child 2	Both	Mother	2	Child problem behaviour – difficult behaviour (anger, persistence, negative mood and attention seeking) and inhibited behaviour (shy and fearful)	–	Child problem behaviour – difficult behaviour and inhibited behaviour	–	–	–
Coley et al. (2011)	Three-City Study (Embedded Developmental Study; EDS)	2402 in whole sample 726 in sub-sample	2-4yrs	Both	Both	2	Externalising and Internalising scales of the CBCL	–	Engagement in antisocial behaviours (self-report)	Participation in illegal activities in the previous 12 months (self-report)	–	Socio-demographic risk factors. Parenting beliefs and practices and specific parenting behaviours

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Conger et al. (2003)	Family transitions project	558 (initial) 75 (eligible)	Mean = 2.4 yrs	Both	G1 Mother, G2& G3 Both	3	Aggressive and antisocial actions during task & CBCL (parent report)	–	Problem behaviour (angry and aggressive behaviours) during a sibling interaction task in adolescence and parent report	–	–	Socio-demographic risk factors, parental hostility and coercion
Davies et al. (2012)	A high-risk sample from a moderately sized metropolitan area in the Northeast (USA)	201	2 yrs	Both	Mother	2	ODD, ADHD subscales from the CBCL, emotional reactivity to parental conflict using the IDI	Cortisol samples	Maternal antisocial personality disorder assessed using the Computerised Diagnostic Interview Schedule IV (CDIS-IV)	–	Interpartner aggression	Socio-demographic risk factors, parent child interaction, diminished maternal responsiveness
Dodge et al. (1990)	Multi-Site Child Development Project	309	4 yrs	Both	Mother	2	Aggressive behaviour subscale CBCL (teacher report) peer nominations of aggressive behaviour	Social information processing assessed using child's recall of vignettes	–	–	Physical abuse towards the child	–

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Farrington (2000)	Cambridge study in delinquent development	411 (initial) 378 (still alive age 32)	8 - 32 yrs	Male	Both	2	Conduct disorder and antisocial personality disorder (DSM-III-R) - ASP scale. Convictions	Poor relationship with female partner and parents & employment	–	Conviction (parent and sibling)	Convictions for violent offences	Socio-demographic risk factors, poor child rearing and poor supervision
Farrington et al. (2001)	Pittsburgh Youth Study	1517 (initial) & 932 (arrest info available)	6yrs, 9yrs & 12yrs followed every 6mths for 3 yrs, then yearly	Male	Both	3	Arrests and court convictions (excluding drunkenness, traffic and status offenses)	–	–	Arrests and court convictions in parents and other family members	–	–
Farrington et al. (2009)	CSDD	411 (365 participated at 48yrs)	G2 8-48 yrs (G1 and G3 ages not given)	Male	Both	3	Criminal convictions	–	–	Criminal convictions	–	–
Ferguson (1952)	Longitudinal study of school leaving boys at 14yrs (1947)	1349, 165 convicted	8-18 yrs	Male	Both	2	Criminal convictions	–	–	Conviction (parent and sibling)	–	Socio-demographic risk factors

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Foley et al. (2001)	Virginia Twin Study of Adolescent Behavioral Development (VTSABD)	1412 (initial) 850	Juvenile (no more information given)	Both	Both	2	CD, Major Depressive Disorder (MDD), ODD, overanxious disorder, Separation Anxiety Disorder (SAD) assessed using Child and Adolescent Psychiatric Assessment (CAPA)	–	Parent version of the CAPA, lifetime history of psychiatric disorder measured by structured clinical interview and diagnostic interview schedule for DSM-III-R	–	–	–
Frick et al. (1992)	3 year longitudinal study	177	mean = 9yrs 6mths	Male	Both	2	Clinical diagnosis of disruptive behaviour disorders (DISC & DSM-III-R)	–	Clinical diagnosis of ASPD (DSM-III-R)	–	–	Parental Depression (DSM-III-R), substance abuse (DSM-III-R), maternal parenting
Herndon & lacono (2005)	MTFS	1626 (see above)	Cohort 1 11 yrs Cohort 2 17 yrs	Both	Both	2	Attention Deficit Hyperactivity Disorder (ADHD), CD, ODD, MDD, SAD, AAB (where appropriate) and substance abuse diagnosed through structured clinical interviews	–	AAB diagnosed through structured clinical interviews	–	–	–

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Hjalmarsson & Lindquist (2011)	Stockholm Birth Cohort Study (SBCS)	15117	From birth	Both	Father		Official criminal record	–	–	Official criminal record	Criminal record for a violent offence	–
Huesmann et al. (1984)	longitudinal intergenerational study (22yrs)	870 (initial) 82 (sub-sample with children)	8yrs (G2) 6-12yrs (G3)	Both	Both	3	Peer-nomination index of aggression	IQ score	Peer-nomination index of aggression (childhood). Self, spouse ratings of aggression (age 30)	Citations of offenses (New York State Divisions of Criminal Justice)	–	Severity of punishment reported for specific misdeeds
Jaffee et al. (2002)	E-Risk twin study	1210 (initial) 1116 (5yr old visit)	5 yrs	Both	Mother		Externalising and internalising CBCL (mean mothers and teachers report)	–	–	–	Adult domestic violence assessed using the conflict tactics scale	–
Jaffee et al. (2003)	E-Risk	1210 (initial) 1116 (5yr old visit)	5yrs	Both	Both	2	CBCL (delinquent and aggressive behaviour scales) (Mother and Teacher report). CD & ODD (DSM-IV)	–	ASPD assessed using the Young Adult Behavior Checklist (YABC)t & DSM-IV (self and partner report)	–	–	Father presence and Father marital status

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Jaffee et al. (2004)	E-Risk	1203 (initial) 1116 (5yr old visit)	5 yrs and 7 yrs	Both	Both	2	Antisocial behaviour assessed using CBCL together with the DSM-IV criteria for CD and ODD.	–	Antisocial behaviour assessed using the YABC and the Diagnostic Interview Schedule	–	Child physical maltreatment using the clinical interview protocol from the multi-site study (mother report)	–
Kendler et al. (1997)	National Comorbidity Survey (NCS)	8098	15-54 yrs	Both	Both	2	Major Depression (MD), Generalised Anxiety Disorder (GAD), Antisocial Personality (ASP), and substance abuse using the Composite International Diagnostic Interview (CIDI)	–	Family History Research Diagnostic Criteria (child report) for MD, ASP and substance abuse, for GAD used a measure adopted from the Virginia twin studies.	–	–	–

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Kerr et al. (2009)	Oregon Youth study	206 (annual participation >94%)	9-33yrs (G2) 3 & 7 yrs (G3)	Both	Fathers	3	Toddler Behavior assessment (parent report) CBCL (parent report)	–	CBCL & Peer Questionnaire (parent and teacher report). Elliott Delinquency Scale, child interview and activity preferences Questionnaire (child self-report)	Official arrest records	–	Positive adjustment in adolescence (academic skills, peer relations and self-esteem) (G2), Constructive parenting, family activities checklist

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Kim et al. (2009)	OYS	206 (initial) 122 for G3 assessments (230 G3 children)	G2 9-21 yrs G3 18-21 months	G2 Male G3 both	G1 Mothers G2 Both (male participant and his partner)	3	G2 externalising behaviour measured with the CBCL (parent report). G3 activity level and anger subscales of the Toddler Behaviour Assessment Questionnaire (TBAQ), the activity level, anger, soothability, impulsivity and inhibitory control subscale from the Child Behaviour Questionnaire (CBQ) and the aggressive behaviour and destructive behaviour subscales from the CBCL (as well as internalising subscales).	–	G1 externalising behaviour (self-report). G2 father's externalising behaviour measured with CBCL (parent report) and mother's externalising behaviour measured with the Elliot Behaviour Checklist (self-report) and the young adult behaviour checklist (YABC; partner report)	G1 and G2 official arrest records	–	G1 and G2 Internalising

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Kinner et al. (2007)	MUSP longitudinal study	2399 (sub-group with complete data on father criminal history)	3-5days, 6mths, 5yrs, 14yrs	Both	Both	2	Youth self-report and CBCL. Substance use (alcohol and tobacco)	–	–	Paternal imprisonment	–	Socio-demographic risk factors, maternal mental health, relationship difficulties between mother and partner. Parental monitoring, maternal alcohol and tobacco consumption
McCord (1991)	Longitudinal study for prevention of delinquency	232 families 253 boys	5-13 yrs (M=10.5)	Male	Both	2	Criminal records	–	Aggressive behaviour (yelling, throwing or breaking things or hitting people)	criminal record - Type 1 index crime (theft, breaking and entering, assault, murder, rape or attempted murder or rape)	–	Father's absence, maternal attitude, confidence, restrictiveness, supervision and discipline, substance abuse

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Mednick et al. (1984)	Adoptions between 1927 and 1947	14,427	Not reported	Both	Both	2	Court convictions (violent and property crimes)	–	–	Court Convictions in both biological and adoptive parents.	–	–
Murray & Farrington (2005)	CSDD	411	8-32yrs	Male	Both	2	Official criminal history (criminal record office, London). Self-reported delinquency and violence. Antisocial personality (interview)	Poor life success (interview) e.g. accommodation, cohabitation, children, employment	–	Parental convictions and imprisonments (criminal record office, London)	–	Separation from child for reasons other than imprisonment e.g. illness.
Nijhof et al. (2009)	Effects of risk factors on future delinquent behaviours of young offenders	577	8-14yrs	Both	Both	2	Police records – seriousness of initial offence and subsequent offences (within 18 months)	–	–	Police records – frequency and seriousness of offences was recorded	–	–
Owen et al. (2006)	African American women and their children	139	8-12 yrs	Both	Mother	2	Externalising and internalising CBCL (parent report) and Youth Self Report (YSR; child report)	Cognitive impairment assessed using the Peabody Picture Vocabulary Test III	–	–	Interpartner violence assessed using the Index of Spouse Abuse (ISA)	Cognitive impairment

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Pfiffner et al. (2001)	School aged children who were referrals to a clinic for child attention and disruptive problems in Irvine, California	161	5-11yrs	Both	Both	2	CD, ODD, ADHD assessed using the Diagnostic interview Schedule for Children (DISC), the Child Symptom Inventory (CSI; parent and teacher report) and Self-Report of Antisocial Behaviour (SRA; child report)	–	Antisocial Personality Disorder (APD) symptoms assessed using the structured clinical interview for the DSM-IV (self-report or partner report)	–	–	Socio-demographic risk factors and Father absence
Putkonen et al. (2002)	Offspring of homicide recidivists	36 offenders with 11 children and 220 controls	18-37 yrs	Both	Both (each child only had one offender parent)	2	Criminal records obtained by the criminal records office and prison register	–	–	–	Homicide offenders who had committed 2 or more homicides	–
Smith & Farrington (2004)	CSDD	411 (initial), 178 (father with child)	8-32yrs (G2), 3-15yrs (G3)	Male	Both	3	conduct problems (10 behaviours), criminal behaviours (criminal record office, London)	–	Antisocial Personality Disorder (DSM-IIIIR)	Parental convictions and imprisonments (criminal record office, London)	–	Parenting attitudes, involvement, supervision and family conflict

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Ramakers et al. (2010)	Transfivive	198 original participants which led to a study of 1500 father son dyads	Not given	Male	Father	5	Criminal records documentation for all participants born after 1916 and juvenile delinquency (criminal behaviour before age 17)	–	–	Criminal records and juvenile delinquency	–	Occupational status, educational level and intelligence, socio-demographic risk factors
Renk et al. (1999)		Study 1 - 126 Parents (90 mothers, 36 fathers) Study 2 - 150 father-mother-adolescent triads	Study 1 - 2-18yrs Study 2 - 11-18yrs	Both	Both	2	Emotional and behavioural problems (age appropriate CBCL)	–	–	–	–	Psychological Symptoms (Study 1 - BSI, Study 2 - BDI)

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Robins et al. (1975)	A normal sample of black children of both sexes in the USA	223 (initial) 76 men with 145 children older than 18 years	18 yrs and older	Both	Both	3	Delinquency (being known to the juvenile court or to the police before the age of 17 for a non-traffic offence)	–	–	Delinquency (being known to the juvenile court or to the police before the age of 17 for a non-traffic offence) and adult arrests.	–	Socio-demographic risk factors
Roettger & Swisher (2011)	Add Health	20700 (initial), 6602 cases for delinquency and 6217 for arrest	12-18yrs (initial) to 31yrs	Both	Both	2	Offending (child report) and delinquency (violent and non-violent acts that may lead to arrest and incarceration during the past 12 months; self-report)	–	–	Father's incarceration (child report)	–	Socio-demographic risk factors, family process, parent characteristics and social attachments
Thorn-berry et al. (2003)	RYDS	1,00 (initial) 296 (eligible age of child) 220 (due to missing data)	4+ years	Both	Both	3	Early antisocial behaviour (CBCL)	–	Antisocial behaviour in adolescence (minor offenses to serious crimes) (G2)	–	–	Socio-demographic risk factors, parental attitudes and consistency of discipline

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Tompsett & Toro (2010)	Homeless adolescents in a large Midwestern city (USA)	252 homeless adolescents and 149 housed adolescents. 331 in the follow up	13-17yrs (M=15.4 0 initial) 18-26 (M=21.6 9 at follow up)	Both	Both	2	Association with deviant peers measured with the Social Network Interview (SNI; self-report), Overt and covert antisocial behaviour assessed with the DISC and the adult diagnostic interview schedule.	–	Parental deviance assessed with SNI (child report)	–	–	Parental monitoring
Van de Rakt et al. (2008)	Criminal Career and Life-course Study (CCLS)	4,846 fathers, 8,085 children	12-39yrs	Both	Father	2	Criminal convictions (criminal record office, Netherlands)	–	–	Criminal convictions (criminal record office, Netherlands) Classified into: Violent, property, vandalism, drug, firearms and other	–	–
Van de Rakt et al. (2009)	CCLS	3027 (6952 children) and 447 controls (1066 children)	12 yrs +	Both	Both	2	Criminal convictions (criminal record office, Netherlands)	–	–	Criminal convictions (criminal record office, Netherlands)	–	–

Author	Study sample	No.	Child Age	Child Sex	Mother / Father	No. Generations	Problem behaviour in child	Other child variable	Parent antisocial behaviour	Parent criminal record	Parent physical aggression	Other
Van de Rakt et al. (2012)	CCLS	4615 (initial) 2667 fathers with 5981 children over 18yrs	18 yrs +	Both	Father	2	Criminal convictions (criminal record office, Netherlands)	–	–	Criminal convictions (criminal record office, Netherlands) and imprisonment	–	Socio-demographic risk factors, father's substance abuse
Van Meurs et al. (2009)	Zuid-Holland Study	2600 (initial) 1365 with 424 children (follow up at time 7)	G1 4-16 yrs (initial) 27-40 yrs (follow up) G2 6yrs +	Both			Externalising and internalising CBCL	–	Externalising and internalising CBCL	–	–	–

1.9. Glossary of terms used in this thesis

Since antisocial behaviour is an area in which many different terms are used in order to convey similar constructs, the following terms and explanations thereof are those used throughout the subsequent chapters of this thesis.

Antisocial Behaviour. Includes all forms and types of antisocial behaviour including criminal behaviour and non-criminal antisocial acts, violent behaviour and non-violent antisocial behaviours.

Criminal behaviour. Any behaviour for which the individual has been formally arrested, charged or prosecuted by a law enforcement agency.

Antisocial Personality Disorder Symptoms (ASPD symptoms). Behaviours described by the DSM IV as symptoms of antisocial personality disorder and conduct disorder.

Non-Violent Antisocial Symptoms. Specifically relates to those behaviours that are considered to be antisocial, but which are not related to use of physical aggression. For example: theft, vandalism, deceit, impulsivity, irritability or arrests for non-violent crimes.

Physical Aggressiveness. Any action that may cause physical harm to another individual, including hitting, kicking, scratching, biting or using or threatening to use a weapon etc. Also

referred to as *violent* in the context of physical aggressiveness which leads to criminal arrests, charges or prosecutions.

Physical Fights / Fighting. Interpersonal physical aggression towards any other individual as a result of a dispute, including physical aggression used against peers in late childhood and adolescence.

Chapter 2.

The Cardiff Child Development Study Methodology

2.1. Aims of the Chapter

The present chapter outlines the methodology used by the Cardiff Child Development Study (CCDS), which is the source of data for all the subsequent chapters. This includes a brief description of the general design, the participants, demographic characteristics and procedures used in the CCDS.

2.2. Design

The CCDS is a prospective longitudinal study of a nationally representative sample of mothers and their firstborn children. Mothers were recruited and interviewed prior to the birth of their first child. Subsequent waves of data collection occurred when the child was 6, 12, 18 and 33 months of age. The study is currently assessing the children between 6.5 years and 7.5 years of age (Wave 6), although the data for this work were taken from the first 5 waves. The children participated in regular observed assessments; both in their own homes and in the laboratory. The parents participated in interview and questionnaire measures in which they reported on their own and their child's behaviour. The CCDS is funded by the Medical Research Council (MRC) and ethical approval was obtained for the procedures from the NHS Multi-Centre Research Ethics Committee and the Cardiff University School of Psychology Research Ethics Committee.

2.3. Participants

The CCDS participants are a volunteer sample of parents and their firstborn children, who were living in South Wales at the time of their first child's birth. Three hundred and thirty-two pregnant women and their partners were recruited between November 2005 and June 2008 from National Health Service (NHS) antenatal clinics in hospitals and GP surgeries in two Health Care Trusts in Wales, United Kingdom.

Of the 332 families enrolled in the study information about the father was obtained for 326 (98.2%) families. Of the remaining families 2 (0.6%) mothers were in same sex partnerships and had no contact with the biological father, 1 (0.3%) was a single mother who was not in contact with the biological father and 3 (0.9%) fathers refused to participate. Fathers reported on their own behaviour either by questionnaire or interview for 286 (87.7%) families. In the remaining families the mother reported on the father's behaviour.

2.4. Demographic characteristics of the sample

Demographic information about the participants was obtained during the antenatal assessment by interview and questionnaire. The participants recruited for the CCDS were representative of the UK population, and did not differ significantly from the nationally representative sample in the Millennium Cohort Study (K. Kiernan, personal communication, April 2, 2009). Table 2.1 provides the demographic information for both the full sample (N=332) and the thesis sample (N=326). The two samples did not differ significantly on any demographic characteristic.

Table 2.1. Demographic characteristics for the full sample and my thesis sample.

		Full Sample (N=332)	Thesis Sample (N=326)
Age at the child's birth (Mean)	Mother	28.15 (Range 16.09-42.99)	28.12 (Range 16.09-42.99)
	Father	30.68 (Range 15.62-56.67)	30.81 (Range 15.62-56.67)
Relationship Status at the child's birth (Percentage)	Married	50.3%	51.2%
	Cohabiting	33.7%	32.8%
	In a relationship but not living together	6.9%	6.4%
Social Class (Percentage)	Single	9.6%	9.5%
	Middle Class	50.9%	50.6%
	Working Class	49.1%	49.4%
Mother's Ethnicity (Percentage)	British	92.7%	92.9%
	Non-British	7.3%	7.1%
Fathers' Ethnicity (Percentage)	British	93.1%	93.1%
	Non-British	6.9%	6.9%
Mother's Highest Educational Qualifications (Percentage)	Fewer than 5 A*-C GCSE passes	21.7%	21.5%
	Undergraduate degree	28.0%	28.2%
	Postgraduate degree	24.7%	24.9%
Father's Highest Educational Qualifications (Percentage)	Fewer than 5 A*-C GCSE passes	24.5%	24.5%
	Undergraduate degree	22.8%	22.8%
	Postgraduate degree	15.2%	15.2%
Child Gender (Percentage)	Male	56.7%	56.3%
	Female	43.3%	43.7%

2.5. Procedures

2.5.1. Wave 1: Prenatal Home Visit

At Wave 1 CCDS administrative staff made appointments for two research assistants to visit the families whilst the mother was in her third trimester of pregnancy. Participants gave informed consent for the interview to take place and for the interview to be recorded using audio recording equipment. Mothers and fathers were interviewed at the same time in separate rooms. If the mother and father could not be interviewed at the same time then attempts were made to interview each parent separately. The interview included a psychiatric assessment of symptoms of mood disorder as well as information about the participants' experience of conflict in the workplace, the participants' social network and socio-demographic information. Following the interview questionnaire batteries were administered to both parents, which included measures on family structure, health, lifestyle, life events, personality, relationships and attitudes towards having a baby. Parents completed these questionnaires in their own time and posted them back to the project

2.5.2. Wave 2: Early Infancy Home Visit

Participants were contacted when the infant was 6 months old (mean age was 6.64 months) to make an appointment for a home visit. One or two research assistants visited the home. The home visit took approximately two hours and during that time the infant was given a 25 minute assessment and the mothers were interviewed. During the 25 minute child assessment various social, emotional and cognitive tasks were administered, including several parent-child interaction tasks. Mothers were again interviewed about their mental health as well as the birth of their child and family circumstances. A questionnaire battery was given to the infant's mother, father and, if possible, another significant person in the child's life (e.g. a family member or friend). Mothers' and fathers' questionnaires included questions about

family structure, health, lifestyle, life events, relationships and their infant's behaviour. The significant other person was only asked to report on the infant's behaviour.

2.5.3. Wave 3: Late Infancy Laboratory Visit

Participants were contacted when the child was approaching his/her first birthday; the mean age at the Wave 3 assessment was 12.84 months. Two to four families were invited to come to the laboratory to attend a 'birthday party' in which the laboratory had been decorated with balloons and a 'teddy bear's picnic' was simulated. When the families arrived at the laboratory they were each assessed individually in separate testing rooms. These assessments included several social, emotional and cognitive tasks. During the individual assessments the caregiver who accompanied the child to the laboratory (90% mothers) completed a questionnaire battery about the child's behaviour. After the individual assessments the families were all taken into the 'birthday party room'. A researcher dressed as the 'birthday lady' in a princess costume would administer the 'teddy bear's picnic' in which a researcher dressed as a teddy bear would enter the room to join in the play food picnic. The families were then left alone for a 20 minute free play session, where the parents were instructed to act as they would normally at a mother and toddler group.

2.5.4. Wave 4: Early Toddler Home Visit

Appointments were made for researchers to visit the participants' homes again when the child was 18 months old; the mean age at the Wave 4 assessment was 20.59 months. The home visits lasted approximately 2 hours. Mothers were given a brief interview about their family circumstances. Then parent-toddler interaction tasks were administered. In the second hour the parents were asked to invite a friend to the house who had a child of a similar age to their

child. The parents and a significant other person in the child's life were given a questionnaire battery to complete and return to the project in a freepost envelope. Mothers' and fathers' questionnaires included questions about family structure, health, lifestyle, life events, relationships and their toddler's behaviour. Questionnaires completed by the significant third person contained only questions about the toddler's behaviour.

2.5.5. Wave 5: Late Toddler Home Visit

The families were again invited to the laboratory when the children were 33 months old; the mean age at Wave 5 was 33.60. The procedure for Wave 5 was very similar to that of Wave 3. Two to four families were invited to the laboratory at the same time. The children were assessed individually in individual testing rooms, in which the children completed several social and cognitive tasks. The families were then taken to the 'birthday party room' where the same 'teddy bear's picnic' scenario was enacted, followed by a 20 minute free play session. Mothers, fathers and a significant other person were again asked to complete questionnaire batteries. These questionnaires were given to the families prior to the laboratory visit and the families were asked to bring them with them when they came to the visit or post them back to the project after the laboratory visit.

2.6. Measures

2.6.1. Parents' Criminal Behaviour

Both partners reported on their own and their partner's arrest history. As in previous research (Caspi et al., 2001) both partners showed good agreement in reporting each other's arrest history, $K = .76, p < .001$. Therefore, when self-report data were missing (61 fathers and 2 mothers), the partner's report was used. Arrest history was categorised into *no arrest*, *non-violent arrest* and *violent arrest*. Non-violent offences included crimes such as *shop lifting*, *vandalism*, *trespass*, *drug and substance related offences* and *driving offences*. Violent arrests included *Actual Bodily Harm (ABH)*, *Grievous Bodily Harm (GBH)*, *common assault*, *armed robbery*, and *theft from a person (with or without a weapon)*.

2.6.2. Parents' Antisocial Behaviour

2.6.2.1. Parents' Antisocial Personality Disorder Symptoms (ASPD symptoms).

The participants reported on their own current antisocial personality symptoms ($N = 318$ women and 260 men). Items were taken from the screening questionnaire of the International Personality Disorder Examination (IPDE; Loranger et al., 1994) and were included in a questionnaire entitled 'What I am like now'. The IPDE has previously been used in community samples including a national study in Australia (Lewin, Slade, Andrews, Carr & Hornabrook, 2005). The subset of items that measured symptoms of the DSM-IV definition of Antisocial Personality Disorder (ASPD) were combined to form a composite ASPD symptom score. These items were *deceitfulness*, *impulsivity*, *irritability*, *aggressiveness*, *physical fights*, *arrests*, *recklessness*, *lack of remorse* and *failure to sustain consistent work behaviour*.

Juvenile conduct problems were reported in a retrospective questionnaire entitled ‘What I Was Like When I Was Young.’. Items from the DSM-IV definition of Conduct Disorder were combined to create a composite Conduct Disorder (CD) symptom score. These items were *stealing, deceitfulness, destruction of another’s property, truancy, defiance, anger and physical fighting*.

For both the current and juvenile behaviours, participants scored 0 when they reported that the item was *not true*, 1 when *somewhat true* and 2 when *certainly true*. Because the DSM-IV definition for ASPD states that the individual must have a history of juvenile conduct disorder symptoms to be diagnosed with ASPD, and the scores of both scales were strongly correlated ($r=.57, p<.001$), a composite antisocial personality symptom score was created. The resulting scale had an acceptable level of internal consistency for fathers, $\alpha = .79$, and for mothers, $\alpha = .78$.

2.6.2.2. Parents’ non-violent antisocial symptoms. In order to measure non-violent symptoms alone the physically aggressive items from the above scale were removed. The two physically aggressive items were “I lose my temper and get into physical fights” and “[when I was young] I fought a lot”. The composite measure of non-violent ASPD symptoms was created by summing the scores from both scales. The resulting scale achieved an acceptable level of internal consistency for fathers, $\alpha = .74$, and for mothers, $\alpha = .76$.

Where self-report data for this measure were not available for a participant the score was imputed from the individual’s history of arrest, which was obtained from the participant’s partner. The score was imputed using unstandardized predicted scores from an SPSS regression analysis.

2.6.3. Parents' Physical Aggressiveness

Any report of fathers' and mothers' physical aggression during adulthood (occurring after 18 years of age) at either Wave 1 or Wave 2 was recorded. This information was obtained from both the questionnaire measures and interview measures.

Two items from the antisocial personality symptom scale (described above) were used to assess fighting; 'I lose my temper and get into physical fights' and '[when I was young] I fought a lot'. Evidence of physical fighting was recorded as *present* or *not present*. Two of the male partners did not record that they ever participated in physical fights; however, they had been arrested for fighting and thus were assigned a score of *present* for evidence of physical fights.

At both Wave 1 and Wave 2 the participants were asked to report on their partners' and their own criminal activity (see Chapter 3). If the participant or his or her partner had reported that he or she had been arrested for a violent offence over the age of 18 then the participant was scored as reporting evidence of physical aggression.

During the Wave 1 interview both the fathers and mothers were asked questions about their employment and work life part of the Adult Personality Functioning Assessment (APFA; Hill, Fudge, Rutter and Pickles, 1989). A set of structured questions pertaining to the participant's experience of conflict, anger and aggression at work were used. Any reports of physical aggression within or outside the workplace during the interview were scored as evidence of physical aggression.

In a couple of cases the parent was under 18 at the time when his or her child was born, for these cases the current use of physical aggressive behaviour was used even though it was prior to 18 years of age.

2.6.4. Sociodemographic Risk Factors

The family's overall sociodemographic risk index items (described in Hay et al., 2011) were based on the female partner's information. Dichotomous variables were created for social class (0= *middle class*, 1= *working class*), educational attainment (0= *more than 5 GCSE grades A*- C or equivalent*, 1= *fewer than 5 GCSE grades A*- C*), stable partnership with the baby's father (0= *no stable partnership*, 1= *stable partnership*), marital status (0= *married*, 1= *not married*) and mother's age at entry into parenthood (0= *20 years of age or older*, 1= *19 years of age or younger*). Mother's age at the child's birth was significantly correlated with the father's age, $r(314) = .74, p < .001$. A composite sociodemographic risk index was created by summing these five scores. The composite score showed an acceptable level of internal consistency $\alpha = .74$. Although these social risk variables were based on the woman's socio-demographic information, we found a positive association between the social risk index and men's poor educational attainment (fewer than 5 GCSE grades A*- C), $r = .44, p < .001$, and a negative association between men's age at entry into parenthood and the sociodemographic risk index, $r = -.60, p < .001$. Since these correlations were strong and significant the sociodemographic risk index was used as a measure of social risk for both partners.

2.6.5. Age-appropriate measurement of children's aggressive behaviour

Children's physical aggressiveness was measured using the infant and toddler versions of Cardiff Infant Contentiousness Scale (CICS; Hay, Perra, et al., 2010; Hay, Waters, et al., 2014), the Aggressive Conduct Problems Scale of the Child Behaviour Check List (CBCL; Achenbach & Rescorla, 2001), and the Peer Interaction Coding system ratings of observed use of bodily force against peers (PICS; Hay, Mundy, et al., 2011). Details about construction of age-appropriate variables from these scales are presented in Chapter 4.

Table 2.2. Waves and measures used in each chapter.

Chapter Number	Waves used in each chapter	Measures used in each chapter (of those described above)
3	Wave 1	Parents' violent and non-violent criminal behaviour, Parents' ASPD Symptoms, Parents' physical fighting
4	Wave 1, Wave 2, Wave 3, Wave 4, Wave 5	Parents' non-violent antisocial symptoms Parents' physical aggressiveness, Infants' and Toddlers' CICS Toddlers' CBCL aggressive conduct problems Toddlers' PICS use of bodily force
5	Wave 1, Wave 2, Wave 3, Wave 4, Wave 5	Fathers' physical aggressiveness Infants' CICS (Father absence & Toddler physical aggressiveness are described in Chapter 5)

Chapter 3.

Associations between Fathers' and Mothers' Criminal, Antisocial and Violent Behaviour

3.1. Introduction

The relationship between parents and children is preceded by the relationship between the mother and the father. It is possible that children's behaviour is affected by the overall antisocial climate of the home, not just mothers' or fathers' behaviour in isolation. Before investigating fathers' contribution to the child's behaviour it is important to understand the similarities and differences between the mothers' behaviour and the fathers' behaviour. Previous researchers have found similarities between spouses for many biological and psychological characteristics. This similarity between couples is often discussed in terms of assortative mating or assortative pairing. These characteristics range from physical characteristics such as BMI and height (Silventoinen, Kaprio, Lahelma, Viken & Rose, 2003) to psychological characteristics such as personality traits (Caspi & Herbener, 1990) and psychiatric disorders (Maes et al., 1998; Rutter & Quinton, 1984). In this chapter I will be examining similarities and differences in men and women's antisocial, criminal and violent behaviours before these couples became parents.

3.1.1. Assortative Pairing for Antisocial Behaviours and Criminality

There is reason to believe that antisocial fathers may have antisocial partners. Individuals at risk for antisocial behaviours typically begin relationships with antisocial

others in adolescence (Thornberry, Lizotte, Krohn, Farnworth, & Joon Jang, 1994; Warr, 1993). Having delinquent peers is a risk factor for antisocial and delinquent behaviour during adolescence (Kandel, 1978; Moffitt, Caspi, Rutter & Silva, 2001; Shortt, Capaldi, Dishion, Bank and Owen, 2003; Thornberry et al., 1994; Tremblay, Mâsse, Vitaro, & Dobkin, 1995; Warr, 1993). It has been suggested that peers are the primary influence for delinquency during adolescence (Aseltine, 1995). Adolescents who acquired delinquent peers at a young age were likely to still have delinquent peers five years later (Warr, 1993), and associations with delinquent peers exist into adulthood (Shortt et al., 2003). Antisocial adolescents are also likely to have romantic partners who engage in antisocial activities (Haynie, Giordano, Manning & Longmore, 2005; Shortt et al., 2003).

Investigations into adult romantic partnerships have found that individuals who engage in antisocial activities are more likely to have partners who have also engaged in antisocial behaviour (Capaldi & Crosby, 1997; Cloninger, Reich & Guze, 1975; Galbaud Du Fort, Boothroyd, Bland, Newman & Kakuma, 2002; Kim & Capaldi, 2004; Krueger, Moffitt, Caspi, Bleske & Silva, 1998). Diagnoses of Antisocial Personality Disorder (ASPD) have been shown to be more prevalent among those whose partners have also been diagnosed with ASPD than those whose partners have not (Sakai et al., 2004). Sakai and colleagues (2004) suggest that assortative mating may be greater for individuals on a life-course-persistent route to antisocial behaviour (as described by Moffitt, 1993) than those on the adolescence-limited route. Other forms of antisocial behaviour such as alcoholism and substance use have also been found to be more prevalent among the partners of those diagnosed with the same problem (Grant et al., 2007; Sakai et al., 2004).

Criminal offences are also associated in marital partners (Rowe & Farrington, 1997). The more criminal offences that the individual has committed the more likely he or she is of marrying a criminal partner, and a history of incarceration increases the risk of marrying a

criminal partner considerably more (van Schellen, Poortman & Nieuwbeerta, 2011). Having a deviant partner increases the risk of offending compared with having no partner or a non-deviant partner (Woodward, Fergusson & Horwood, 2002). It has also been found that individuals who display antisocial behaviours during adolescence are more likely to form unions with individuals who have been involved in criminal behaviour (Moffitt et al., 2001; Woodward et al., 2002). It is important to note that partners can also have a positive effect on individuals' behaviour; for example, Individuals at high risk for antisocial behaviours (those who have been raised in children's homes) who have supportive and non-deviant partners were less likely to engage in antisocial behaviours in adulthood than those who had unsupportive and deviant partners (Quinton et al., 1993).

Not only is both partners' current behaviour related, but so is their past behaviour. Those who experienced conduct disorder symptoms earlier in life are more likely to form a partnership with an individual who also had conduct disorder symptoms (Galbaud Du Fort et al., 2002; Maes, Silberg, Neale & Eaves, 2007; Quinton et al., 1993; Sakai et al., 2004). Hicks, Krueger, Iacono, McGue and Patrick (2004) found evidence of assortative mating for antisocial behaviours using a composite score of both juvenile and adult symptoms. These findings suggest that it is important to look at past and present behaviour.

Loeber and Hay (1997) suggested that there are subgroups of individuals who exhibit different forms of antisocial and criminal behaviours. Some individuals have a propensity to commit violent crimes whilst others have a propensity to commit property crimes; only a small minority will commit both property and violent crimes (Lacourse et al., 2010). Individuals who commit violent offences are more likely to be persistent offenders or adult onset offenders rather than adolescent onset offenders (Farrington, Ttofi & Coid, 2009). Therefore, it is important to understand more about assortative pairing in the use of violence separately from other antisocial behaviours

Investigations into assortative mating for violent behaviours have mainly been concerned with aggression occurring between partners. This research suggests that one partner's use of physical aggression within the relationship is associated with the other partner's use of physical aggression (Kim & Capaldi, 2004; Langer, Lawrence & Barry, 2008; Marshall, Jones & Feinberg, 2011). However, there is very little research investigating the use of violence outside of the relationship. Frisell, Pawitan, Långström and Lichtenstein (2012) found that convictions for violent crimes were significantly associated across partners. However, in Frisell and colleagues' (2011) study, assortative mating was treated as a control variable. Additionally, they did not look at non-criminal violent behaviour, which is important because convictions only show a small percentage of the violent behaviours that take place. Therefore, it is necessary to focus on the participant's experience of physical fights as well as their criminal history of violence.

3.1.2. Objectives

Past findings would suggest that couples expecting their first child might be similar in their history of antisocial behaviour and violence. The aim of this chapter was to investigate the associations between partners' antisocial and violent behaviour. Couples enrolled in the Cardiff Child Development Study reported on their criminal history, antisocial personality symptoms and experience of physical fights (either currently or in the past). Two research questions were asked:

- (1) Do men and women differ in their criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness?

(2) Are there significant associations between partners' rates of criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness, which are not explained by measures of the couple's environment?

3.2. Method

3.2.1. Participants

The participants were recruited for the CCDS from NHS antenatal clinics and GP surgeries in the South Wales (UK) area. Of the 326 families described in Chapter 2 in which information about the father was available, 321 families provided questionnaire reports of the fathers' behaviour. The 5 remaining families who participated in the interview assessment at Wave 1 but did not complete questionnaires are not included in the analyses undertaken for this chapter.

3.2.2. Procedures

Whilst the women were in their third trimester of pregnancy both they and their partners reported on their family structure, health, lifestyle, life events, personality traits, personal relationships and attitudes towards having a baby. Data from the life events and personality measures provided information about each parents' criminal history and symptoms of antisocial personality disorder.

3.2.3. Measures

For more detailed descriptions about the study design see Chapter 2.

3.2.3.1. Criminal behaviour. Both partners reported on their own and their partner's arrest history. In cases where the participant had not reported on their own arrest history the partner's report was used. Individuals were assigned to one of three groups for arrest history; *never arrested, arrested for a non-violent offence, and arrested for a violent offence*. Two dummy variables were created for history of arrest. The first examined differences between

no arrest (0) and *non-violent offences* (1), the second differences between *no arrest* (0) and *violent offences* (1).

3.2.3.2. Antisocial Personality Disorder symptoms (ASPD symptoms). Both partners reported on their own antisocial personality disorder symptoms. Items were included in questionnaires entitled ‘What I am like now’ and ‘What I was like when I was young’. Items from the ‘What I am like now’ questionnaire were taken from the screening questionnaire for the International Personality Disorder Examination (IPDE; Loranger et al., 1994). In this study only items that measured symptoms from the DSM-IV definition of Antisocial Personality Disorder were used. Items from the ‘What I was like when I was young’ questionnaire were taken from the DSM-IV definition of Conduct Disorder. A composite score was created using the items from both of these questionnaires.

3.2.3.3. Physical Fights. Both partners reported on their own physical fights. Fighting was assessed using two items from the ASPD symptoms scale; ‘I lose my temper and get into physical fights’ and ‘[when I was young] I fought a lot’. Those individuals who had answered positively to either of these two questions scored 1 for fighting and these individuals who answered negatively to these questions scored 0.

3.2.3.4. Sociodemographic risk factors. Sociodemographic risk factors were assessed using the female partners’ information. Dichotomous variables were created for social class, educational attainment, stable partnership with the baby’s father, marital status, and female partner’s age at entry into parenthood. These items were summed to create the sociodemographic risk factors score. As described in chapter 2, measures of the male partner’s educational attainment and age at the study child’s birth correlated with the mother’s sociodemographic risk factors. This measure was therefore considered to be an appropriate measure of both partners’ sociodemographic risk.

3.3. Results

Univariate correlations between the variables used in this chapter and all other chapters can be found in Table A in the Appendix. Table 3.1 shows the associations between the measures of antisocial behaviour within individuals. ASPD symptoms and physical fights were associated with non-violent and violent criminal behaviour in both men and women.

Table 3.1. Correlations within individuals for measures of antisocial behaviour.

		Non-Violent Arrest	Violent Arrest
ASPD symptoms	Women	.50*	.34*
	Men	.43*	.34*
Physical fights	Women	.27*	.25*
	Men	.20*	.30*

* $p < .001$

3.3.1. Differences in partners' criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness

3.3.1.1. History of arrest. Twenty-eight women (8.7%) and 89 men (27.7%) had been arrested prior to the pregnancy. Twenty-two (6.9%) women and 71 (22.1%) men had been arrested for non-violent offences. Six (1.87%) women and 18 (5.61%) men had been arrested for violent offences. Men were more likely to commit both non-violent offences and violent offences than women were, $\chi^2(1) = 26.06, p < .001$ and $\chi^2(1) = 42.77, p < .001$ respectively.

3.3.1.2. Symptoms of ASPD. The mean ASPD symptom score for women was 4.37 (SD=4.02), and the mean score for men was 6.33 (SD=4.56). Men had higher ASPD symptom scores than women, $t(257) = -8.53, p < .001$.

3.3.1.3. Fighting. Of those who reported on their experience of physical fights, 76 (23.90%) women and 95 (36.54%) men reported that they fought at some time in their lives. No difference was found between men and women's lifetime participation in physical fights, ($\chi^2 (1) = 1.56, p = .21$).

3.3.2. Associations between partners' criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness

3.3.2.1. History of arrest. As shown in Figure 3.1 the majority of women and men who had never been arrested had partners who had never been arrested. However, women were slightly more likely than men to have a partner who had been arrested. The majority of women arrested for non-violent offences had partners who had been arrested. However, the majority of men arrested for a non-violent offence had partners who had not been arrested. Women's and men's non-violent arrest history were associated, $K = .23, p < .001$.

Figure 3.1 shows that those individuals arrested for violent offences were the most likely to have a partner who had been arrested. All women who had been arrested for a violent offence had a partner who had been arrested, the majority of whom had also been arrested for a violent offence. Nearly half of the men who had been arrested for a violent offence had a partner who had been arrested and half of those partners had also been arrested for violence. The association between women's and men's violent offences was significant, $K = .31, p < .001$. These associations indicate that partners are more likely to display criminal behaviours if their partner also displays criminal behaviours.

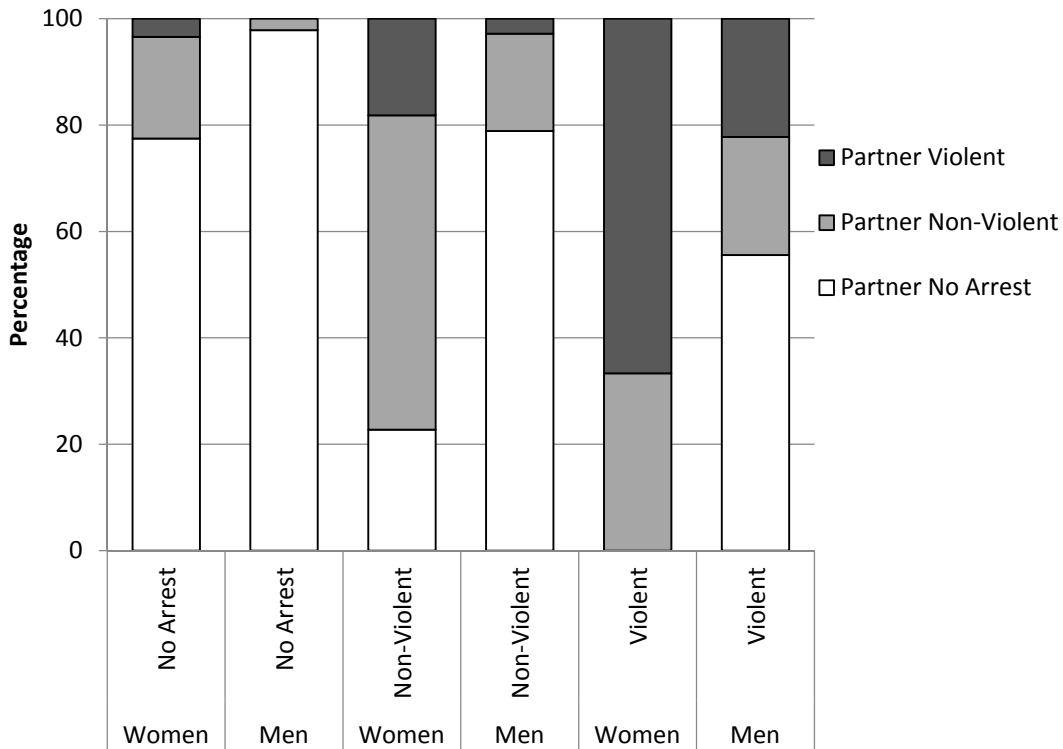


Figure 3.1. Percentages of no arrest, arrest for non-violent offences and violent offences for the partners of women and men.

3.3.2.2. Symptoms of ASPD. ASPD symptoms across partners were analysed using an intraclass correlation. A significant association was found between women's and men's ASPD symptoms, $ICC = .32, p < .001$, which indicates that partners are similar in their symptoms of antisocial behaviour.

3.3.2.3. Physical fights. The majority of women and men who did not participate in physical fights had partners who did not fight (see Figure 3.2). For both men and women who did participate in physical fights, the proportion of partners who fought was slightly larger than those who did not fight. The association between women's and men's fighting was not significant, $K = .07, p = .21$.

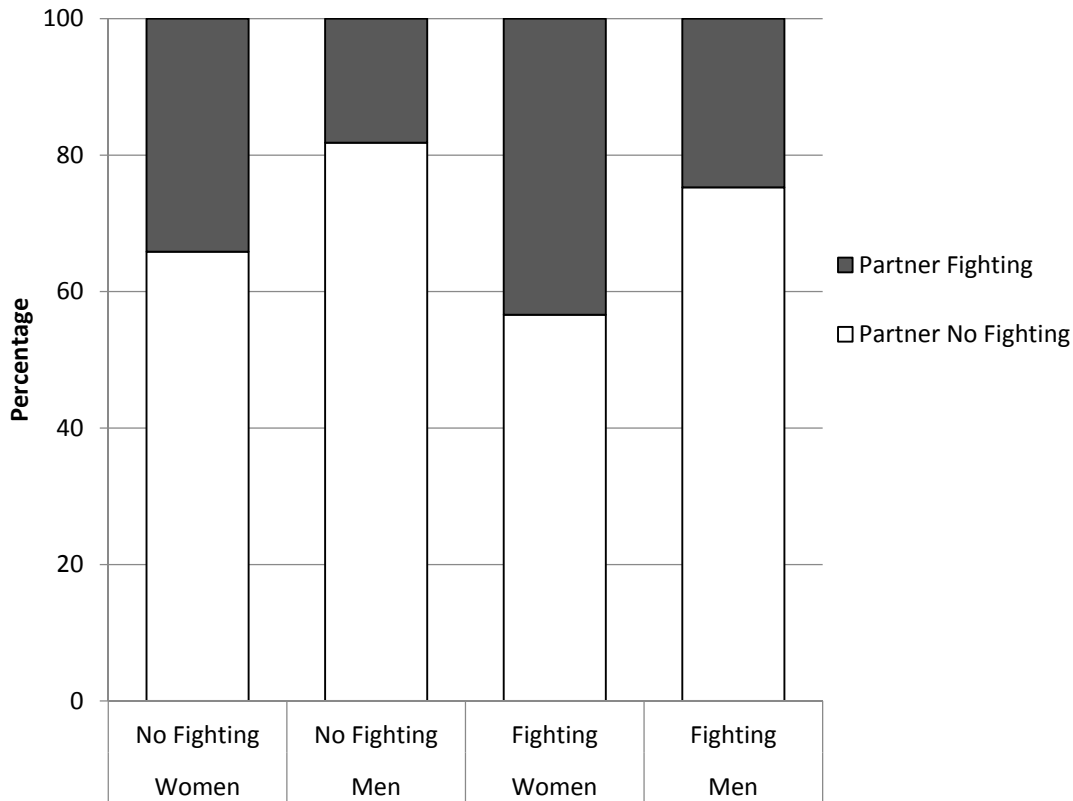


Figure 3.2. Percentages of participation in physical fights for the partners of women and men.

3.3.3. Are the associations between partners' antisocial behaviours due to measures of the couple's environment?

The sociodemographic risk index was associated with arrest history, ASPD Symptoms and fighting (Table 3.2). Because sociodemographic risk was associated with all of the study variables, regressions were conducted whilst controlling for social risk for criminal behaviour and antisocial personality disorder symptoms. Women's scores were treated as dependent variables and men's scores as predictors.

Table 3.2. Correlations between study variables and social risk for women and men.

	Social Risk	
	Women	Men
Non-Violent Arrest	.32*	.25*
Violent Arrest	.24*	.28*
ASPD symptoms	.52*	.38*
Physical fights	.31*	.24*

3.3.3.1. Arrest history. A logistic regression analysis was conducted to examine the association between women's and men's history of arrest whilst controlling for sociodemographic risk. Sociodemographic risk was entered as a control variable at the first step of the regression model and significantly predicted the women's history of arrest, Wald statistic = 33.60, $p < .001$, $OR = 2.25$, 95% CI [1.71, 2.96]. The association between women's and men's criminal history remained significant after accounting for the sociodemographic risk index, Wald statistic = 17.32, $p < .001$, $OR = 9.32$, 95% CI [3.26, 26.68].

3.3.3.2. Symptoms of ASPD. A linear regression was conducted to investigate the relationship between women's and men's ASPD symptoms whilst controlling for sociodemographic risk. Sociodemographic risk was entered as a control variable at the first step of the regression model. It was found that sociodemographic risk accounted for 19% of the variance in women's ASPD symptoms, $F(1,257) = 60.48$, $p < .001$, Adjusted $R^2 = .19$, $\beta = .44$. Men's ASPD symptoms accounted for a further 3% of the variance, and significantly predicted women's ASPD symptoms after controlling for sociodemographic risk, $\Delta R^2 = .03$, $\beta = .19$, $p = .002$. Thus, antisocial behaviour is associated in romantic partners and is not wholly explained by measures of the couple's social environment.

3.4. Discussion

This chapter investigated differences and similarities in partners' criminal behaviour, antisocial personality disorder symptoms and physical aggressiveness. Men were more likely to commit both violent and non-violent crimes, and had more antisocial personality disorder symptoms. However, there was no difference between men and women for physical fights. An interesting finding was that there was no difference in the occurrence of physical fights between men and women; however there was a difference between men and women's arrest history for violent offences. This might suggest that men and women commit violent behaviours at a similar frequency but women are less likely to get caught, or their violent behaviours are less likely to cause serious harm. It is also possible that women may use a more generalised definition of what constitutes a fight.

Despite the difference in their frequency of antisocial behaviour, associations between the partners' behaviour were found for history of violent and nonviolent crime, and antisocial personality disorder symptoms. These associations remained significant after controlling for sociodemographic risk, providing evidence that there is similarity between partners for these traits, which is not solely due to the risk factors in the environment in which they live.

Findings from the present study replicate previous research, which has also found evidence of assortative mating for antisocial personality symptoms (Capaldi & Crosby, 1997; Cloninger et al., 1975; Galbaud Du Fort et al., 2002; Kim & Capaldi, 2004; Krueger et al., 1998; Sakai et al., 2004) and criminal behaviours (Rowe & Farrington, 1997; Moffitt et al., 2001; van Schellen et al., 2011; Woodward et al., 2002). Previous studies have shown that there is evidence of assortative mating for violence between romantic partners (Kim & Capaldi, 2004; Langer et al., 2008; Marshall et al., 2011), but much less is known about the use of violence outside of the marital relationship.

My research supports and extends the findings of Frisell and colleagues (2012) who investigated assortative mating for violent crimes. However, we found no substantial evidence of assortative mating for the non-criminal use of violence (physical fights). This may have been because we were focusing on a representative community sample, not on offenders, and there may not have been enough individuals engaging in fighting to detect an effect.

This study has limitations. Participants were asked for their most serious offence rather than for all of the offences they had been arrested for. Because of this I was unable to ascertain how frequently the individual participated in criminal behaviours, which would have given some measure on the individual's general propensity to criminal behaviour. Presumably there are differences between the individuals who commit only one offence and those individuals who commit many offences over a long period of time. However, I was able to find that criminal behaviour was associated between partners and so the information that was obtained had enough statistical power to allow significant findings.

I did not consider the participants' justifications for physical aggressiveness or their perceptions about the appropriateness of physical aggression. Researchers have shown that when children perceive violence as an appropriate form of behaviour they are more likely to commit aggressive acts (Huesmann & Guerra, 1997). The social information processing theory suggests that some individuals are biased to attribute hostility to the intentions of others, regardless of that individual's true intention, and respond to that perceived hostility with aggression (Crick & Dodge, 1994; Dodge, Laird, Lochman & Zelli, 2002). This research has mostly been conducted on children, but, in view of the longitudinal stability of antisocial behaviour, it is likely that these biases and perceptions are likely to continue into adulthood. Shared assumptions about the justification of antisocial behaviour may contribute to the similarity between members of a couple.

I relied mainly on retrospective information about arrests, fighting and conduct disorder symptoms. Thus it is not possible to draw firm conclusions that the similarity between the partners represents assortative mating, defined as choice of a similar partner, or merely the growing similarity of members of a couple who are living together for a substantial period of time. Getting prospective information in studies on assortative mating is very difficult as there is no way of predicting which individuals will form partnerships and therefore prospective, longitudinal research on both partners currently does not exist. The best way to achieve this would be to study every individual within a population before they form partnerships with one another (Knight, 2011). However, adult follow-up of existing longitudinal studies in which children's conduct symptoms have been assessed would also contribute relevant information.

Violence is arguably the most severe form of antisocial behaviour because of the cost to society and the impact it has on victims' lives. Violent individuals may encourage physical aggression within their partners and therefore cause an increased threat for the individuals around them. Children residing with these adults may be at increased risk, both for maltreatment from either/both parents and for displaying violent behaviours that are being modelled. Propensities towards violent behaviour within families needs to be further addressed and examined more closely.

Chapter 4.

Fathers' Contribution to the Development of Aggression

4.1. Introduction

Antisocial behaviour and crime pose considerable problems for society. Therefore studies that investigate the origins and different components of antisocial behaviour are vital.

In this chapter, I will investigate the relationship between fathers' antisocial behaviour and the development of aggression in their offspring at 33 months of age. It is well known that trajectories to high levels of aggression emerge in this developmental period (e.g., NICHD Early Child Care Research Network, 2004; Tremblay, Nagin, Séguin, Zoccolillo, Zelazo, Boivin & Japel., 2004), but less is known about fathers' effects on children in this age range. I will then seek evidence for possible associations between fathers' antisocial behaviour and earlier precursors to aggressiveness evident by six months of age (see Hay, Waters, et al., 2014).

4.1.1. Antisocial Behaviour in Fathers and Outcomes for Children

Fathers who engage in antisocial behaviours are more likely than other men to have a child with behaviour problems (Frick, Lahey, Loeber, Stouthamer-Loeber, Christ & Hanson, 1992; Huesmann, Eron, Lefkowitz & Walder, 1984; Jaffee, Moffitt, Caspi & Taylor, 2003; Smith & Farrington, 2004). Children with symptoms of Conduct Disorder (CD) are more likely to have a father who has Antisocial Personality Disorder (ASPD) symptoms (Frick et al., 1992; Smith & Farrington, 2004).

Criminal behaviour in fathers is not just related to criminal activity in their offspring but to other measures of the children's antisocial behaviour, such as externalising problems and delinquency (Farrington 2000; Farrington et al., 2001; Kinner, Alati, Najman & Williams, 2007). Farrington and colleagues (2001) found that out of many social and demographic risk factors, having an arrested father was the strongest predictor of antisocial behaviour in children. Children separated from a parent due to imprisonment were more likely to be antisocial adults than children who were not separated or those separated for other reasons, such as hospitalisation or death (Murray & Farrington, 2005; Aaron & Dallaire, 2010).

However, less is known about the specific effects of the fathers' violent behaviour. Violent behaviour is not displayed by all individuals with a propensity to antisocial behaviour (Farrington, 2000; Lacourse, 2010). Individuals who commit violent acts do not necessarily commit other non-violent antisocial acts (Farrington, 2000; Lacourse et al., 2010; Farrington et al., 2009; Nagin & Tremblay, 1999). Therefore violence is worth investigating separately from other antisocial behaviours.

Fathers who commit violent crimes have children who are more likely to commit crimes, both violent and non-violent (McCord, 1991; Putkonen et al., 2002). However, research on the effects of fathers' violent behaviour on children (rather than adults and adolescents) is very limited. The research into the area of violent behaviour in fathers has been largely concerned with the issue of domestic violence (Dodge et al., 1990; Jaffee et al., 2004). However, the fathers' violent behaviour outside of the child's home environment has largely not been considered.

Evidence for a relationship between fathers' antisocial behaviour and their preschoolers' aggression is fairly limited. Fathers' problem behaviours have been shown to

be associated with toddlers' problem behaviours (Capaldi et al., 2012; Conger et al., 2003; Kerr et al., 2009; Kim et al., 2009). Fathers' difficult behaviour and externalising problems in childhood and adolescence are associated with toddlers' difficult behaviour and externalising problems (Kerr et al., 2009; Kim et al., 2009). However, Kim and colleagues (2009) found this was only true of daughters' externalising problems and not sons'. Only one study has investigated the effects of the father's current behaviour on the behaviour of his toddler. Capaldi et al. (2012) found that fathers' antisocial behaviour was significantly associated with daughters' externalising behaviour at 39 months of age, but not with sons' externalising behaviour. Other work has also examined fathers' antisocial behaviour in adulthood and toddlers' behaviour but has not reported the relationship between father's and child's behaviour at three years. However, when the children were five years old the fathers' antisocial behaviour predicted the child's externalising behaviour (Coley et al., 2011).

In terms of aggressive behaviour, a study by Conger and colleagues (2003) investigated the use of aggression in adolescents' interaction with siblings and then looked at the children of those adolescents several years later in a clean-up task with their parent. Parents' use of aggression in their own adolescence did not predict their toddlers' use of aggression. This measure of aggression included overt physical aggression but it also included other types of aggressive behaviour. An investigation into partner violence and the effects on two-year-old children found that children were more likely to display disruptive behaviours (Davies et al., 2012). However, interparental aggression may influence the child more because the child may witness the aggressive behaviour. The current study aimed to investigate all evidence of fathers' use of physical aggression, including violent behaviour that took place outside of the home environment, in relation to the early development of aggression.

4.1.2. Rated and Observed use of Aggression in Toddlers

With some exceptions (e.g., Conger et al., 2003), most of the previous work mentioned has used parents' reports of children's aggression and other behaviour problems. Hay, Castle and Davies (2000) showed that parents' reports of the child's behaviour were correlated with observed behaviour in the laboratory, which would suggest that parents can be reliable informants of their child's behaviour. However, there is still a possibility that the parents may provide a biased report of the child's behaviour, and when they are reporting on their own behaviour there is the problem of shared methods variance. Therefore it is important to observe toddlers' behaviour directly.

In the present chapter, I have examined reports from three informants (mothers, fathers, and a third person who knows the child well) and also observed toddlers' interactions with peers. Within toddlers' early interactions with peers, conflicts emerge, often over possession of objects or personal space (Hay & Ross, 1982). These conflicts can escalate into more serious disputes involving the use of force against a peer (Cummings, Iannotti & Zahn-Waxler, 1989; Hay, Castle & Davies, 2000; Hay, Nash, Caplan, Swartzentruber, Ishikawa & Vespo, 2011; Hay & Ross, 1982; Rubin, Burgess, Dwyer & Hastings, 2003). Researchers have shown that instrumental force, involving the desire for another's object, is more common than bodily force involving physical assault of a peer (Hay et al., 2000; Hay, Nash et al., 2011; Hay & Ross, 1982; Rubin et al., 2003). It has also been shown that different types of hitting may have different social meanings to toddlers (Brownlee & Bakeman, 1981). The use of bodily force is relatively rare in the toddler period; for example, in one study 10% of children hit or kicked other children, 20% of children pushed or grabbed another child and only 2% pinched or bit another child on a daily basis (Willoughby, Kupersmidt & Bryant, 2001).

Researchers have found that aggressive behaviour in toddlerhood is related to the use of aggressive behaviour later on in early childhood (Cummings et al., 1989). Problems with peers and negative behaviours (including physical aggression) in toddlerhood predicted teachers' reports of externalising behaviour at 5 years of age (Fagot & Leve, 1998). In other work from the Cardiff Child Development Study, it has already been established that individual differences in infants' anger and use of force emerge even earlier, by six months of age. These early behaviours are not assumed to reflect intentional aggression, but rather can be characterised as 'contentiousness,' being prone to conflict with other people (see Hattwick, 1936; Hay, Waters, et al., 2014). These early contentious behaviours qualify as developmental precursors to later aggression, insofar as they are associated with known risk factors for aggression and predict later physical aggression and related conduct problems (Hay, Mundy, et al., 2011; Hay, Waters, et al., 2014). The precursor behaviours reported by informants at six months predict to observed as well as rated aggressiveness at 12 months (Hay, Mundy, et al., 2011). In this chapter, I test the hypothesis that fathers' antisocial behaviour contributes uniquely to the prediction of these individual differences in toddlers' aggressiveness and earlier precursors to aggressiveness, even when the mothers' history of antisocial behaviour is taken into account.

4.1.3. Aims and Hypotheses

The current study aimed to look at the relationship between fathers' antisocial behaviours and toddlers' aggressive behaviour. I tested whether fathers' violent and non-violent antisocial symptoms had similar effects on children's outcomes. Non-violent antisocial behaviour included all symptoms from the antisocial personality symptoms used in Chapter 3 apart from those pertaining to fighting. Physically aggressive behaviour in adulthood included information obtained from criminal behaviour, reported fighting and information obtained in

the interview. Because previous research has suggested that the relationship between fathers' antisocial behaviour during childhood and adolescence and child behaviour is fairly unreliable (Blazei et al., 2006; Kerr et al., 2009; Kim et al., 2009), childhood symptoms were not considered. Results from Chapter 3 show that mothers' and fathers' antisocial behaviours are associated; for this reason mothers' antisocial behaviours were controlled for whenever fathers' antisocial behaviours were considered. It was hypothesised that the fathers who participated in antisocial behaviours were more likely to have infants who displayed early contentiousness and toddlers who exhibited aggressive behaviours, especially when fathers showed physically aggressive symptoms.

4.2. Method

4.2.1. Participants

Of the 326 families who provided information about the father at the Wave 1 or the Wave 2 assessments, 298 (91%) families also provided questionnaire information about the child's behaviour in the first year. Of the 326 families with information about the father, 287 (88%) also participated in at least one toddler assessment. Those that did not participate included 18 (6%) families who elected to drop out of the study, 15 (5%) families who could not be traced within the time window and 6 (2%) families who were not able to participate at this time but were willing to remain in the study. For demographic information about the whole sample see Chapter 2. Of the 287 families who participated at this stage 284 (99%) provided questionnaire reports from at least one informant at either Wave 4 or Wave 5 (278 mothers, 222 fathers and 239 third informants), 252 (88%) provided questionnaire reports at Wave 5 from at least one informant (238 mothers, 175 fathers and 181 third informants) and 220 (77%) participated in the observational assessment at Wave 5.

4.2.2. Procedures

For a more detailed description of the study design see Chapter 2.

4.2.2.1. Wave 1: Prenatal assessment. Whilst the mothers were in the third trimester of pregnancy appointments were made for researchers to visit the family at home. Both parents were interviewed and completed questionnaire batteries.

4.2.2.2. Wave 2: Early infancy assessment. When the infants were 6 months old (mean age of 6.64 months, standard deviation of 0.88 months). The mother and father completed questionnaires about themselves and their child. For the purposes of this study only the information about the parents was used.

4.2.2.3. Wave 4: Early toddler assessment. Home visits were made to families when the toddlers were between 18 and 24 months old (mean age of 20.59 months, standard deviation of 2.23 months). Three informants completed questionnaires about the child. For the purposes of the current study only the questionnaires were used.

4.2.2.4. Wave 5: Late toddler assessment. Families visited the laboratory when the child was between 30 to 36 months old (mean 33.61 months, standard deviation of 2.47 months). This laboratory assessment included an observed free play session with between one and three similar aged, unfamiliar peers. Questionnaires were again completed by three informants. Due to a number of families not completing the later toddler questionnaires in the age range, several parents were asked to complete the questionnaires retrospectively, which led to a slightly higher mean age of 36.06 months.

4.2.3. Measures

For more detailed descriptions of the study design see Chapter 2.

4.2.3.1. Parents' non-violent antisocial symptoms. Parents reported on their own current and juvenile non-violent antisocial symptoms. These symptoms were summed to create a symptom scale and missing data was imputed from the partners' report of the individual's criminal history using unstandardized predicted scores from a regression analysis.

4.2.3.2. Parents' reports of their own physical aggressiveness in adulthood. Parents reported on their own physically aggressive behaviour. Information about physically aggressive behaviour was obtained during an interview at Wave 1, a questionnaire item about fighting at Wave 1, and arrest history information from questionnaires at Wave 1 and Wave 2.

4.2.3.3. Infants' early contentious behaviour (Cardiff Infant Contentiousness Scale; CICS). At Wave 2 (mean 6.6 months of age) three informants (mother, father and a third person who knew the infant well) were asked to report on precursors of aggressiveness using the Cardiff Infant Contentiousness Scale (CICS; Hay et al., 2010), in which four key items (*hitting, biting, temper tantrums* and *angry moods*) were incorporated into a checklist of normative developmental attainments. The distracter milestones items were age appropriate motor and communication skills, adapted for each age of assessment. All items were reported on a scale from 0 to 2 (*not yet, sometimes or often*). Missing items were prorated. The CICS score was created by summing the items.

To create the infant CICS score data were obtained from the Wave 2 questionnaire and missing data were imputed from scores at Wave 3 using unstandardized predicted scores from an SPSS regression analysis. In infancy the four item CICS scale showed an acceptable degree of internal consistency, significant agreement across informants, and significant associations with infants' observed behaviour, including use of force against peers (for details, see Hay, Perra et al., 2010).

4.2.3.4. Toddlers' angry aggressiveness (Toddler Version of Cardiff Infant Contentiousness Scale; CICS). Two new, age-appropriate items (*grabbing toys out of other children's hands* and *hitting or kicking to get toys*) were added to the milestones checklist to create a toddler version of the CICS at Waves 4 and 5. These items were added to the four key items to measure intentional instrumental aggression. The two additional toddler items have been shown to be related to observations of the infant's tugging of toys belonging to peers (Hay, Waters et al., 2014).

The six item toddler CICS scale showed an acceptable degree of internal consistency at Wave 4, $\alpha = .77$, and at Wave 5, $\alpha = .73$. The six item scale also showed significant

agreement across informants at Wave 4; correlation coefficients ranged between $r = .49, p < .001$ for mothers and third informants, and $r = .32, p < .001$ for fathers and third informants. There was also significant agreement at Wave 5; correlation coefficients ranged between $r = .41, p < .001$ for mothers and fathers, and $r = .26, p < .001$ between fathers and third informants.

In the present analyses, to reduce shared methods variance, fathers' self-reported antisocial behaviour was examined in relation to mothers' reports on the CICS. If the mother's score was missing then the third informant's score was used. In cases where neither the mother nor the third person had reported on the child's behaviour, the fathers' report was used (N = 16 for infants and N = 4 for toddlers).

Questionnaires that were returned outside of the age window (N=10) were not used as the mean and standard deviation for this measure were significantly different from those that were returned within the required time. A mean score from Wave 4 and Wave 5 was used to create a toddlerhood CICS score.

4.2.3.5. Clinically relevant aggressive conduct problems (Child Behaviour Check List; CBCL). Three informants (mother, father and a third person who knew the child well) were asked to complete the 1½- to 5-year-old version of the Child Behaviour Check List (CBCL; Achenbach & Rescorla, 2001) at Wave 5. Of those that participated at the toddler ages, 252 (88%) families completed a CBCL at the Wave 5 time point (238 mothers, 175 fathers and 181 third informants). The CBCL aggressive conduct problems scale was used as a continuous measure of clinically significant behavioural problems in young children. Items included in the CBCL aggressive conduct problems scale were as follows: *Can't stand waiting, defiant, demands must be met immediately, destroys things belonging to his/her family or other children, disobedient, doesn't seem to feel guilty after being naughty, easily*

frustrated, gets into many fights, hurts animals or people without meaning to, angry moods, physically attacks people, punishment doesn't change his/her behaviour, screams a lot, selfish or won't share, temper tantrums or hot temper, uncooperative, wants a lot of attention and stubborn, sullen or irritable. Similarly to the procedure used for the CICS, mothers' reports were used where possible. When no mothers reported, third informant reports were used and where neither mother nor third informant had reported father reports were used (N = 4). Informants' ratings were significantly associated with one another, $r = .46, p < .001$ between mothers and fathers; $r = .49, p < .001$ between mothers and third informants; and $r = .39, p < .001$ between fathers and third informants.

4.2.3.6. Observed use of bodily force against peers (Peer Interaction Coding Scheme; PICS). At a mean age of 33 months toddlers were observed in a free play session with between one and three similar aged, unfamiliar peers. Observers used the Peer Interaction Coding System (PICS) to record interactions among peers and the occurrence of certain peer directed behaviours. The PICS has previously been used in studies of 1- to 3-year-old children (Caplan, Vespo, Pederson & Hay, 1991; Hay, Castle & Davies, 2000). Episodes of peer interaction were transcribed and each child's interactive moves were coded based on a predetermined set of behavioural categories including the use of bodily force directed towards a peer. Bodily force was coded only if the action entailed direct contact of the peer's body (as opposed to tugging on a toy held by the peer), was socially directed rather than accidental and accompanied by a visual gaze towards the recipient. Observers recorded whether the use of force was possibly or definitely present. A dichotomous variable was created to indicate whether the child had ever used bodily force against a peer within the observational session. Independent observers transcribed 23 (25%) Wave 5 observational sessions including 60 (27%) children with good observer agreement. However, due to the

small number of children who used bodily force against a peer it was decided that a consensus between two observers should be established for every occurrence of bodily force.

Because children were observed in dyads or triads, it was necessary to test for dependencies in the data. Using SPSS linear mixed-models analysis it was ascertained that there was no significant effect of pairings with particular peers in observational sessions on the infants' or toddlers' use of forceful contact.

4.3. Results

4.3.1 Descriptive Statistics

Means and standard deviations for the infant and toddler variables are displayed in Table 4.1. Correlations between the variables used in this chapter and all other chapters can be found in Table A in the Appendix. Preliminary tests revealed a significant associations between infants' CICS scores and toddlers' CICS scores and toddlers' CBCL aggressive conduct problems scores, $r(276) = .32, p < .001$ and $r(246) = .22, p = .001$ respectively. These associations indicate that the putative precursors to angry aggressiveness were indeed related to later angry and aggressive behaviour in toddlerhood (see Hay, Waters, et al., 2014 for more details). There was a significant gender difference in infants' CICS scores, $r(299) = .14, p = .02$, and therefore gender was controlled for in analyses of infants.

Toddlers' CICS scores and toddlers' CBCL aggressive conduct problems scores were significantly associated with one another, $r(250) = .48, p < .001$. This correlation suggests that these two measures are reflecting the same underlying construct, but there are still differences across the measures. However, toddlers' observed use of bodily force was not by itself significantly correlated with informants' reports of the CICS scores or with the CBCL aggressive conduct problems scores.¹ There were no significant gender differences in toddlers' CICS, CBCL aggressive conduct problems scores, or PICS bodily force, and therefore subsequent analyses in toddlerhood were collapsed across gender.

¹ It should be noted that a combined measure of physical force against peers (tugging on toys plus bodily force) was indeed correlated with informants' reports on the toddler version of the CICS (see Hay, Waters, et al., 2014).

Table 4.1. Descriptive statistics for infant, toddler and parent variables.

	N	M	SD	Range
Fathers' non-violent antisocial symptoms	286	5.80	3.75	0-20
Mothers' non-violent antisocial symptoms	286	3.84	3.44	0-18
Fathers' physical aggressiveness	287	0.12	0.32	0-1
Mothers' physical aggressiveness	287	0.07	0.26	0-1
CICS in infancy (Mother report at Wave 2)	298	2.75	1.62	0-8
CICS in toddlerhood (Mother report averaged across Wave 4 and Wave 5)	284	4.41	2.30	0-11
CBCL aggressive conduct problems scale (Mother report)	252	8.67	5.74	0-29
PICS bodily force between peers	220	0.04	0.20	0-1

4.3.2. Hypothesis 1: Fathers' Antisocial Symptoms Predict Infants' Precursors to Anger and Aggressiveness

I tested the hypothesis that fathers' antisocial symptoms might begin to exert their influence in early infancy. The next analyses examine the effect of fathers' physically aggressive actions and nonviolent antisocial behaviours on early contentiousness at the early infancy assessment.

Table 4.2. Correlations between parents' antisocial symptoms and infants' CICS scores

	Infants' CICS scores
Fathers' non-violent antisocial symptoms	.16*
Mothers' non-violent antisocial symptoms	.26**
Fathers' physical aggressiveness	.16*
Mothers' physical aggressiveness	.10

** $p < .01$, * $p < .05$

4.3.2.1 Fathers' non-violent antisocial symptoms and infants' CICS scores. As shown in Table 4.2 both fathers' and mothers' non-violent antisocial symptoms were significantly and positively correlated with the infant's CICS scores. A linear regression was conducted to investigate the relationship between the fathers' non-violent antisocial symptoms and the infants' CICS scores. The mothers' non-violent antisocial symptoms and the child's gender were entered as control variables at the first step of the regression model. These accounted for 13% of the variance and both significantly predicted the infant's CICS scores, $F(2,295) = 21.83, p < .001$, Adjusted $R^2 = .12$ (see Table 4.3 for beta coefficients). The fathers' non-violent antisocial symptoms accounted for a further 1% of the variance and trended towards significance in predicting the infant's CICS scores ($\beta = .11, p = .06$).

Table 4.3. Prediction of infants' CICS scores from parents' non-violent antisocial symptoms and child gender: Regression analysis

Predictor	CICS Score (N= 296)	
	ΔR^2	B
Step 1	.13**	
Child gender		.12*
Mothers' non-violent antisocial symptoms		.29**
Step 2	.01 ⁺	
Fathers' non-violent antisocial symptoms		.11 ⁺

* $p < .05$, ** $p < .001$, ⁺ $P < .10$

4.3.2.2. Fathers' physical aggressiveness and infants' CICS scores. Thirty-six (12.08%) of fathers reported physically aggressive behaviour in adulthood, and 22 (7.38%) of mothers reported physically aggressive behaviour in adulthood. As shown in Table 4.2 fathers' and mothers', physical aggression was positively associated with the infant's CICS scores. A linear regression was conducted to examine the relationship between fathers' physical aggression and infants' CICS scores. The mothers' physical aggression and the child's gender were entered as control variables at the first step of the regression model. These control variables accounted for 5% of the variance and predicted the infant's CICS scores, $F(2,297) = 7.39, p = .001, \text{Adjusted } R^2 = .04$ (see Table 4.4 for beta coefficients). The fathers' physical aggression accounted for a further 3% of the variance. The fathers' physical aggression significantly predicted the infant's CICS scores ($\beta = .18, p = .002$).

Table 4.4. Prediction of infants' CICS scores from parents' physical aggressiveness and child gender: Regression analysis

Predictor	CICS Score (N= 296)	
	ΔR^2	B
Step 1	.05**	
Child gender		.13*
Mothers' physical aggression		.12*
Step 2	.03*	
Fathers' physical aggression		.18*

* $p < .05$

4.3.3. Hypothesis 2: Fathers' Antisocial Symptoms Predict Toddlers' aggressiveness

I next tested the hypothesis that fathers' antisocial symptoms would also predict toddlers' aggressiveness, even when mothers' symptoms were taken into account. The analyses were conducted first with respect to fathers' non-violent antisocial symptoms and then his own physical aggressiveness.

4.3.3.1. Fathers' non-violent antisocial symptoms and toddler aggressiveness.

Descriptive statistics for fathers' and mothers' non-violent antisocial symptoms are shown in Table 4.1. Correlations between the parents' non-violent antisocial symptoms and toddlers' aggressiveness variables are shown in Table 4.5.

Table 4.5. Correlations between parents' non-violent antisocial symptoms and toddler variables.

	Toddlers' CICS Angry Aggressiveness	CBCL Aggressive Conduct Problems	PICS Bodily Force
Fathers' non-violent antisocial symptoms	.18**	.17**	.11
Mothers' non-violent antisocial symptoms	.21**	.20**	.05

** $p < .01$, * $p < .05$

Fathers' and mothers' non-violent antisocial symptoms were significantly and positively correlated with toddlers' aggressiveness as seen in Table 4.5. A linear regression was conducted to investigate the relationship between the fathers' non-violent antisocial symptoms and toddlers' CICS scores. Mothers' non-violent antisocial symptoms were entered at the first step of the regression as a control variable and accounted for 4% of the variance, $F(1,281) = 13.17, p < .001$, adjusted $R^2 = .04$ (for beta coefficients see table 4.6). Fathers' non-violent antisocial symptoms accounted for a further 1% of the variance and significantly predicted the toddlers' CICS angry aggressiveness scores, $\Delta R^2 = .01, \beta = .12, p = .05$.

The relationship between fathers' non-violent antisocial symptoms and toddlers' clinically significant CBCL aggressive conduct problems was assessed using linear regression. Mothers' non-violent antisocial symptoms were entered as a control variable at the first step of the regression. Mothers accounted for 4% of the variance, $F(1,249) = 10.50, p < .001$, adjusted $R^2 = .04$ (for beta coefficients see Table 4.3). Fathers' non-violent antisocial symptoms accounted for a further 1% of the variance and trended towards significance in predicting toddlers' CBCL aggressive conduct problems, $\Delta R^2 = .01, \beta = .11, p$

= .08. Fathers' and mothers' non-violent antisocial symptoms did not correlate significantly with toddlers' observed use of bodily force during peer interaction (see Table 4.5).

Table 4.6. Prediction of toddler aggressiveness and conduct problems from parents' non-violent antisocial symptoms: Regression Analysis.

Predictor	CICS (N=283)		CBCL Aggressive Conduct Problems (N=251)	
	ΔR^2	β	ΔR^2	β
Step 1	.05**		.04**	
Mothers' non-violent antisocial symptoms		.21**		.20*
Step 2	.01*		.01*	
Mothers' non-violent antisocial symptoms		.17*		.16*
Fathers' non-violent antisocial symptoms		.12*		.11 ⁺

** $p < .001$, * $p < .05$, ⁺ $p < .10$

4.3.3.2. Fathers' Physical Aggressiveness and Toddlers' Aggressiveness.

Descriptive statistics for fathers' and mothers' physical aggressiveness are shown in Table 4.1. Of the families participating in the toddler waves of the study 34 (11.85%) fathers and 20 (7.0%) mothers reported use of physical aggression during adulthood.

Table 4.7. Correlations between parents' physical aggressiveness and toddler variables.

	Toddlers' CICS Angry Aggressiveness	CBCL Aggressive Conduct Problems	Observed Use of Bodily Force
Fathers' physical aggressiveness	.15**	.07	.15*
Mothers' physical aggressiveness	.15*	.18**	-.06

** $p < .01$, * $p < .05$

Fathers' and mothers' physical aggressiveness was significantly correlated with toddlers' CICS scores (see Table 4.7). A linear regression was conducted to investigate the relationship between fathers' physical aggressiveness and toddlers' CICS scores. Mothers' physical aggressiveness was added as a control variable at the first step of the regression. Mothers' physical aggressiveness accounted for 2% of the variance in toddlers' CICS scores, $F(1,283) = 6.275, p = .01$, adjusted $R^2 = .02$ (for beta coefficients see Table 4.8). Fathers' physical aggressiveness accounted for a further 2% of the variance and significantly predicted toddlers' angry aggressiveness scores, $\Delta R^2 = .02, \beta = .14, p = .02$. Fathers' physical aggressiveness was therefore able to predict the toddlers' CICS scores independently of the mothers' physical aggressiveness.

Fathers' physical aggressiveness was not significantly correlated with toddlers' clinically significant aggressive conduct problems (CBCL). However, mothers' physical aggressiveness was significantly correlated with toddlers' CBCL scores. A linear regression was used with the mothers' physical aggressiveness added as a control variable at the first step of the regression. The mothers' physical aggressiveness accounted for 3% of the variance in toddlers' CBCL scores, $F(1,251) = 8.34, p = .004$, adjusted $R^2 = .03$ (for beta

coefficients see table 4.8). Fathers' physical aggressiveness did not significantly predict toddlers' aggressive problems scale scores and accounted for less than 1% of the variance.

In contrast, fathers' physical aggressiveness did predict toddlers' observed use of bodily force against peers (PICS). Mothers' physical aggressiveness was not significantly correlated with the toddlers' use of bodily force (see Table 4.7). A linear regression was used to investigate the association between fathers' physical aggressiveness and toddlers' use of force against peers. Mothers' physical aggressiveness was added as a control variable at the first step of the regression. Mothers' physical aggressiveness accounted for less than 1% of the variance in toddlers' observed use of bodily force, $F(1,219) = 0.68, p = .41$, adjusted $R^2 = -.001$. Fathers' aggressive behaviour accounted for a further 3% of the variance and significantly predicted toddlers' observed use of bodily force, $\Delta R^2 = .03, \beta = .16, p = .02$. This suggests that physical aggressiveness in fathers predicts toddler physical aggressiveness independently of the mothers' behaviour.

Table 4.8. Prediction of toddler aggressiveness scores from parents' physical aggressiveness: Regression analysis.

Predictor	Toddlers' CICS Scores (N=284)		CBCL Aggressive Conduct Problems Scores (N=252)		Observed Use of Bodily Force (N=220)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.02*		.03*		.003	
Mothers' physical aggressiveness		.15*		.18*		-.06
Step 2	.02*		.002		.03*	
Mothers' physical aggressiveness		.13*		.17*		-.08
Fathers' physical aggressiveness		.14*		.04		.16*

* $p < .05$

4.3.4. Item analysis of the toddler CICS and CBCL measures

The finding that toddlers' observed use of force was associated with fathers' physical aggressiveness implies that toddlers' physical aggressiveness is specifically predicted by the fathers' physical aggressiveness. However, to investigate this phenomenon further it is necessary to tease apart the individual items from the scales used in the above analyses so as to examine whether the items specifically pertaining to physical aggressiveness in toddlers are similarly associated with the fathers' physical aggressiveness.

In order to look at the items from the above scales in greater detail a principal component analysis was conducted on the six toddler CICS angry aggressiveness items (from Wave 5 only) and the 19 CBCL aggressive conduct problems items. Three components were

extracted which together explained 43% of the variance. An orthogonal (varimax) rotation was performed. From the components matrix (Table 4.6) it can be seen that all the variables load onto at least one of the three components, with loadings above 0.4. Based on inspection of the items, Component 1 reflects oppositional behaviours, Component 2 represents physical aggressiveness and Component 3 represents frustrated reactions. It should be noted that two CICS physical aggression items load equally on Components 2 and 3.

Individual factor scores were created for each participant for each component, using the regression method. The correlations between these factor scores and the toddlers' observed use of bodily force were examined. There were no significant correlations between the oppositional factor score and bodily force or the frustrated factor score and bodily force. However, the correlation between the physically aggressive factor score and observed bodily force approached statistical significance, $r = .12$, $p = .09$.

Table 4.9. Components matrix for items from toddlers' CICS angry aggressiveness and CBCL aggressive conduct problems.

Item	Component 1 Oppositional	Component 2 Physically aggressive	Component 3 Frustrated
Defiant (CBCL)	.73		
Wants attention (CBCL)	.65		
Uncooperative (CBCL)	.64		
Easily frustrated (CBCL)	.59		
Demanding (CBCL)	.58		
Stubborn (CBCL)	.57		
Disobedient (CBCL)	.57		
No guilt (CBCL)	.55		
Unresponsive to punishment (CBCL)	.54		
Temper tantrums (CBCL)	.54		.52
Screams (CBCL)	.47		
Can't wait (CBCL)	.43		
Hurts accidentally (CBCL)	.41		
Hits/kicks for toys (CICS)		.70	
Hits others (CBCL)		.65	
Physically attacks people (CBCL)		.53	
Gets into many fights (CBCL)		.51	
Bites (CICS)		.51	
Destroys other people's things (CBCL)		.49	
Selfish (CBCL)		.44	
Angry moods (CICS)			.80
Temper tantrums (CICS)			.79
Angry moods (CBCL)	.50		.54
Hits out at people (CICS)		.48	.50
Grabs toys (CICS)		.41	.47

4.3.4.1. Toddlers' physical aggression factor scores and fathers' physical

aggression. In order to examine whether fathers' physical aggression is related specifically to toddlers' physical aggression or a broader set of behaviours, a linear regression was conducted using the toddlers' individual factor scores from the physical aggressiveness component and the fathers' physical aggressiveness. Fathers' and mothers' physical aggressiveness were both correlated with the toddlers' physical aggressiveness factor scores, $r = .15, p = .003$ and $r = .20, p < .001$ respectively. Mothers' scores were entered at the first stage of the regression as a control variable. Mothers' physical aggressiveness accounted for 4% of the variance in toddlers' physical aggressiveness factor scores, $F(1,324) = 13.19, p < .001$, Adjusted $R^2 = .04$ (for beta values see table 4.7). Fathers' physical aggressiveness accounted for a further 1% of the variance and significantly predicted toddlers' physical aggressiveness factor scores, $\Delta R^2 = .01, \beta = .12, p = .03$. Therefore, fathers' physical aggressiveness is associated with toddlers' physical aggressiveness.

Table 4.10. Prediction of toddlers' physical aggressiveness factor scores from fathers' physical aggressiveness: A regression analysis.

Predictor	CICS (N=284)	
	ΔR^2	β
Step 1	.04**	
Mothers' physical aggressiveness		.20**
Step 2	.01*	
Mothers' physical aggressiveness		.18*
Fathers' physical aggressiveness		.12*

* $p < .05$ ** $p < .001$

Fathers' non-violent antisocial symptoms were also examined in order to assess whether this relationship between fathers' and toddlers' physical aggressiveness extends to the fathers' general antisocial behaviour or whether it is specific to physically aggressive behaviour. Fathers' and mothers' non-violent antisocial symptoms were both correlated with toddlers' physical aggressiveness factor scores, $r = .12, p = .02$ and $r = .25, p < .001$ respectively. A linear regression analysis was used and the mothers' non-violent antisocial symptoms were entered at the first stage of the regression as a control variable. Mothers' non-violent antisocial symptoms accounted for 6% of the variance in toddlers' physical aggressiveness factor scores, $F(1,320) = 20.39, p < .001$, adjusted $R^2 = .06$. However, fathers' non-violent antisocial symptoms did not account for any further change in variance and did not significantly predict toddlers' physical aggressiveness factor scores.

4.3.5. Does physical aggressiveness in two parents convey more risk than one parent's aggressiveness?

In order to investigate whether having two rather than one physically aggressive parents is associated with higher physical a one-way ANOVA was conducted. Means and standard errors for toddlers' physical aggressiveness for the number of parents who engage in physical aggressiveness are shown in Figure 4.1. The number of parents who had engaged in physical aggressiveness had a significant main effect on toddlers' physical aggressiveness factor scores, $F(2,323) = 8.74, p < .001$. Simple comparisons indicated that toddlers who had parents who were not physically aggressive were significantly less aggressive than toddlers with two physically aggressive parents ($p = .001$). The difference in mean levels of toddlers' physical aggressiveness between toddlers with one physically aggressive parent and toddlers with two physically aggressive parents approached statistical significance ($p = .06$).

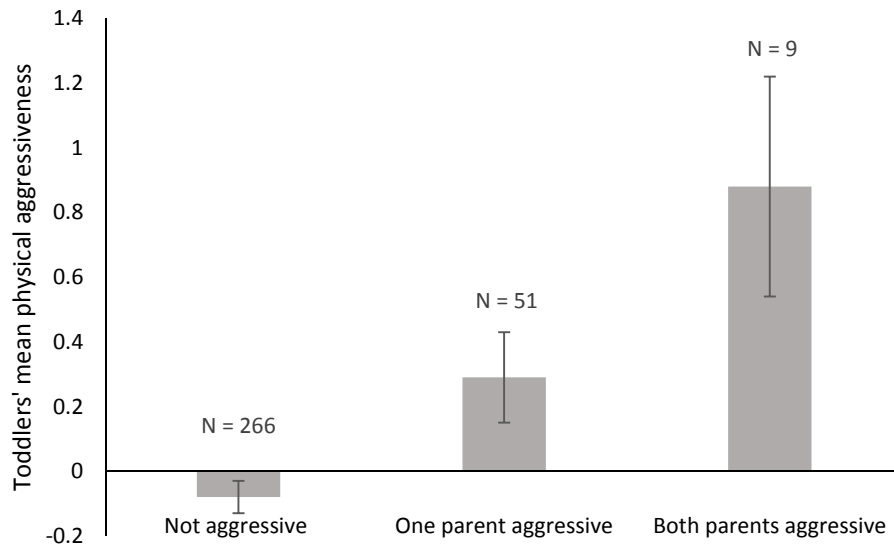


Figure 4.1. Toddlers' mean physical aggressiveness factor scores in relation to number of physically aggressive parents; error bars are \pm the standard error of the mean.

4.4. Discussion

The hypothesis was confirmed. The father's antisocial behaviour does indeed predict his child's behaviour. Fathers' non-violent antisocial symptoms were associated with his toddlers' angry aggressiveness and aggressive conduct problems. Similarly fathers' physical aggressiveness was associated with his toddlers' angry aggressiveness and use of bodily force towards peers. When the toddlers' physically aggressive behaviour was specifically investigated, fathers' physical aggressiveness, but not non-violent antisocial symptoms, was associated with toddlers' physical aggressiveness. These findings lend support to previous studies that have found that fathers' antisocial behaviour is associated with children's problem behaviours in early childhood (Capaldi et al., 2012; Conger et al., 2003; Kerr et al., 2009; Kim et al., 2009). However, the present study extends those findings by showing that the influence of antisocial fathers on the development of children's aggression can be detected by six months of age.

Of particular interest in this study was the fathers' physically aggressive behaviour. Previous research has been very limited in this area. Of the studies that have investigated the effects of fathers' violent or physically aggressive behaviour on offspring behaviour many use adult offspring rather than children (McCord, 1991; Putkonen et al., 2002). Those studies that do look at children focus on the effects of domestic violence (Davies et al., 2012; Dodge et al., 1990; Jaffee et al., 2004), in which the children tend to have more involvement in the violence, either by being the victim or witnessing the violence. Parents' aggressive behaviour and the child's behaviour has been considered in early childhood, however the definition of aggressiveness was broader, including verbal aggression and aggressiveness was measured in adolescence rather than adulthood (Conger et al. 2003). I aimed to look at more general physical aggression, including physically aggressive behaviour that happens outside of the child's home.

Findings from the current study indicated that fathers who had reported physically aggressive behaviour in adulthood had children with higher aggressiveness scores in the toddler period than fathers who had not engaged in physically aggressive behaviour. Fathers who reported physically aggressive behaviour also had infants who scored higher on early measures of contentiousness. In this study I examined observed measures as well as questionnaire measures of aggressive behaviour. It is important to use direct observation as well as questionnaire measures, as parents may be biased. Toddlers' use of force towards peers was not predicted by fathers' non-violent antisocial behaviour. However, what is very interesting is that toddlers' use of force towards peers was predicted by fathers' physically aggressive behaviour. This suggested that aggressive behaviour specifically, rather than a more general antisocial trait in fathers, is related to physically aggressive behaviour in their children.

When items from aggressiveness and conduct problems scales were looked at in greater detail there emerged a component specifically related to physical aggressiveness. Toddlers' physical aggressiveness was predicted by the fathers' physical aggressiveness but not by the fathers' non-violent antisocial personality symptoms. The prediction of toddlers' physical aggressiveness from fathers' physical aggressiveness, using both reported and observational measures, suggests that there is homotypic continuity in physical aggressiveness across generations, but more specifically paternal behaviour affects the child's behaviour.

Since the fathers' aggressive behaviour predicted toddler behaviour after controlling for the mothers' aggressive behaviour it means that fathers have a unique contribution towards their toddlers' physical aggression that is not just mediated through the mother's behaviour. This finding indicates that it is vital to consider paternal influences on the child's behaviour when examining the development of physical aggressiveness in young children.

I also investigated whether the experience of having more than one physically aggressive parent conveyed more risk than having just one physically aggressive parent. Although the difference between having two physically aggressive parents and one physically aggressive parent was not statistically significant, there was a trend towards statistical significance. The cell size was very small for those toddlers with two physically aggressive parents ($N = 9$). Had the sample been larger there may have been greater statistical power to detect a significant effect. Future work should investigate the risk conveyed by one versus two physically aggressive parents further by oversampling physically aggressive parents.

This study has several limitations. Firstly, how much are we actually able to tell about a child's behaviour from a 20 minute observed peer session? There are so many varying factors that may influence the child's behaviour during that period; the child may be tired, hungry, frightened of a new situation, or even just really happy that day. The presence of such situational factors is probably why the effect size is small for the association between father aggressiveness and toddler aggressiveness. However, the fact that fathers' physical aggressiveness is associated with the toddlers' directly observed physical aggressiveness suggests that the toddler's aggressiveness traits are reflected in observed social interactions, even within a small amount of time. Given longer observations of the toddlers the effect sizes might be larger. In the present study longer observations would have been impractical given the number of participants that were observed in this study and the young age of those participants. A possible solution to this problem could be to use diary methods, where the parents record occurrences of their toddlers' physical aggressiveness over a larger period of time, although those parent reports would not necessarily be free of bias

Fathers' self-reports had to be relied upon for both non-violent antisocial symptoms and physically aggressive behaviour. These self-reports may be biased by the informant for social desirability, since these are fairly negative traits about the individual, which they may

not have wanted to report. Unfortunately, observing adult behaviour is much more difficult than observing child behaviour as these behaviours are much less frequent in adulthood than in childhood. However, the parents were reliable in their reporting on each other's criminal behaviour (see Chapter 2), and these parents were also good at reporting on each other's behaviour during conflict between the couple (Phillips, 2012), suggesting that the data that we have are fairly reliable.

In sum, this study has demonstrated that fathers' antisocial behaviour does predict aggressiveness in their offspring, even when mothers' antisocial behaviour is taken into account. Furthermore, fathers' physical aggressiveness, rather than more general antisocial traits, predicts toddlers' physical aggressiveness. Links between fathers' aggressiveness and the development of aggression begin to emerge in the first months of life.

Chapter 5.

Father Absence and Infant and Toddler Behaviour

5.1. Introduction

In the previous chapter I have shown that fathers' antisocial and physically aggressive behaviour is associated with aggressive behaviour in toddlers. However, this relationship could be explained by the fact that antisocial fathers are more likely than other men to be absent fathers. In this chapter I will examine the association between father absence and aggressive behaviour in toddlers.

Previous research has shown that father absence and parental separation are associated with many negative outcomes for offspring. These include low educational attainment (Fergusson et al., 2007; Lipman et al., 2002; Ringbäck Weitoft et al., 2004), low economic success as adults (Fergusson et al. 2007), social impairments (Lipman et al., 2002), lower life satisfaction and general happiness (Acock & Kiecolt, 1989) emotional and anxiety problems (Cherlin, 1998; Fergusson et al. 2007; Strohschein, 2005), and problems with executive function (Rhoades et al., 2011). In this chapter I am primarily concerned with the relationship between a father's absence and antisocial or aggressive behaviour in his offspring. Absent fathers are more likely to be antisocial than non-absent fathers (Jaffee et al., 2001; Pffiffner et al., 2001), and so any problem behaviour in the children may be due to the absence of the father rather than antisocial behaviour in the father.

Many early investigators looked at conviction rates for juvenile delinquency and the proportion of these individuals that had come from "broken homes" (Monahan, 1957; Shaw

& McKay, 1932; Weeks, 1940; Willie, 1967). These studies found that a higher proportion of juvenile offenders came from broken homes than other youths within the community. Girls were at higher risk of committing delinquent acts if they lived in a broken home (Weeks, 1940) and the risk of recidivism was higher among those from broken homes (Monahan, 1957). However, these studies did not often specify what was meant by broken homes and looked at conviction rates which only show a small percentage of the antisocial offences that actually take place. Herzog and Sudia (1973) also argued that youths were more likely to be brought into court if they are from unstable family backgrounds than those in two parent families. Nye (1957) used self-report data to measure delinquency in high school students and looked at whether the child lived with both biological parents. Findings suggested that children who did not live with both biological parents were at an increased risk for delinquency but there was no difference between children not living with both parents and children in homes where the parents were unhappy with their relationship. Thomes (1968) also used self-report data from 9- to 11-year-olds and found very few differences between those whose parents had separated and those whose parents were still together, except that girls reported slightly more aggressive behaviour with peers, but this was not true of boys.

In more recent research absence of the biological father is more difficult to untangle as studies have looked at the effects on children from different family compositions. Several studies have found that children are at greatest risk of displaying antisocial and other difficult behaviours if they are from single parent families rather than two parent families (Carlson & Corcoran, 2001; Fergusson, Boden & Horwood, 2007; Florsheim, Tolan & Gorman-Smith, 1998; Lipman, Boyle, Dooley & Offord, 2002). More years spent in a single parent family was associated with more criminal outcomes in adulthood (Fergusson et al., 2007). Another study by Bachman, Coley, & Carrano (2011) measured the number of the mother's relationship transitions during the child's life (only transitions that affected the child's living

arrangement). They found that children's conduct disorder symptoms were related to the number of transitions within the household and more recent transitions was associated with higher conduct scores. In these studies having a two-parent family does not necessarily mean that the child is living with a biological father. However, a review by Demo and Acock (1988) concluded that youths in two-parent homes display significantly fewer antisocial behaviours than those in single-parent homes regardless of the composition of parents within the two parent homes.

Divorce may have more impact on the children than other types of family separation as it also involves lengthy legal procedures, often including custody battles over the children. Divorce between parents is associated with conduct disorder and other behaviour problems in children (Amato & Keith, 1991; Burt, Barnes, McGue & Iacono, 2008; Cherlin, Furstenberg, Chase-Lansdale, Kiernan, Robins, Morrison & Teitler, 1991; Strohschein, 2005). This has found to be the case particularly within two years of parents' divorce, although there is less evidence of long term effects (Amato & Keith, 1991). However, again in these studies it is not stated whether the divorce is between both biological parents and these studies exclude children from homes where the parents were never legally married.

Different family structures have been looked at in more depth and these studies suggest that living in intact biological families provides the best outcome for children in terms of antisocial and aggressive behaviour problems (O'Connor, Dunn, Jenkins, Pickering & Rasbash, 2001; Hoffman, 2006; Peterson & Zill, 1986). The samples in these studies were subsamples from large, nationally representative, longitudinal research projects both in the UK and in the US. Brown (2004) also looked at the difference in child outcomes between married two biological parent families and unmarried cohabiting two biological parent families. She showed that children from married families exhibited fewer behavioural problems than cohabiting families and children from cohabiting families were not

significantly different from children of single parents or step families. In a community sample from South London, Hay and colleagues (2010) found that there was an association between being born to a cohabiting but unmarried couple and adolescents' violent behaviour

Research investigating biological fathers in particular has found that children were more likely to display antisocial behaviour when the biological father is untraceable, but there is no significant difference in antisocial behaviour between the children who have contact with non-resident fathers and children who live with their fathers (Pfiffner, McBurnett & Rathouz, 2001). Children whose fathers have had offspring with more than one partner are at increased risk for externalising behaviours (Bronte-Tinkew, Horowitz & Scott, 2009). However, the percentage of time a child lived with his or her absent father is not significantly associated with externalising behaviour (Capaldi, Pears, Kerr, Owen & Kim, 2012).

Prospective studies on the effects of parental separation have looked at children from intact families at two time points where the parents had separated by the second assessment and compared the child's behaviour to children from families that continued to remain intact. Findings again reveal that children from divorced or separated homes are at a greater risk for antisocial and problem behaviours than children from intact homes (Cherlin, 1991; Sentse, Ormel, Veenstra, Verhulst & Oldehinkel, 2011; Strohschein, 2005). However, Strohschein (2005) also discovered that children displayed more problem behaviours at time one, if their parents later divorced by time two. Additionally, Sentse and colleagues (2011) looked at temperament and found that children with low effortful control were at an increased risk of exhibiting problem behaviours if their parents had separated compared to children with different temperaments.

Studies have shown that children in intact families where there is high marital conflict can be at as much risk, if not at greater risk for exhibiting antisocial behaviours than single-

mother families (Nye, 1957; Peterson & Zill, 1986; Rutter, 1971). As mentioned in previous chapters it has been suggested that children can actually benefit from not living with their biological father. This is the case when there is increased conflict between the parents (Strohschein, 2005) or when the father displays antisocial or criminal behaviours (Jaffee, Moffit, Caspi & Taylor, 2003; McCord, 1991). These findings suggest that the relationship between father absence and child problem behaviour may be due to the environmental factors that the child has experienced due to the parental separation. This has been supported by studies using genetically sensitive designs, including an adoption study (Burt et al., 2008) and a twin study (D'Onofrio, Turkheimer, Emery, Slutske, Heath, Madden & Martin, 2005). Both D'Onofrio and colleagues (2005) and Burt and colleagues (2008) concluded that the association was more likely to be due to the environmental risk than a passive gene-environment correlation.

Previous work has investigated the effects of several covariates on the relationship between parental separation and offspring antisocial and behaviour problems. These covariates included demographic variables (Brown, 2004; Carlson & Corcoran, 2001; Fergusson et al., 2007; Florsheim et al., 1998; Hoffmann, 2006), community factors (Hoffmann, 2006), family problems and beliefs about family (Fergusson et al., 2007; Florsheim et al., 1998), discipline practices (Florsheim et al., 1998), parents' mental health and criminal behaviour (Carlson & Corcoran, 2001; Fergusson et al., 2007) and offspring IQ (Fergusson et al., 2007). In these studies, with the exception of Hoffmann (2006), when covariates were included the association between parental separation and offspring antisocial behaviour was no longer significant. However, Pffiffer and colleagues (2001) found that when parental separation was added as a covariate the relationship between the fathers' antisocial behaviour and child conduct problems did not change.

So what are the characteristics of an absent father? Having children at a young age and poor educational attainments predict absent fatherhood (Clarke, 1998; Jaffee, Caspi, Moffitt, Taylor & Dickenson, 2001; Lerman, 1986). Absent fathers are also more likely to have a history of conduct disorder or other antisocial behaviours (Jaffee et al., 2001; Pffiffer et al., 2001), engage in sexual activity before the age of 16 and have been brought up in a low income family (Jaffee et al., 2001; Lerman, 1986). Having an absent father makes an individual more likely to become an absent father or to have a child with an absent father (Pouget, Serbin, Stack, Ledingham & Schwartzman, 2012).

In the previous work examined above, very young children have been largely ignored with the earliest child outcome measures taking place at around three years old (Bronte-Tinkew et al., 2009; Capaldi et al., 2012). The aim of this chapter was to look at absent fatherhood and the emergence of aggressive behaviour in toddlers. To investigate factors which may predict father absence associations between father absence and measures of social risk and fathers' aggressiveness were considered. Two-parent families were then compared with those where fathers had separated from the mother at some point before the toddler assessment. Covariates were also examined to investigate whether the relationship between father absence and toddler outcomes would remain significant after accounting for social adversity and fathers' physical aggressiveness. It was hypothesised that toddlers would display more aggressive behaviour if they lived in a father-absent home. Lastly, the children's behaviour in infancy was explored to consider whether the child's earlier behaviour would predict whether fathers were more likely to be absent in the toddler period.

5.2. Method

5.2.1. Participants

Of the 332 families participating in the CCDS the present analyses focussed on all cases in the sample who live with their biological mothers and for whom there is information about fathers' presence or absence and parents' antisocial behaviour. At Wave 1 the number of eligible participants was 323 (97% of the full sample). Of those that were not eligible two of the biological mothers were in same-sex partnerships, one of the biological mothers had died, in one case the grandparents had legal custody of the child and in another case the father had full legal custody of the child. Of the 323 families who participated at Wave 1, 249 (77%) participated in the questionnaire component of the child assessments at Wave 5. Of those that did not participate at Wave 5, 19 (6%) families withdrew participation from the study, 17 (5%) families were not traced in the time window and 38 (12%) families did not participate in all of the questionnaire components of the assessments.

5.2.2. Procedure

Information for the current analysis was obtained from the questionnaire measures given at all five waves and information about the parents was taken from interviews conducted at Waves 1 and 4. For more information about the structure of the 5 waves see Chapter 2.

5.2.3. Measures

5.2.3.1. Evidence for father absence. Mothers and fathers were asked to report their relationship status at Wave 1 in both the questionnaire and the interview. Mothers who reported that they were not in a romantic relationship, or were in an unstable relationship with the baby's father and did not live with the biological father were classified as single mothers

at birth ($n = 18$ fathers never resided with their infants). Mothers and fathers were then asked to complete a questionnaire regarding their significant life events at Wave 3 and each subsequent wave of assessment. The mothers were also interviewed at Wave 4 and asked to report on any change in the family's living situation. Evidence that the parents had separated and the father was no longer living with the child at the toddler assessment was taken from the life events questionnaires and the interview with the mother ($n = 27$ fathers no longer resided with their toddlers, providing a total of $n = 45$ absent fathers).

5.2.3.2. Fathers' physically aggressive behaviour. Fathers provided information about their own aggressive behaviour. This information was obtained from a questionnaire item at Wave 1 about current participation in physical fights, during the interview at Wave 1 and evidence of violent criminal behaviour from questionnaires at Wave 1 and Wave 2. If there was any evidence that the individual had participated in physically aggressive behaviour after the age of 18 years then the individual scored 1 for aggressive behaviour, all other individuals scored 0 for aggressive behaviour.

5.2.3.3. Sociodemographic risk factors. Sociodemographic risk factors included measures of the mothers' social class (middle class or working class), both parents' educational attainment (more than or fewer than 5 GCSE A*-C passes), marital status (married or unmarried), and age at entry into parenthood. For more detailed descriptions of these measures see Chapter 2.

Since these items were so highly correlated with one another a sociodemographic risk index, similar to that used in Chapter 3, was created. This was done by summing the dichotomous measures of the mothers' social risk, educational attainment, marital status and age at entry into parenthood.

5.2.3.4. Toddler physical aggressiveness factor scores. A principal components analysis had been conducted on the six toddler CICS angry aggressiveness items and the 19 CBCL aggressive conduct problems items assessed at Wave 5 (see Chapter 4). For a more detailed description of the scales see chapter 2. Three components were identified and individual factor scores were created for each participant using SPSS. Missing values were replaced with the mean. For the purposes of this chapter only the factor score from the component representing physically aggressive behaviours was used.

5.2.3.5 Infants' early contentious behaviours (CICS). Infant contentiousness was measured using the Cardiff Infant Contentiousness Scale (CICS; Hay et al., 2010). The CICS scale contained four items: *hitting*, *biting*, *temper tantrums* and *angry moods*, which were incorporated into a checklist of normative developmental attainments. All items were reported on a scale from 0 to 2 (*not yet*, *sometimes* or *often*). Missing items were pro-rated. The CICS score was created by summing the items. Scores for the infants were obtained from the Wave 2 questionnaire and missing data was imputed from the scores Wave 3. For a more detailed description of the CICS see chapter 4.

5.3. Results

Correlations between the variables used in this chapter and all other chapters can be found in Table A in the Appendix. Means and correlations between variables used in this chapter are shown in Table 5.1.

5.3.1. Risk factors for father absence

Associations between the sociodemographic characteristics of the family and the father's absence from the home by the time his child was toddler age are presented in Table 5.1. The father's absence was negatively associated with both the mother's and the father's age at entry into parenthood, suggesting that younger fathers were more likely to be absent fathers, but also younger mothers were more likely to partner with men who become absent fathers. Mother's social class and marital status were both positively correlated with the father's absence, which indicates that mothers rated as working class and unmarried mothers were more likely to partner with men who became absent fathers. Both mothers' and fathers' poor educational attainment was positively correlated with the father's absence, which suggests that fathers with lower educational attainments were more likely to be absent fathers and mothers with lower educational attainments were more likely to partner with men who became absent fathers. Since many of these sociodemographic characteristics were strongly correlated with one another a composite score was created in order to control for sociodemographic risk in the following analyses. This measure of sociodemographic risk contained the mother's age, social class, marital status and educational attainment.

In order to examine the association between the father's absence from the home by the time his child was toddler age and the father's own physical aggressiveness a point biserial correlation was used. The father's absence from the home was correlated with his own physical aggressiveness, $r(284) = .18, p = .002$.

Table 5.1. Correlations between variables (N=282).

	Mean	S.D.	Range	Correlations										
				1	2	3	4	5	6	7	8	9	10	
1. Father absence	0.20	0.40	0-1	–										
2. Fathers' physical aggressiveness	0.12	.33	0-1	.19*	–									
3. Mother's age at entry into parenthood	28.68	6.02	16.09-41.81	-.50**	-.21**	–								
4. Father's age at birth of focal child	31.47	6.52	16.5-56.67	-.40**	-.19*	.71**	–							
5. Mothers' social class (working class)	0.45	0.50	0-1	.33**	.14*	-.54**	-.35**	–						
6. Parents' marital status (not married)	0.45	0.50	0-1	.50**	.25**	-.51**	-.39**	.38**	–					
7. Mother's educational attainment (fewer than 5 GCSE's or equivalent)	0.17	0.37	0-1	.36**	.11	-.42**	-.31**	.36**	.32**	–				
8. Father's educational attainment (fewer than 5 GCSE's or equivalent)	0.22	0.42	0-1	.19*	.12	-.33**	-.10	.27**	.23**	.32**	–			
9. Sociodemographic risk	1.18	1.24	0-4	.59**	.21**	-.71**	-.52**	.76**	.75**	.70**	.39**			
10. Toddlers' physical aggressiveness factor scores	-0.01	0.92	-1.69-3.42	.16*	.19*	-.16*	-.06	.10	.06	.15*	.05	.13*	–	

** $p < .001$, * $p < .05$

5.3.2. The effect of the father's absence and fathers' physical aggressiveness on toddlers' physical aggressiveness

Of particular relevance to this chapter is the relationship between father absence and toddler outcomes. Father absence was significantly correlated with toddlers' physical aggressiveness (see Table 5.1). An analysis of covariance was conducted to examine the association between father absence and toddlers' physical aggressiveness factor scores. Mean toddlers' physical aggressiveness scores for father absence and fathers' physical aggressiveness are displayed in Figure 5.1. Sociodemographic risk was not significantly associated with toddlers' physical aggressiveness. There were significant effects of both the father's absence and fathers' physical aggressiveness on toddlers' physical aggressiveness, $F(1,279) = 5.06, p = .03, \text{partial } \eta^2 = .02$ and $F(1,279) = 8.50, p = .004, \text{partial } \eta^2 = .03$ respectively. The interaction between father absence and fathers' physical aggressiveness was not significant. The mean toddlers' physical aggressiveness scores for father absence and fathers' physical aggressiveness suggest that toddlers' physical aggressiveness was greatest when fathers were both absent and physically aggressive and lowest when fathers were present and non-aggressive (see Figure 5.1). Fathers' physical aggression and father absence therefore predicted toddlers' physical aggressiveness independently of one another.

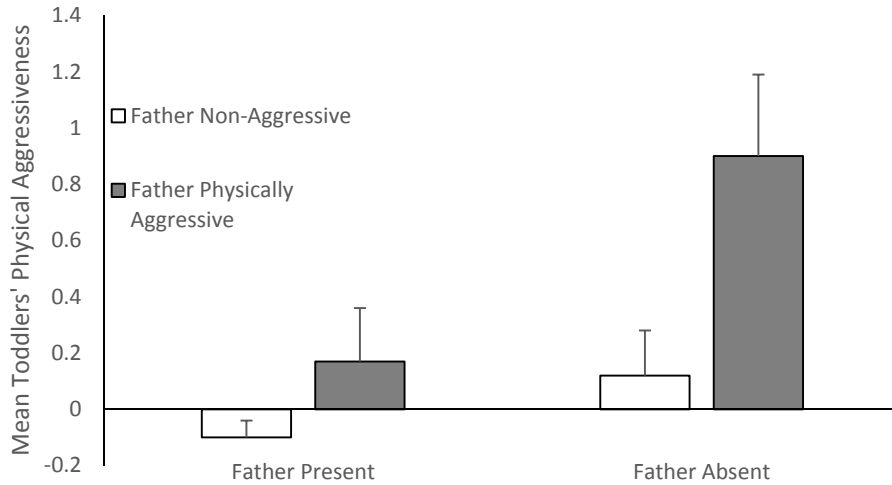


Figure 5.1. Mean toddlers' physical aggressiveness scores for father absence and fathers' physical aggressiveness. Error bars are the standard error of the mean.

5.3.3. Does infants' early contentiousness predict the father's absence?

In order to explore whether father absence at the toddler age may be predicted by the child's earlier behaviour, cases were excluded where the child had never resided with his or her father (N=18). A point-biserial correlation showed a positive association between infant CICS scores and father absence, $r(256) = .13, p = .04$.

A logistic regression analysis was used to control for sociodemographic risk in the prediction of father absence from earlier infant contentiousness. Sociodemographic risk was entered as a control variable at the first step of the regression and significantly predicted father absence, Wald statistic = 53.80, $p < .001$, OR = 3.44, 95% CI [0.94, 1.37]. Infant CICS scores and father absence were not significantly associated after controlling for sociodemographic risk. These results suggest that the association between infant contentiousness and father absence can be explained by general adversity in the family's environment.

5.4. Discussion

Fathers' absence did predict toddler aggressiveness. Previous research has shown that living in a single parent family is associated with a greater number of antisocial and behaviour problems in children (Carlson & Corcoran, 2001; Fergusson, Boden & Horwood, 2007; Florsheim, Tolan & Gorman-Smith, 1998; Lipman, Boyle, Dooley & Offord, 2002). However, few studies actually look specifically at the biological father's absence; many look at different family structures to see which provides better outcomes for the children. What has been shown in this chapter is that the lack of a biological father in itself is associated with problem behaviours in young children without adding in all of the complicated family structures, such as single parent families, divorced parents vs. separated parents, step-parents and step-siblings that may follow the biological father's absence. Past research has mainly focused on older children, however it is crucial to investigate the effects on young children as it is important to see the point at which these problems first become apparent.

In the current study measures of social adversity within the family environment were highly correlated with the father's absence from the family home. These findings are similar to those of previous work (Brown, 2004; Carlson & Corcoran, 2001; Fergusson et al., 2007; Florsheim et al., 1998). However, dissimilarly to these previous studies the effect of father absence did not become non-significant when these social risk factors were taken into account. This suggests that the effects of father absence on toddlers' behaviour is not merely a product of social adversity, but that father absence is also important in understanding toddlers' behaviour.

Fathers' physical aggressiveness did predict whether or not the father would be absent from the family home by the toddler period. Previous findings have also found that a fathers' antisocial behaviour is a predictor for father absence from the family home (Jaffee et al., 2001; Pfiffner et al., 2001). As previous chapters have shown fathers' antisocial behaviour

has an independent prediction from the mothers' antisocial behaviour on the child's aggressive behaviour. These findings now suggest that it is not only that physically aggressive fathers are more likely to be absent fathers, but that physical aggressiveness in fathers itself is important in understanding child behaviour in toddlerhood. The father's personalities and the behaviours he displays are just as important to the development of aggressive behaviours as whether or not he is present in the home with the child. Although fathers' physical aggressiveness and absence from the child's home were correlated with one another, tolerance statistics for collinearity suggested that this was not a problem for the analyses.

Previous studies have investigated the interaction between fathers' antisocial behaviour and absence from the family home (Jaffee et al., 2003; McCord, 1991). These studies found that offspring were at greatest risk of displaying antisocial behaviours themselves when the father was present in the family home and displayed antisocial behaviours. The current study was not able to replicate this finding; children were at greatest risk of aggressive behaviours when the fathers were both absent and displayed aggressive behaviours themselves.

The current study explored whether a father's absence may be predicted by the earlier behaviour of his child. Although infants' early contentious behaviour was correlated with father absence, the association was not significant when sociodemographic risk was entered into the analysis. Since absent fathers were removed when they had been absent before the child was born, cell sizes were very low for the father absent group. Therefore future work should continue investigating whether father absence can be predicted by the behaviour of his child.

A limitation of the study was that the measures for both infants' early contentious behaviour and toddler aggressiveness relied on parents' reports. However, Chapter 4 illustrated that the relationship between aggressiveness in fathers and toddlers was evident both in parent reports and observational measures by impartial observers. The fathers also reported on their own antisocial behaviour by self-report questionnaire measures, but as previous chapters have discussed the parents were able to provide reliable information about their partners' arrest history, suggesting that most fathers were willing to report their antisocial behaviours accurately.

The father absence information was obtained at all five waves; however the exact dates of when the fathers left the family home were not obtained. If a family did not participate in a particular wave then it was only known at the later wave when the father had left the home, it is unknown whether he left before the previous wave that the family did not participate in. It was therefore only possible to accurately ascertain whether the father had left at some point prior to the toddler waves.

The group size for the father absence group was rather small in comparison with the group of children whose fathers were still present in the family home. However, these were drawn from a nationally representative sample of first time parents in a prospective design. It is therefore reasonable that this group should be small if that is the reality for the population of families at this time in the child's life.

The current study used a prospective design from pregnancy. The majority of parents were still in a romantic partnership at the beginning of their child's life. This study therefore was able to study the parents and the children prior to parental separation. Future work should continue to look at the relationship between the parents and the children's behaviour as the

children get older and more parents will inevitably separate as the children age, allowing greater predictions to be made from the early information to the later problems.

Chapter 6.

General Discussion

6.1. Summary of Findings

The aim of this thesis was to investigate the relationship between fathers' antisocial behaviour and the behaviour of their young children. I was also interested in whether a father's violent or physically aggressive behaviour has different associations with his child's behaviour from his non-violent antisocial behaviours. Participants used throughout this thesis were recruited for the Cardiff Child Development Study, which is a longitudinal study of firstborn children and their parents.

Since the relationship between the father and his child is preceded by the relationship between the father and the mother the first empirical chapter aimed to address the similarities between partners prior to becoming parents. Firstly I found that there were gender differences in the likelihood to commit crime. Men were more likely to commit criminal acts, both violent and non-violent offences, and to be arrested for this criminal activity. Men were also more likely to have more antisocial personality disorder symptoms than women. However, interestingly there was no evidence that men were more likely to have ever participated in physical fights than women.

Men and women's arrest history and antisocial personality disorder symptoms were associated with one another. There were associations between men and women's history of violent offences as well as non-violent offences. In fact in this sample every woman who had been arrested for a violent offence had a partner who had been arrested, and three quarters of

women arrested for non-violent offences had a partner who had been arrested. However, no significant associations were found between men and women's participation in physical fights. These associations between men and women's criminal and antisocial behaviours remained after controlling for sociodemographic risk, which indicates that there are similarities between romantic partners for antisocial and violent behaviours.

Previous work has also shown that there are similarities between partners for antisocial behaviours (Capaldi & Crosby, 1997; Cloninger et al., 1975; Galbaud Du Fort et al., 2002; Kim & Capaldi, 2004; Krueger et al., 1998; Sakai et al., 2004). However, very few studies have looked into partners' similarity in terms of violent behaviours outside of the domestic environment. Frisell and colleagues (2012) did investigate the similarities between partners for criminally violent behaviour. The findings from this study replicate the findings by Frisell and colleagues (2012) but also extend the previous findings as non-criminal use of violence was also investigated.

Previous work has looked at the effects of fathers' antisocial behaviours on children's antisocial behaviours (Blazei, Iacono & McGue, 2008; Capaldi et al., 2012; Coley et al., 2011; Foley, Pickles, Simonoff, Maes, Silberg, Hewitt & Eaves, 2001; Frick, Lahey, Loeber, Stouthamer-Loeber, Christ & Hanson, 1992; Herndon & Iacono, 2005; Jaffee, Moffitt, Caspi & Taylor, 2003; Jaffee, Caspi, Moffitt & Taylor, 2004; Pfiffner, McBurnett & Rathouz, 2001; Smith & Farrington, 2004). However, many of these studies look at older children in middle and late childhood. In this body of work I was particularly interested in looking at the effects on preschool age children.

In Chapter 4 the relationship between fathers' antisocial behaviour and young children's behaviour was examined. The children were seen twice in the infancy period, at mean ages of 7 and 13 months, and twice in the toddler period, at mean ages of 21 and 34

months. In infancy scores were taken from the early infancy time point and missing data was imputed from the scores in late infancy. In toddlerhood composite measures across both time points were computed. Fathers' non-violent antisocial symptoms were associated with measures of toddlers' aggressiveness as reported by the toddlers' mothers. Although fathers' non-violent antisocial symptoms were not significantly associated with early contentiousness in infants, a trend towards significance was observed in this relationship. In previous work into the effects on preschoolers the father's current antisocial behaviour only predicted the behaviour of daughters and not sons (Capaldi et al., 2012). This study has extended this finding by showing that there is an association between fathers' antisocial behaviour and toddler aggressiveness, and that there were no gender differences in this relationship.

Previous research discussed in Chapter 1 into the effects of a father's physically aggressive behaviour on offspring had not investigated the associations with children's behaviour. In Chapter 4 fathers' physical aggressiveness and the behaviour of infants and toddlers was examined, and it was found that fathers' physical aggressiveness was associated with the mothers' reports of both infants' early contentiousness and toddlers' aggressiveness.

However, parents' reports may be biased, and for this reason observations were made of the toddlers' aggressiveness. The toddlers' observed use of bodily force against peers was associated with fathers' physically aggressive behaviour, but not the fathers' non-violent antisocial symptoms. Thus, it was fathers' aggressive behaviour specifically that was associated with toddlers' use of force rather than a more general antisocial trait in the fathers. This finding indicates that the relationship between physically aggressive behaviours across generations may be substantially different from the relationship between other types of antisocial behaviour.

In order to examine physically aggressive behaviour specifically across generations, rather than other aggressive behaviours Chapter 4 explored the individual items from the toddlers' CICS angry aggressiveness and the CBCL aggressive conduct problems scales. The results indicated that there was a component specifically related to the toddlers' physical aggressiveness. Factor scores obtained from this physical aggressiveness component were shown to be associated with fathers' physical aggressiveness but not fathers' non-violent antisocial behaviours. These results together with the results from observational measures of the toddlers' aggressiveness indicate that there is homotypic continuity in physical aggressiveness across generations.

All of the associations between fathers' physical aggressiveness and non-violent behaviours and toddlers' aggressiveness remained significant after controlling for mothers' behaviours. This suggests that fathers do provide unique contributions to their children's behaviour independent of the mother's behaviour. The relationship between fathers' and children's behaviour is not wholly mediated through the mothers' behaviour despite the similarities between partners that were examined in Chapter 3. These findings suggest that investigating the fathers' contribution is crucial to the understanding of the development of physical aggressiveness.

Preliminary analyses did suggest that there was a trend towards an increased risk of higher physical aggressiveness in toddlers when both parents displayed physical aggressiveness as opposed to just one parent. However, since the results were not statistically significant further work would be needed to examine this further.

Fathers' antisocial behaviour and fathers being absent from the child's home have previously been shown to be associated with one another (Jaffee et al., 2001; Pfiffner et al., 2001). It was possible that the associations between fathers' physical aggressiveness and

toddler behaviour could be explained by father absence instead. The final empirical chapter aimed to examine whether father absence was associated with toddlers' physical aggressiveness.

Fathers' absence from the child's home by the time the child was three years old was associated with fathers' physical aggressiveness. This finding supports previous work that looking at the relationship between antisocial behaviours and father absence (Jaffee et al., 2001; Pffiffer et al., 2001).

The father's absence from the child's home and fathers' physical aggressiveness was associated with toddlers' physical aggressiveness, even after controlling for measures of sociodemographic adversity within the family. This finding suggests that father absence does not explain the effect of fathers' physical aggressiveness on toddlers' use of physical aggression, but that both father absence and physical aggressiveness are important in understanding the development of physical aggressiveness in toddlerhood. At older ages research has shown that children are at greatest risk of displaying antisocial behaviours when the father was present and antisocial (Jaffee et al., 2003; McCord, 1991). However, in this study the interaction between fathers' physical aggressiveness and father absence was not significant, suggesting that toddlers were at greatest risk of displaying physically aggressive behaviours when the father was absent and physically aggressive.

In conclusion, partners' antisocial and violent behaviours are associated with each other. However, despite this association the fathers' antisocial and physically aggressive behaviours were associated with toddler aggressiveness independently of the mothers' antisocial and physically aggressive behaviour. The relationship between fathers' physical aggressiveness and the development of aggression can be detected from as young as six months of age. The father's physical aggressiveness is specifically associated with toddlers'

physical aggressiveness, suggesting homotypic continuity in physical aggressiveness from fathers to toddlers. Finally, although the father's antisocial behaviour is associated with his absence from the child's home, father absence does not explain the relationship between the father's physical aggressiveness and the toddler's physical aggressiveness.

6.2. Limitations

There were a number of limitations of this work. Firstly, many of the measures used were self-report and parent-report measures. Questionnaire self-report measures are liable to bias, especially considering the nature of the questions about antisocial behaviour. Individuals may have felt that their arrest history and antisocial behaviours were personal issues and may not have wanted to admit to negative traits and behaviours. Having said this, individuals were always assured that their answers to these questionnaires would remain anonymous and confidential, which should have helped to reduce bias. Furthermore, there was good agreement in the reporting of partners' arrest history (see Chapter 2). Mothers reliably reported on fathers' arrest history and fathers reliably reported on mothers' arrest history. This agreement suggests that participants reported honestly about their own behaviour.

In order to reduce bias in the parent-report measures the Cardiff Infant Contentiousness Scale measure was embedded into a questionnaire about normative developmental milestones. This was done to indicate that these items reflected behaviours that all children may develop at some point, rather than being signs of behavioural problems. Three informants were given these questionnaires, the mother, the father and a significant other person in the child's life. By giving questionnaires to three separate informants it was possible to assess the agreement between the informants. The agreement between all three informants was acceptable, which suggests that no one informant was more biased than the

others. The mother's report of the child's behaviour was used in the first instance to reduce shared methods variance, as the father was reporting on his own antisocial behaviour. The mothers' self-reports of her own antisocial behaviours were then used as covariates in these analyses.

However, these procedures detailed above do not completely eliminate bias. In order to overcome this problem independent observational methods are required. Previous work using the Cardiff Infant Contentiousness Scale found that infants with higher scores were more likely to show distress whilst restrained in a car seat for 30 seconds at six months old and more likely to use force against peers at 12 months old (Hay, Perra et al., 2010). In the toddler period higher scores on the two instrumental aggression items was related to tugging toys from peers in an observed free play task (Hay, Waters et al., 2014). In Chapter 4 toddlers' use of bodily force was observed and showed that fathers' physically aggressive behaviour predicted both this observed measure as well as the parent reported Cardiff Infant Contentiousness Scale measure. These findings suggest that mothers' reports of child aggressiveness can be confirmed with observational measures, which indicates that mothers are good at reporting their own child's behaviour.

The participation rate dropped over time. This is an unavoidable problem in longitudinal research as participants are sometimes difficult to trace if they have moved house or changed their names. Having said this, the overall attrition rate for the Cardiff Child Development study is good, with 88% of families participating at least once over the toddler period. However, participation was lower for those attending the observational assessment at Wave 5. This was possibly because laboratory assessments were held on weekday afternoons and a greater number of mothers were unavailable at this wave than at previous waves due to work commitments. Another reason was that a number of participating families had moved

away and were unable to travel back to the laboratory to be assessed. Given these constraints the rate of participation was still acceptable at this wave.

The questionnaire measures of the father's antisocial history used could possibly have been more informative if more information had been collected about their arrest histories and antisocial behaviours. For example, we only asked about the most serious offence that the individual had been arrested for, but the frequency of arrests and physically aggressive behaviours may have also been interesting. If the frequency of physically aggressive behaviour or the seriousness of the behaviour displayed was known it may have been possible to create a scale rather than a dichotomous variable.

In this community-sample of individuals living in South Wales only a minority of individuals had serious antisocial problems or displayed many physically aggressive behaviours. This meant that group sizes were rather small for the physically aggressive groups. However, although the effect sizes were small it was possible to find associations from these small groups, and therefore in a case-comparison sample with oversampled antisocial individuals one would expect the effect sizes to be greater.

6.3. Implications and Directions for Future Research

This body of work has several implications. Firstly, the results have made it evident that fathers are important to study in their own right, and not just as an influence on mothers' behaviour. As explained in Chapter 1, previous work has neglected fathers because studying fathers poses difficulties and increases the work and cost of the research study (Jaffee et al., 2003; Pedersen & Robson, 1969). However, fathers are important contributors in their child's development, as findings from this work have shown that the father's behaviour predicts the child's behaviour independently of the mother's behaviour. This makes it clear that although

getting fathers involved in research is difficult, it is worth the increased understanding about the associations with the child's development.

A further implication from the present work is that physically aggressive behaviour is different from other forms of antisocial behaviour and should be studied separately and not just as a component of antisocial behaviour. In these studies I have examined fathers' physical aggression and found that it is associated with the development of physically aggressive behaviours in children. Physical aggression, but not non-violent antisocial symptoms, is associated with toddlers' physical aggressiveness. These findings suggest that it is important to look at physical aggression as well as other non-violent forms of antisocial behaviour rather than combining the behaviours together as many previous studies have done (Conger et al., 2003; McCord, 1991). It is also important to study the effects of fathers' physical aggression outside of the child's home as well as physical aggression within the domestic environment as this work has shown that this too impacts children.

It is also important to investigate the effects of the father's behaviour on very young children. In Chapters 4 and 5 I have examined the relationship between the fathers' behaviour and the children's behaviour in both infancy and toddlerhood and the findings indicate that preschool children can be affected by the fathers' behaviour, in particular his physical aggressiveness. Previous research has focused on older children with only a handful of studies actually examining preschool children (Capaldi et al., 2012; Conger et al., 2003; Kerr et al., 2009; Kim et al., 2009) and even fewer look at the effects of the father's current behaviour (as opposed to his childhood behaviour) on his preschool child (Capaldi et al., 2012). This work has shown that these behaviours do begin to develop very early in life and further work could look at the development of these behaviours in infants as well as preschoolers.

During this thesis I have focussed mainly on whether or not an association can be seen between fathers' and children's physically aggressive behaviours; due to the current lack of research into this area it was important to document whether or not an association exists before looking at the causal mechanisms at work in the association. Future work should examine the genetic and environmental origins of these behaviours in terms of the father's contribution towards these behaviours.

The nature of antisocial and aggressive behaviours within families means that there are many conflicts present within family life. Although I looked at the father's absence from the home I did not look at the experience of conflict that the child may have had. It could be that these conflicts at home are shaping the child's behaviour and this is what is causing these aggressive behaviours to develop. Future work should look at family conflicts and relationship satisfaction between parents and whether this predicts to the child's behaviour independently of the parents' antisocial traits.

In this work I conducted preliminary analyses on whether the mothers' and fathers' physical aggressiveness combined conveys further risk to the child than just one parent displaying physically aggressive behaviours. However, although toddlers' mean physical aggressiveness scores were highest in the two aggressive parents group the results were not statistically significant. This may have been because the group sizes were too small. This is something that future work should investigate by using a larger sample than the Cardiff Child Development Study or alternatively by oversampling individuals who exhibit aggressive behaviours in order to have larger group sizes. To further understand the relationship between aggressiveness in parents and children it would be a good idea to look at the frequency with which individuals display these behaviours and whether the frequency predicts different child aggressiveness outcomes. The justifications that individuals make about their aggressive or

antisocial behaviours may also be of interest to study, to see whether they blame themselves or others for their behaviours and what effect this has on child behaviour.

I have illustrated that fathers' behaviours affect toddlers' behaviours, rather than just the father's absence or presence. However, all of the behaviours discussed were negative behaviours. It is also possible that fathers' positive behaviours promote positive behaviours in their young children. Future work should investigate the relationship between pro-social behaviours in fathers and their offspring.

6.4. Final Conclusions

This work has shown that it is important to study fathers independently of mothers as fathers' behaviour is independently associated with children's outcomes. My research has furthered the knowledge in the field of physical aggression and fatherhood, but also in the development of aggressive behaviours in very young children. Little was previously known about the association between fathers' physical aggressiveness and the development of aggressiveness in children and this work was able to show that aggressiveness in fathers is able to predict the development of aggression from infancy into the toddler period. Further work still needs to understand this relationship better as the processes whereby these behaviours are transferred from father to child are still unknown.

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Appendix

Table A. Correlations between all variables used in thesis.

Chapter variable used in	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	3	Fathers' arrest history	–																	
2	3	Mothers' arrest history	.38** (319)	–																
3	3	Fathers' ASPD symptoms	.49** (260)	.14* (258)	–															
4	3	Mothers' ASPD symptoms	.34** (318)	.56** (318)	.33** (258)	–														
5	3	Fathers' Fighting	.29** (260)	.14* (258)	.60** (260)	.14* (258)	–													
6	3	Mothers' Fighting	.18* (318)	.35** (318)	.15* (258)	.59** (318)	.08 (258)	–												
7	3	Sociodemographic risk index	.33** (321)	.38** (319)	.38** (260)	.52** (318)	.24** (260)	.31** (318)	–											
8	4	Fathers' non-violent antisocial symptoms	.53** (321)	.18* (319)	.99** (260)	.32** (318)	.50** (260)	.18* (318)	.34** (321)	–										

Chapter variable used in		Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
9	4	Mothers' non-violent antisocial symptoms	.33** (321)	.55** (319)	.33** (260)	.99** (318)	.13* (260)	.50** (318)	.51** (321)	.32** (321)	-										
10	4 & 5	Fathers' physical aggressiveness	.34** (321)	.11* (319)	.57** (260)	.19* (318)	.53** (260)	.14* (318)	.23** (326)	.51** (321)	.18* (325)	-									
11	4	Mothers' physical aggressiveness	.23** (320)	.39** (318)	.19* (260)	.50** (318)	.07 (260)	.53** (318)	.29** (325)	.23** (320)	.44** (320)	.19* (325)	-								
12	5	Father absence	.18* (283)	.20* (283)	.26** (234)	.35** (283)	.13* (234)	.21** (283)	.63** (284)	.22** (283)	.35** (283)	.18* (284)	.27** (284)	-							
13	4 & 5	Infant CICS	.12* (296)	.11 (296)	.16* (296)	.26** (296)	.13* (243)	.17* (296)	.28** (298)	.16* (296)	.26** (296)	.16* (298)	.10 (298)	.20** (278)	-						
14	4	Toddler CICS	.10 (283)	.01 (283)	.18* (233)	.21** (283)	.07 (233)	.10 (283)	.11 (284)	.18* (283)	.21** (283)	.15* (384)	.15* (284)	.14* (281)	.32** (276)	-					
15	4	Toddlers CBCL aggressive conduct problems	.09 (251)	.05 (251)	.16* (208)	.20* (251)	.00 (208)	.03 (251)	.16* (252)	.17* (351)	.20* (251)	.07 (252)	.18* (252)	.14* (249)	.22** (246)	.48** (250)	-				
16	4	Toddlers' use of bodily force	-.06 (219)	-.06 (219)	.14 (185)	.03 (219)	.06 (185)	-.10 (219)	.09 (220)	.11 (219)	.05 (219)	.15* (220)	-.06 (220)	.16* (218)	.08 (219)	.10 (217)	.04 (205)	-			
17	4 & 5	Toddlers' physical aggressiveness factor score	.10 (321)	.06 (319)	.12* (260)	.25** (318)	.04 (260)	.13* (318)	.16* (326)	.12* (321)	.25** (321)	.15* (326)	.20** (325)	.17* (284)	.05 (298)	.45** (284)	.38** (252)	.12 (220)	-		

Chapter variable used in	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
18	4	Toddlers' oppositional factor score	.02 (321)	.02 (319)	.07 (260)	.06 (318)	-.04 (260)	-.04 (318)	.05 (326)	.09 (321)	.06 (321)	-.03 (326)	.07 (325)	.02 (284)	.12* (298)	.13* (284)	.88** (252)	-.02 (220)	.00 (326)	-	
19	4	Toddlers' frustrated factor score	.05 (321)	.02 (319)	.08 (260)	.11* (318)	.05 (260)	.04 (318)	.08 (326)	.07 (321)	.12* (321)	.01 (326)	.06 (325)	.14* (284)	.24** (298)	.56** (284)	.29** (252)	.00 (220)	.01 (326)	.00 (326)	-

* $p < .05$, ** $p < .001$, number of participants is shown in brackets below the correlation