FROM CHILDHOOD AGGRESSION TO DELINQUENCY: CAUSAL PATHWAYS

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July 1998

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CHAPTER 1

THE PROBLEM OF YOUTH CRIME

1.1 Concerns and Costs of Crime

Crime remains a source of concern and considerable cost to the Australian community. The Crime and Safety Survey conducted in Queensland by the Australian Bureau of Statistics (1995a) found 52 per cent of respondents perceived crime to exist in their neighbourhood. In Brisbane, 62 per cent thought there was a problem with crime in their neighbourhood. Of those who perceive a problem, 44 per cent reported "housebreaking" was the main problem, 20 per cent referred to "dangerous driving" and 11 per cent referred to "louts and youth gangs". "Car theft", "other theft" and "other assault (not defined)" concerned about 6.7 per cent of the above group. The 1991 Queensland Crime Victims Survey (1992) assessed fear of crime and found that 0.2 per cent of males and 11.0 per cent of females felt unsafe in their house at night while 12 per cent of males and 45 per cent of females felt unsafe walking alone in their neighbourhood at night.

The Roy Morgan Research Centre (*The Bulletin*, August 29, 1995) has regularly published national polling data on issues that are perceived by the electors to be appropriate for Federal government action. "Law and order" features as a major concern for between 4 per cent and 12 per cent of electors. The relatively low percentage compared with other issues may reflect the perception that "law and order" is an area of State government jurisdiction.

Walker (1997) has reported cost estimates of crime in Australia. Crime and its prevention place a considerable financial burden on the community. These costs do not include the long-term social costs to victims. The total estimate of the cost of crime in Australia in 1996, according to Walker (1997), was between $11 billion and $13 billion while the cost of preventing crime was about $8 billion. This represents over 4 per cent of Australia's Gross Domestic Product (GDP).

In a report from the Australian Institute of Criminology (Potas, Vining and Wilson, 1990), it was estimated that the cost of crime committed by youths aged between 7 and 18 was $1.5 billion per year in 1990. This included $610 million in direct costs and $800 million borne by the criminal justice system. The cost of detaining juveniles was estimated to be $70 million per annum.

1.2 The Extent of Juvenile Crime

National figures on juvenile crime in Australia are difficult to interpret as states and territories differ in their definition of the age of a juvenile and their crime reporting systems. Table 1.1 shows the number of juveniles per 100,000 in each state who were alleged to have committed or who were convicted of violent offences in 1996 based on a study by Mukherjee, Carchach and Higgins (1997). Several conclusions can be drawn from this study. Juvenile males have the highest rates of arrest for property crimes. Juvenile females have higher rates than adult females in this category of crime. More adults than juveniles are arrested for homicide. Juveniles and adults have similar rates of serious assault though juveniles have higher rates of arrest for common assault

of arrest for common assault and robbery. Both male and female juveniles have higher rates of stealing, and break and enter with stealing than do adults.

Table 1.1: Rates per 100,000 of violent offences among juveniles in 1996 by State

State	Classification	Homicide	Serious Assault	Common Assault
VIC				
Males	Alleged offenders	4.92	210.71	368.19
Females	processed	0.00	43.92	127.51
QLD				
Males	Offenders	1.68	235.94	185.06
Females	associated with cleared offences	1.19	55.45	70.35
WA				
Males	Arrests, summons	1.86	205.91	499.73
Females	cautions	0.00	42.24	164.05
SA				
Males	Offenders	1.21	162.84	634.48
Females	recorded	0.00	47.11	250.85
TAS				
Males	Charges laid	0.00	30.04	35.50
Females		0.00	2.84	5.68
ACT				
Males	Arrest details	17.91	174.60	250.71
Females		0.00	4.71	65.93
NT				
Males	Arrests	0.00	95.17	818.50
Females		0.00	9.99	139.50

The Criminal Justice Commission in Queensland (CJC Qld) published a major issues paper in 1992 on the subject of "Youth Crime and Justice in Queensland" (CJC Qld, 1992). Key conclusions of this report suggested that the rate of juvenile involvement in crime has increased over 20 years surveyed; most of young people's crime was at the less serious end of the property crime continuum; a small number of reoffenders are responsible for

much of the crime committed by juveniles and most children who appear in court do not reoffend.

The CJC Qld further examined the issue of youth and crime between 1992 and 1994 in a research paper entitled "Children, Crime and Justice in Queensland" (CJC Qld, 1995). On the question of whether there had been an increase in certain types of juvenile crime, the CJC concludes that there has been a 33 per cent increase in the number of offences against persons but an increase of only of 3.7 per cent in crimes against property. Overall there was a 7 per cent increase in the rate of offences per 1,000 children in the population aged 10 to 16 years. This increase involved juveniles apprehended for minor as well as serious crime. Males were more often involved in violent offences, but the rate of violent offences by females has also increased.

In a detailed examination of the problem of repeat offenders CJC Qld (1992) reported that a cohort of youth in Queensland who were aged 10 in 1983/84, had appeared 3,179 times in the Children's court in the seven years to 1989/90 when the cohort was aged 17. Almost 66 per cent of the cohort appeared only once and were responsible for only 35 per cent of the court appearances. One-third of the offending youth were responsible for two-thirds of the court appearances. Less than one-fifth of all offenders accounted for almost half of the court appearances. In the United States, research findings (Salts, Lindholm, Goddard and Duncan, 1995) are similar to the conclusions of the CJC insofar as recidivist youth account for the majority of the juvenile crime.

The problem of delinquency and recidivism invites attention from a research perspective. Identification of factors that predict entry into a life of crime opens up the possibility of early prevention. One predictor of adult offending is thought to be childhood aggression (Farrington, 1991a).

1.3 Definition of Key Terms

As the major theme of this research is the development, continuity and sequelae of childhood "aggression", attention needs to be devoted to defining this term. "Aggression" is a term widely used in the literature on problem behaviour, but it is rarely defined and it is often not distinguished from "antisocial behaviour". The word "aggression" covers a multitude of behaviours from open defiance and hostility to covert antisocial acts such as stealing or lying.

Dorothy Lewis (1996a) defines human "aggression" as "behaviours by one person intended to cause physical pain, damage or destruction to another" (1996:334). Other writers have expanded the concept to included "instrumental aggression" which is aimed at securing extraneous rewards, not the pain of the victim, while still others have used the term "hostile aggression" to encompass the aim of inflicting injury on others. Bandura (1973) makes the point that such distinctions are misleading as most aggression has some other goal than injury of the victim. Bandura (1973) defines "aggression" as "behaviour that results in personal injury and in the destruction of property" (1973:5). The injury may be psychological or physical. Such a definition avoids the question of the goal or purpose of the destructive acts. Some

destructive behaviour is socially acceptable, e.g. the behaviour of dentists and drivers of bulldozers.

Another term used frequently but rarely defined in the literature on aggression in young children is "behaviour problems". Campbell (1995) points to descriptive research showing that many toddlers experience behaviours which parents find annoying or difficult. However these actions might be seen as normative as children at this age seek autonomy. Difficulties in sharing with others, conflict in the preschool peer group, increases in fearfulness and self-consciousness between 24 and 36 months are all part of normal behavioural development.

In contrast to these normal patterns of behavioural development, Campbell (1995) argues that the definition of "behaviour problems" in young children should include a pattern or constellation of symptoms with at least short-term stability that goes beyond a transient change or stressor. This constellation of symptoms should be consistent across situations, be relatively severe and "interfere with the child's ability to negotiate normal developmental challenges" (1995:117).

The conceptual framework which underpins much of the present research relies for its definition of aggression on the reported presence of a number of behaviours labelled "externalising". "Externalising" behaviour can refer to a wide range of hostile, aggressive and delinquent actions (Hinshaw, Lahey and Hart, 1993). "Externalising" behaviours are one of two dimensions of human conduct that have consistently emerged in factor analytic investigations of children's behaviour. The robust and cohesive nature of this

The measurement of childhood "aggression" is described in more detail in the Methods section. Achenbach (1991) conceptualises "externalising" behaviour as containing a collection of behaviours seen in clinical populations. Here it is relevant to point out that the key behaviours classified as "aggression" include maternal reporting of child behaviour which has the following features: frequent argumentativeness, demanding attention, destruction of property, fighting, disobedience at home, and temper tantrums amongst others. This aggregation of behaviours reflects the child's open display (either verbally or physically) of hostile defiance and/or destructiveness.

An alternative approach involving a clinical/categorical perspective focussed on the classification and definition of childhood aggression is the *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition) (DSM-IV) (American Psychiatric Association [APA], 1994).

Oppositional Defiant Disorder (ODD) is characterised by the DSM-IV as "a recurrent pattern of negativistic, defiant, disobedient and hostile behaviour toward authority figures" (APA, 1994:91). Four of the criteria must be met to reach a diagnosis. The DSM-IV criteria include losing one's temper, arguing with adults, actively defying or refusing to comply with rules set by adults, deliberately doing things that will annoy other people, blaming others for one's mistakes or misbehaviour, being touchy or easily annoyed by others, being angry and resentful and being spiteful and vindictive. ODD usually occurs before the age of 8 and rarely later than early adolescence.

"Conduct Disorder" (CD) is described in the DSM-IV as "a repetitive and persistent pattern of behaviour in which basic rights of others or major age-

appropriate norms or rules are violated" (APA, 1994:85). CD encompasses four types of behaviours: aggressive conduct that causes or threatens physical harm to other people or animals; non-aggressive conduct that causes property loss or damage; deceitfulness or theft; and serious violations of rules. When a diagnosis of CD is made before the age of 10, it is classified as the "child-onset type" and when it occurs after the age of 10 it is classified as the "adolescent onset type". In order to meet criteria for CD, children must satisfy no fewer than three of the criteria with at least one being present in the past six months. Of the 15 criteria, seven involve aggression (bullying, initiating fights, using a weapon, cruelty to people, cruelty to animals, stealing while confronting a victim, forced sexual activity). It is therefore possible for children to have CD without being aggressive in the sense of being openly hostile or defiant as defined in this study. It is unusual for aggressive children younger than 6 to be diagnosed with CD but most children with CD have previously been diagnosed with ODD (Loeber, Lahey and Thomas, 1991).

"Antisocial behaviour" encompasses a large number of behaviours from aggression to stealing, truancy and fire setting, amongst others. It is recognised that large numbers of children and youth engage in these behaviours without suffering the impairment of ODD or CD (Kazdin, 1987).

The adult sequelae of chronic childhood aggression include "Antisocial Personality Disorder" (APD), described in DSM-IV as "a pervasive pattern of disregard for, and violation of, the rights of others that begins in childhood or early adolescence and continues into adulthood" (APA, 1994:645). A diagnosis

of APD is given only to adults who are at least 18 years old and who have had a history of CD prior to the age of 15.

"Delinquency" is a legal term that refers to behaviours that violate laws and are exhibited in adolescence. It is important to note here that not all delinquent behaviour involves aggression. For example, an adolescent who shoplifts may be described as delinquent, but not aggressive, whereas an adolescent who commits an assault is delinquent and aggressive.

CHAPTER 2

EPIDEMIOLOGY

2.1 Prevalence of Psychological Disorder in Childhood and Adolescence

The classic epidemiological investigation of childhood psychological disorders is the Isle of Wight study (Rutter, Tizard and Whitmore, 1970). It was subsequently replicated in a London borough (Rutter, Cox, Tupling, Berger and Yule, 1975). The researchers used a two-stage process with a teacher-administered general screening questionnaire followed up with detailed clinical interviews. The prevalence of child psychiatric disorder was 6.8 per cent for those living in the rural community and 25.4 per cent for those living in the inner city. In a review of 49 community studies from the U.S.A., Australia, Canada, Sudan, the U.K, Hong Kong, France, China, Finland, Japan, Thailand and Norway, Verhulst (1995) found that the median prevalence of psychiatric dysfunction in children was 12.3 per cent. Prevalence rates in general are affected by factors such as gender, the diagnostic instruments used, age of the child, and the family, social and cultural background of the individual respondent. Since many psychological disorders co-occur in the same individual, the total proportion of children with psychiatric disorders is less than the combined totals of each type of psychological disorder.

Australian epidemiological studies have produced differing estimates of the prevalence of childhood psychological disorders. Connell, Irvine and Rodney (1982), using Rutter's methodology, found a prevalence rate of

10 per cent in the rural communities and 15.1 per cent in urban areas while more densely populated metropolitan communities had a prevalence rate of 18.4 per cent. Sawyer, Sarris, Baghurst, Cornish and Kalucy (1990), using the Child Behaviour Check List (CBCL) (Achenbach, 1991), surveyed children from South Australian schools, finding a prevalence ranging from 2.3 per cent to 13.9 per cent.

The Western Australia study of children and adolescents using the CBCL found a prevalence of 17.7 per cent with psychological disorder. Children aged 4–11 years had a prevalence of 16.0 per cent while for adolescents aged 12–16 years it was 20.6 per cent who scored above the standard US criteria for a psychological disorder using the CBCL (Zubrich *et al.*, 1995).

Bor, Presland, Lavery, Christie and Watson (1992) designed a teacher questionnaire to identify students who were experiencing either emotional, conduct, attentional or learning problems. While the study attained only about a 50 per cent response rate in its random survey of Queensland primary and secondary schools, the findings suggested a prevalence of 17.0 per cent of children with adjustment difficulties, a finding similar to that of the Western Australian Child Health Survey (Zubrich *et al.*, 1995).

2.2 Prevalence of General Behaviour Problems in Young Children

In studies of preschool children using behaviour problems checklists, measures have generally found that about 10–15 per cent of children have mild to moderate problems (Campbell, 1995). In a British population study, 15 per cent of 3-year-old children were found to have mild behaviour problems, 6.2 per cent moderate problems and 1.1 per cent severe problems

(Richman, Stevenson and Graham, 1982). Moderate and severe behaviour problems were more common in boys. In a similar study conducted in the U.S.A., Earls (1980) found that 11-24 per cent of 3-year-olds had behaviour problems with 7 per cent of children having moderate or severe problems.

In the Dunedin birth cohort study, 2 per cent of the sample were found to have hyperactive behaviour at 3 years (mother and observer reports), a further 3 per cent were described as being "difficult to manage" while 6 per cent of children were inhibited and fearful, giving an overall prevalence of 11 per cent of 3 year old children with a psychological problem (McGee, Feehan and Williams, 1995). Teachers reported lower rates of problem behaviours than parents.

2.3 Prevalence of Oppositional Defiant Disorder

Bauermeister, Canino and Bird (1994) note the wide variety of methods used to measure aggressive behaviour and the marked variation in prevalence of ODD from 5.7 per cent to 9.9 per cent. In the Dunedin cohort study, McGee, Freehan, Williams and Anderson (1992) reported a prevalence of 1.3 per cent for ODD at 11 years, and 2.0 per cent for these children at 15 years of age. Verhulst, van der Ende, Ferdinand and Kasius (1997) found very similar rates of ODD for both parent rated (0.6 per cent) and child rated (0.7 per cent) ODD in Dutch adolescents. Cohen *et al.* (1993), using different criteria, reported much higher rates of ODD, with a prevalence of 10.4 per cent for girls and 14.2 per cent for boys aged 10 to 13 years. The prevalence of ODD varied with age, with 15.6 per cent of girls and 15.4 per cent of boys at ages 14 to 16,

and 12.5 per cent of girls and 12.2 per cent of boys at ages 17 to 20 identified as ODD.

2.4 Prevalence of Conduct Disorder (CD)

Depending on the criteria and the measurement instruments used, community prevalence of CD varies from 3 to 16 per cent. Prevalence also varies with age, level of urbanisation and gender. The Isle of Wight and the London Borough study by Rutter *et al.* (1975) found that "conduct disorder" was 4.2 per cent in the rural community and doubled in the city. Using the parent form of CBCL in children aged 4–16 years, the Western Australian Child Health Survey found a prevalence of 10 per cent for delinquent behaviour and 4 per cent for aggression (Zubrick *et al.*, 1995). Several community studies of CD using *Diagnostic Statistical Manual*, Third Edition (DSM–III) (American Psychiatric Association, 1980) and *Diagnostic Statistical Manual*, Third Edition Revised (DSM–IIIR) (American Psychiatric Association, 1987) criteria have found a prevalence of between 2 and 6 per cent (Kazdin, 1995).

In a large (n = 2,679) Canadian sample from Ontario, Offord, Boyle and Racine (1991) found overall prevalence of CD for children aged 4–16 was 6 per cent. CD was more common in boys (8 per cent) than girls (3 per cent) and in adolescents (7 per cent) than children (4 per cent). In the Dunedin cohort study, Anderson, Williams, McGee and Silva (1987), using DSM–III criteria, reported a prevalence of 3 per cent for CD at 11 years. When the same children were followed up at age 15, the overall rate of CD was 6 per cent (McGee *et al.*, 1992). However, when CD was categorised into "Aggressive" and "Non–aggressive", McGee *et al.* (1992) found that there was

an increase in non-aggressive CD from ages 11 to 15 (from 0.4 per cent to 4.0 per cent) but no increase in aggressive CD (1.6 per cent to 1.3 per cent).

Using a Diagnostic Interview Schedule for Children (DISC-1), Cohen *et al.* (1993) found that prevalence of CD varied according to age and gender. From ages 10 to 13, 4 per cent of girls and 16 per cent of boys were diagnosed with CD, from ages 14 to 16, 9 per cent of girls and 16 per cent of boys were diagnosed with CD and from ages 17 to 20, 7 per cent of girls and 10 per cent of boys were diagnosed with CD. CD appeared to peak at age 10 for boys and declined steadily until age 20, whereas it peaked at age 16 for girls.

Prevalence rates for CD in adolescents differ according to whether the diagnosis is taken from parental reports or child reports. Verhulst, van der Ende, Ferdinand and Kasius (1997) when using the DISC based around DSM-III-R diagnostic criteria found a prevalence of 6 per cent for CD when completed by the child, versus only 1 per cent when the DISC was administered to the parent. CD has been found to be less prevalent using DSM-III-R criteria than DSM-III criteria, when both have been compared in the one study (Lahey *et al.*, 1990). The DSM-III-R criterion appears to be more valid because it is more strongly associated with outcomes such as police contacts, history of antisocial personality disorder in the biological father and suspensions from school (Lahey *et al.*, 1990).

We conclude that both ODD and CD are relatively common in children and adolescents. There are significant gender differences: males outnumber females in most studies. The relationship between ODD, CD and delinquency will be explored in the next section.

CHAPTER 3

THE LINK BETWEEN CHILDHOOD AGGRESSION, ANTISOCIAL BEHAVIOUR, PERSISTENT JUVENILE OFFENDERS AND ADULT PSYCHOPATHOLOGY

A substantial body of longitudinal research demonstrates that persistent delinquent acts in adolescence emerge as the outcome of a predictable developmental trajectory of behaviour problems and aggression beginning in childhood (Farrington, 1994). It needs to be emphasised that a variety of overlapping behaviours (e.g. aggression, lying, stealing, being troublesome) have been used to predict subsequent delinquency.

Robins (1966) established that a diagnosis of adult antisocial personality was preceded by history of antisocial behaviour especially in boys. Of the 64 male adults with antisocial personality, the majority manifested antisocial behaviour before the age of 8. The early precursors of adult antisocial personality were truancy, failure to perform well academically, stealing and discipline problems in the school. The number of symptoms was more predictive than the type of symptom. Hostile defiance in childhood was manifested by between 53 per cent and 45 per cent of the adult sociopaths.

In a review, Loeber and Dishion (1983) concluded that some family management techniques (lack of supervision and too much discipline) followed by the child's conduct problems were strong predictors of delinquency. Mitchell and Rosa (1981) found that destructiveness (consistent with our conceptualisation of aggression) was only one amongst other antisocial

behaviours that predicted a criminal conviction. Kelso and Stewart (1986) followed up 55 aggressive conduct disordered boys. The types of aggressive behaviour studied overlapped with behaviours central to this study, i.e. oppositional behaviour, fighting with adults and peers. The most powerful predictors of continuing aggressive conduct disorder were the number of symptoms of conduct disorder the child initially had. These results mirror those of Robins (1966).

In the studies discussed so far, aggression has been identified as an important, but not necessarily dominant, predictor of future delinquency. The view that aggression is the crucial predictor of delinquency is controversial. Regardless of whether prior aggression or other variables are found to be the "best" predictor of aggressive behaviour by youth, a number of conditions need to be met if a variable is to serve as the basis of an intervention. Firstly, there should be a strong association between the variable of interest and aggressive child behaviour; secondly, the association should be arguably causal; and thirdly, a substantial proportion of the cases of aggressive behaviour should be attributable to that factor. If aggression is the main predictor of future deviance, then arguably the above criteria are met and prevention programs could be targeted to early evidence of aggressive behaviour.

Farrington (1991a) has examined whether aggression is a specific trend or part of a more general syndrome of antisocial behaviour. If the latter is true, then childhood aggression should predict both antisocial behaviour and violence in adulthood. If aggression is a specific trait, then it should predict violence in adulthood but not other antisocial behaviour. In a 25 year follow-up of 400

urban working class males, Farrington found that aggression in childhood predicted both antisocial behaviour and violence in adulthood, and concluded that "the causes of aggression and violence must be essentially the same as the causes of persistent and extreme antisocial, delinquent and criminal behaviour" (1991:25). Farrington (1994) has argued that the results of a number of longitudinal studies support the above conclusion.

3.1 Adult Disorders Predicted by Childhood Aggression and Antisocial Behaviour

Whilst there is substantial evidence supporting the continuity of antisocial behaviour from childhood through to adulthood, there is also evidence that childhood conduct problems predispose adults to a range of psychiatric problems and more general life difficulties. Results from the NIMH Epidemiological Catchment Area Project show that a wide range of adult mental health problems including somatisation, phobia, panic, obsessive-compulsive disorder, schizophrenia and antisocial personality disorder occur with a high frequency in adults with a history of childhood conduct disorder (Robins and Price, 1991).

Converging evidence for the high rate of psychiatric comorbidity among individuals with a history of conduct disorder is supported by the findings of a study conducted by Canadian researchers (Swanson, Bland and Newman, 1994). In a random sample of 3,258 adults, they found a lifetime prevalence of 3.7 per cent for antisocial personality disorder (ASP) using DSM-III criteria. Consistent with previous studies (e.g. Robins, 1978), 50 per cent of males with ASP in the Canadian study had symptoms of conduct problems by age 7, and

95 per cent of these males had symptoms of conduct problems by age 12. Of the ASP males with conduct problems by age 12, 90.4 per cent received another (current) psychiatric diagnosis, compared with only 30.1 per cent of all other study participants. The three disorders with the highest comorbidity among adults with ASP were alcohol abuse (85.6 per cent), drug abuse (34.6 per cent) and depression (25.0 per cent). Zoccolillo, Pickles, Quinton and Rutter (1992) found that while less than half of their follow-up cohort of conduct-disordered youth had a DSM III diagnosis of antisocial personality disorder, about three-fifths had persistent social problems across many areas of their lives including love relationships, work and friendships. These results suggest that addressing childhood conduct disorder is important for reducing not only concurrent antisocial behaviour and its criminal outcomes in adolescence and adulthood, but also psychiatric disorder generally.

If aggression shows a substantial level of continuity from childhood to adolescence and beyond, then treatment of the childhood aggressive syndrome becomes a key strategy in any prevention approach. Further, any prevention strategy needs to identify the point at which the chronic aggression begins, e.g. infancy, preschool period, middle childhood, etc., if effective intervention/prevention programs are to be instituted.

3.2 The Continuity of Aggression

The stability of aggressive behaviour has been reviewed by Olweus (1979) who examined the stability of male aggression over different ages, e.g. preschool, childhood, adolescence, adulthood. The average raw and disattenuated correlations were 0.55 and 0.68. The author concluded that a

substantial degree of stability existed in male aggression over time and the stability was similar to that of intelligence test results. Gersten *et al.* (1976) assessed the changes in behaviour in a group of 732 children and adolescents over five years. The stability coefficients were greater than 0.55. In particular, three dimensions all representing aggressive or antisocial behaviours (conflict with parents, fighting and delinquency) showed consistency over time.

This finding from research on delinquency and aggression pointing to the continuity of problem behaviour over time has led some researchers to propose that there is an underlying antisocial trait (e.g. Moffitt, 1993a; Patterson, 1993). When the same measures of problem behaviours are compared longitudinally, stability has been shown for both caseness of individuals with problem behaviour, and for syndromes and traits measured on continuous scales. The continuity of problem behaviours appears to begin with disobedient and aggressive behaviour at about age 3, followed by conduct disorder in later childhood and then, in adolescence, delinquency often leading to arrest (Moffitt, 1993a). For example, an individual may bite and hit at age 4, shoplift and truant at age 10, steal cars and sell drugs at age 16, commit robbery and rape at age 22 and engage in child abuse and fraud at age 30 (Moffitt, 1993a). There is other evidence which shows that a first arrest between ages 7 and 11 has been shown to be important for predicting long-term adult offending (Loeber, 1982).

Whilst the proportion of children who exhibit stable aggressive behaviour is relatively small, there is a much larger proportion of adolescents who engage in antisocial behaviour but who do not continue with this behaviour. Moffitt

(1993a) therefore makes the important distinction between "life-course-persistent-antisocial behaviour" and "adolescence-limited" antisocial behaviour. Moffitt (1993a) argues that the hallmark of "life-course-persistent-antisocial" behaviour is continuity both across situations and over time. Moffitt (1993a) invokes the concept of heterotypic continuity to describe the trait or attribute that is assumed to underlie the diverse range of antisocial behaviours.

Patterson (1993) argues for the continuity of antisocial behaviour in children as reflecting orderly changes in the manifestation of an underlying antisocial trait. He suggests that over time there are both qualitative and quantitative shifts in the manifestation of this trait. He found new behaviours were added to the indicators of the underlying antisocial trait over time.

3.3 Stability of Problem Behaviours in Young Children

In a recent review of the literature Campbell (1995) reported that adult ratings of problem behaviours in young children are remarkably stable for both representative and selected samples. This finding holds both over short-term follow-ups of 1 to 2 years (e.g. Richman, Stevenson and Graham, 1982) and over longer term follow-ups of 3 to 7 years (e.g. Campbell and Ewing, 1990; Richman, Stevenson and Graham, 1982). When children with clinically significant behaviour problems at age 3-4 are followed longitudinally, about 50 per cent continue to show problems into primary school and early adolescence (Campbell, 1995).

For example, Richman, Stevenson and Graham (1982) found that a significant proportion of behaviour problems persisted in children at 3 and 4 years to 8 years including being overactive, having poor concentration, being

difficult to control and manifesting temper tantrums. Using the cut-off on the Behaviour Screening Questionnaire (BSQ) to divide disturbed from non-disturbed children, they found that 63 per cent of children in the problem group at age 3 remained in this group at age 4, whereas 11 per cent of the control group at age 3 met the cut-off for disturbed children at age 4. By 8 years, 62 per cent of the problem group remained within the disturbed range on the BSQ (mild, moderate or severe) whereas only 22 per cent of the control group fell within this range.

In a longitudinal study Campbell and colleagues report the follow-up at ages 4, 6, 9 and 13 of two cohorts of hard-to-manage preschool children (Campbell, Szumoski, Ewing, Gluck and Breaux, 1982). They found stability of problem behaviours from 3 to 4 to 6 years of age. Children with behaviour problems were also more likely to be receiving remedial help at school and to be rated as more disruptive by teachers (Campbell, Ewing, Breaux and Szumowski, 1986). These results were replicated in a second longitudinal study. This study also found that, for the hard-to-manage boys aged 2.5 to 4.5 years, by age 9, 34 per cent met criteria for an externalising disorder (oppositional defiant disorder, conduct disorder and/or attention deficit hyperactivity disorder) (Campbell, Pierce, Moore, Marakovitz and Newby, 1996).

Likewise, Egeland, Kalkoske, Gottesman and Erickson (1990), in a study of 97 preschoolers aged 4.5 to 5.0 years, found that 80 per cent of children classified as "acting out" in preschool were classified as having a behaviour problem (marginal or clinical) in either second or third grade. Greater continuity was apparent for boys than girls in first grade but gender differences

disappeared by third grade. Fischer, Rolf, Hasazi and Cummings (1984), in a nine-year follow-up study using the CBCL, found that males (n = 299) with severe externalising problems had a 0.25 probability of having severe externalising problems at follow-up. Females (n = 242) had a probability of 0.35 of the same outcome. Not surprisingly, coefficients of stability and measures of continuity appear to be larger for shorter follow-up periods (e.g. 2 to 3 years) than for longer ones (e.g. 9 years).

Continuity of problem behaviour from childhood to adolescence

The pattern of a large proportion of young children with behaviour problems developing externalising problems in adolescence has been found in studies using a range of methodologies. In a large Dutch study of 1,774 children 4 to 16 years, 1,334 were available for follow-up 2–16 years later (Verhulst and Althaus, 1988). Problem scores on the CBCL declined in the sample over the follow-up period, and were higher for males than for females on each measurement occasion. Although only 28 per cent of children in the top 10 per cent of the externalizing syndrome remained in this range at follow-up, 54 per cent of children from the total sample initially classified as disturbed remained in the disturbed ranges two years later.

Similarly, in the Cambridge Study, Farrington (1994) found that half of the most antisocial boys at ages 8 to 10 were among the most antisocial at age 14 and 43 per cent were still among the most antisocial at 18 years of age. In the Dunedin birth cohort 86 per cent of children with conduct and oppositional defiant behaviours at age 7 also exhibited these behaviours at age 15 (Moffitt, 1993a). These results are all consistent with the work reviewed by Olweus

(1979, 1980, 1984) who found that the average stability coefficient for males' aggression in more than 16 studies was about 0.68.

3.4 Measurement Error in Measures of Stability

Despite the impressive stability coefficients observed for aggressive behaviour in childhood and adolescence, few studies take into account the effect of measurement error. The effect of measurement error at two or more occasions of measurement has the effect of introducing random variation and hence variability in the results (Ferguson, Horwood and Lynskey, 1995). Fergusson *et al.* (1995) have therefore argued that much observed discontinuity in behaviour may be due to measurement error rather than represent true behavioural change, and have shown that when corrections for measurement error are used, the stability of childhood externalising problems may be as high as 90 per cent. This result may be found when continuous measure of aggression and behaviour problems is used such as the CBCL. However, when diagnostic criteria for caseness are used, measures of continuity may have been found to be reduced substantially, as demonstrated by Fergusson *et al.* (1995).

3.5 Summary of Evidence of Continuity of Aggression

Overall an impressive number of longitudinal studies have found similar results, especially in males. If aggression develops in the preschool years approximately 50 per cent will remain aggressive in their pre-adolescent and adolescent years. A significant number of these adolescents will engage in antisocial behaviour.

While the evidence seems consistent with respect to aggression being the key behaviour that predicts a recidivist career, a number of researchers have suggested that aggression itself is a surrogate for other vulnerabilities. Rutter and Rutter (1993) have summarised the evidence that childhood aggression predicts not only aggression in adolescence but also non-violent antisocial behaviour. One possibility is that aggressive children suffer from a complex of problems described as hyperactive-impulsive-inattentive behaviour. Some studies have shown that when aggression is measured in the absence of the above symptom complex, aggression by itself failed to predict antisocial behaviour (Rutter and Rutter, 1993). Farrington (1994) reports a study which found that the hyperactivity-impulsively-attention deficit (HIA) syndrome significantly predicted juvenile convictions independently of conduct disorder of childhood. Of special significance is a group of children who begin their antisocial career at an early age. With this group the best predictor for future delinquency is early offending behaviour rather than aggression.

Many issues remain to be addressed. In some studies, aggression is the key predictor of delinquency, in others it is the HIA syndrome, while in others early offending is the main predictor. However the focus of this study is on the long-term risk behaviour of young children with high levels of aggression at 5 years of age.

CHAPTER 4

CORRELATES OF AGGRESSION

4.1 Social and Cultural Factors

Macro-social

A variety of macro-societal factors have been implicated as causes of aggression and violence in society. Landau (1984) used measures of social stress and found a relationship between stress and levels of violent crime during the 1960s and 1970s in 11 of 12 countries studied. The Australian Institute of Criminology Report on Violence in Australia (1990) cites evidence of higher homicide rates in countries with high income inequality and in countries experiencing periods of economic decline. The report also noted that cultural disintegration such as experienced by the Aboriginal people could contribute to a loosening of prohibitions against violence. Consistent with this is the finding in the report of the CJC, Qld (1995) which found that Aboriginal and Torres Strait Islander children were over-represented in the Queensland juvenile justice system, accounting for half the cases in custody.

Race

Offord and Fleming (1996) and Rutter and Giller (1983) reviewed the evidence relating race and ethnicity to child and adolescent psychopathology. Compared with white Americans, Mexican-Americans, North American Indians and African-Americans have an increased prevalence of psychological disorder, including aggressive behaviour. Rutter and Giller (1983) acknowledge difficulties in interpreting these results due to factors such as possible bias in the collection of statistics. On the other hand, British children

of Asian origin have rates of psychological disorder equal to or lower than white children. The explanation of these differences may lie in the experience of poverty, family adversity and difficulties in school performance characteristic of some ethnically disadvantaged families. The Aboriginal and Torres Strait Islander group in Australia are likely to be effected by similar experiences.

Media and violence

The extent of the influence of the media on levels of aggression in the child and youth community remains controversial. It has been extensively reviewed elsewhere (Edgar, 1988). While there is consistent evidence that there is increasingly vivid depiction of violence and longer hours of exposure to television viewing by children, the connection between these changes and negative outcomes for children remains inconclusive (Australian Institute of Criminology, 1990). At best a mutually reinforcing relationship may exist between aggressive children and their choice of violent themes which further reinforces their antisocial belief system.

Socio-economic Status (SES)

Low family SES is strongly associated with the early onset of serious conduct disordered behaviour (Offord, Boyle and Racine, 1991) and the maintenance of chronic and serious antisocial behaviour (e.g. Loeber, Green, Keenan and Lahey, 1995). Eron, Guerra and Huesmann (1997) found that poverty was associated with stressful life events and beliefs promoting aggression. Low family SES has also been consistently associated with early onset maternal pregnancy, perinatal complications, large family size, family discord, parental psychopathology and low levels of parental education (Offord, Boyle and Racine, 1991). McLoyd and Wilson (1991) assessed 92 children

and their mothers, living in poverty, and suggested there was a causal pathway linking economic stress to maternal distress, poor nurturance, open family discussion of economic hardship, and subsequent increased childhood misery. Bor *et al.* (1997) examined the relationship between chronic poverty and behaviour problems of young children in an Australian cohort. The more often a family experienced low income the higher was the rate of child behaviour problems.

Urban and rural differences

A large number of childhood and adolescent psychological disorders, but especially antisocial behaviour and delinquency, occur more frequently in urban areas (Offord and Fleming,1996). A suggested explanation of the difference in rates is an increase in psychosocial distress experienced by inner city families. Factors such as increased marital discord, low social class and large family size contribute to childhood psychological maladjustment (Rutter, 1978). It is unclear why low social class families might experience more adversity in urban rather than rural areas. Suggested explanations include a concentration of factors such as high density living with more opportunity for conflict due to the sheer concentration of large families in low rent areas, loss of community supports, migration of problem families into the inner cities, more competition for jobs in the cities, and deterioration in the structural aspects of communities with an escalating cycle of vandalism (Rutter, 1981).

School factors

The influence of schools on rates of disruptive behaviour, delinquency and academic success or failure has been extensively researched by Rutter, Maughan, Mortimore, Ouston and Smith (1979). Schools have been found to

have influences above and beyond intake characteristics of the pupils and their families. Certain process factors do make a difference to the level of disruptive behaviour within the classroom. These include teacher skill at classroom control, teachers acting as good role models, use of rewards, the degree to which pupils are given responsibilities within the school, the expectations of students, and the degree to which the school focuses on academic attainment. Rates of delinquency can also be influenced by the mix of students. In this study the more a school contained numbers of intellectually disadvantaged students or the more one social class dominated the mix of the school, the higher were the delinquency rates. Rutter and Giller (1983) suggest these results seem to be explained by a peer subculture effect rather than changes in teacher behaviour towards the students.

Peer groups

The association between deviant peers and delinquency is well established in the literature (Elliot, Huizinga and Ageton, 1985). Researchers differ in the importance they attribute to deviant peers in the maintenance of aggressive behaviour (Keenan, Loeber, Zhang, Stouthamer-Loeber and Kammen, 1995). It has also been argued that deviant and aggressive children seek peers who are similar to themselves , whereas others see the peer group as providing the context for children to act out existing delinquent tendencies (Patterson, 1982).

In a longitudinal study consisting of six waves of respondents, Keenan *et al.* (1995) studied 250 high-risk and 250 control-group boys from first, fourth and seventh grades in inner-city public schools in Pittsburgh. They found a two- to fourfold increase in the likelihood of delinquency given a delinquent

peer context. These authors did not find that parenting practices moderated the effects of peer influence.

4.2 Family and Maternal Correlates

Henry, Moffitt, Robins, Earls and Silva (1993) argue for the importance of studying family factors in relation to antisocial behaviour and aggression. It is also argued that the most effective interventions for problem behaviours in children occur when the family is the unit of intervention (Sanders and Markie-Dadds, 1996).

Marital conflict

Children in families characterised by dyadic instability and conflict consistently demonstrate significantly higher rates of both internalising and externalising behaviour problems (Dadds, Sanders, Behrens and James, 1987; Emery, 1982; Gottman and Katz, 1989; Grych and Fincham, 1990; Long, Forehand, Fauber and Brody, 1987; Johnson and O'Leary, 1987; Jacobson, 1978). In a review of 19 studies, Grych and Fincham (1990) found 15 (79 per cent) supported the finding of a relationship between marital conflict and children's adjustment. This finding appeared where the parents subsequently divorced and as well remained intact. Our own work has also found an association between dyadic (marital) conflict and an increased prevalence of a variety of categories of child behaviour problems (Najman *et al.*, 1997).

Parental conflict over childrearing has also been shown to predict adjustment problems in children in both cross-sectional and longitudinal studies (Block, Block and Morrison, 1981). In the Dunedin study, conflict over

how to discipline the young child was a predictor of later adolescent antisocial behaviour (Henry *et al.*, 1993). In the Dunedin Study (Henry *et al.*, 1993), the number of parent changes was the best predictor of membership in the antisocial group. Similar findings have been reported by the MUSP (Najman *et al.*, 1997).

Parental mental health

Dyadic discord and dissolution have been found to be only modest predictors of chronic behavioural problems in children (Kazdin, 1987). Rather, the evidence suggests that dyadic discord and dissolution impact most strongly by way of their effects on parental emotional adjustment (e.g. maternal depression) and parent-child interaction (e.g. inconsistent or dysfunctional parenting).

Consequences of maternal depression (Fergusson, Horwood, Greton and Shannon, 1985; Richman *et al.*, 1982) and anxiety (Bates and Bayles, 1984) have consistently been linked with both maternal and independent observer ratings of problem child behaviour. Children of depressed or anxious mothers appear to be at higher risk for a range of emotional and behavioural problems, cognitive deficits and poor school adjustment (Grunebaum, Cohler, Kauffman and Gallant, 1978; Hammen *et al.*, 1987). Additionally research examining the association between maternal depression and maternal perceptions of child adjustment in clinic families have consistently demonstrated that mothers reporting higher levels of depression perceive their children as less well adjusted (e.g. Brody, Stoneman and Burke, 1988; Friedlander, Weiss and Traylor, 1986; Pannaccione and Wahler, 1986). Depressed mothers also appear to interact differently with their children,

engaging in significantly higher levels of aversive and coercive parenting (Pannaccione and Wahler, 1986).

Rutter and Quinton (1984) conducted a four-year prospective study of psychiatric patients. They compared the children of psychiatric patients with children in the general population control group. They found that there was more marital discord among the psychiatric sample and that the children of parents experiencing psychiatric disorders were more likely to have behavioural or emotional disturbances, particularly conduct disorders. The psychiatric risk to the children was greatest when their parents had personality disorders involving hostile features, and when the children themselves had difficult temperaments.

Parenting style

There is growing consensus that family disruption or adversity, in the form of maternal depression, marital discord, divorce or other stresses have their major impact on child behaviour because they are associated with a particular pattern of parenting (Belsky, 1984; Hetherington, Stanley-Hagan and Anderson, 1989; Snyder, 1991). Patterns of parenting associated with childhood aggression include inconsistent parental disciplinary practices, parental rejection, harsh punishment, parental modelling and lack of parental supervision (Eron, Huesmann and Zelli, 1991; Patterson, DeBaryshe and Ramsey, 1989).

In particular, the *quality* of parent-child and family relationships has been implicated as a risk factor for the development of behavioural problems in children. Parents of children with behaviour problems show lower levels of acceptance of the child, manifest less warmth and/or affection, and report

lower levels of attachment and positive feelings than do parents of non-problematic children (Loeber and Dishion, 1983). A lack of warmth and engagement coupled with negative maternal control appear particularly important as predictors of later non-compliant/aggressive behaviour in young children (Bates and Bayles, 1984). Parental disciplinary practices characterised by a combination of warmth, firm but apparently fair control, and the use of explanations and reasoning are associated with child behavioural compliance (Crockenberg and Litman, 1990; Kuczynski, Konchanska, Radke-Yarrow and Girnius-Brown, 1987).

There is a need for caution in interpreting the causal direction of the above associations. Many of these findings are consistent with the possibility that difficult children often elicit inconsistent and aversive parenting behaviour. For example, mothers with hyperactive, aggressive or non-compliant children have been shown to be less patient, more power assertive, and less consistent (Patterson, 1980; Patterson, Debaryshe and Ramsey, 1989). Mothers of preschool-age children rated as being more difficult or having more behavioural problems cite their interactions as less positive, more negative, and more conflict-ridden than do comparison mothers (Barron and Earls, 1984; Richman *et al.*, 1982).

4.3 Child Correlates

Gender

Generally, rates of CD and ODD are higher in boys, and this pattern follows through until adolescence when there is an increase in girls with non-aggressive CD (McGee *et al.*, 1995). The majority of research on conduct

disorder in children and adolescents has focussed on males. Zoccolillo (1993) suggests the reasons for this are the perception that conduct disorder is unknown in girls, that much research in this area has come from the criminal justice system, and that DSM-IV criteria for conduct disorder were derived on male samples and have never been validated on females. This may result in an underestimation of the problems of aggression in female children and adolescents. However, Zoccolillo argues that CD is the most persistent psychiatric disorder in young girls and, for this reason alone, warrants further investigation.

The adult outcomes of aggression in childhood are different for males and females. Substance abuse, mental health service use, police contacts, total disturbances and school behaviour problems are reported in boys, whereas academic problems, suicidal behaviour, police contacts and school behaviour problems are reported in girls (Achenbach, Howell, McConaughy and Stanger, 1995).

Cognitive factors in the child

Aggressive and antisocial children and adolescents are known to have a preponderance of learning difficulties associated with low, average or borderline intellectual ability. In addition, many of these children have lower than average verbal intelligence which is partly a reflection of the presence of reading and complex language difficulties (Rutter and Giller, 1983; Richman *et al.*, 1982). Several hypotheses have been put forward to explain the association between disruptive disorders and learning/reading difficulties. One model suggests that behaviour interferes with learning, hence the emergence of academic problems. Evidence for this latter view is

questionable in large part because the cognitive difficulties often predate the behaviour problems. Alternatively, a more complex model suggests that the children with learning problems may experience low self-esteem while socialised in an environment that is deficient in verbal stimulation and high in family adversity. Entry into school further exacerbates the cycle of anger and failure. Associated with the latter model is increasing evidence that the reading disorder/aggression relationship may be underpinned by a third process in the form of attention weaknesses (Maughan and Yule, 1994).

4.4 Prenatal/Pregnancy Correlates

Smoking and substance abuse

Cigarette smoking and other forms of substance use or abuse (e.g. alcohol) during pregnancy may constitute both a pre- and a perinatal risk factor for developmental and behavioural problems. For example, cigarette smoking during pregnancy potentiates the occurrence of other perinatal risk factors such as prematurity and low birth weight (Abel, 1984; DiFranza and Lew, 1995; English and Eskenazi, 1992). Smoking during pregnancy is believed to contribute to adverse reproductive outcomes primarily through foetal hypoxia, and may also have direct effects on the developing foetus (Hagino and Lee, 1985; Van de Kamp and Collins, 1994). Research on human neonates suggests an association between maternal smoking during pregnancy and increased rates of a variety of neurobehavioural difficulties (Fried and Makin, 1987; Friedson, Watkinson and Gray, 1992), all of which may have relevance to temperamental differences observed from early infancy.

A number of studies have found increased levels of behaviour problems in offspring of mothers who smoked during pregnancy. Several studies have linked heightened rates of inattention, impulsivity and motor hyperactivity during childhood in offspring of mothers who smoked during pregnancy (e.g. Fergusson, Horwood and Lynskey, 1993; Fried, Watkinson and Gray, 1992; Naeye and Peters, 1984), raising the possibility that prenatal maternal smoking may be salient as a risk factor for the development of Attention Deficit Hyperactivity Disorder (ADHD). Additionally, an association between maternal smoking during pregnancy and a higher incidence of reported conduct problems in offspring children has been observed by a number of researchers (e.g. Fergusson *et al.*, 1993; Makin, Fried and Watkinson, 1991; Weitzman, Gortmaker and Sobol, 1992). However, some of these studies have not adequately controlled for potential confounds such as socio-economic status, parental psychosocial adjustment and parent-child interaction. In the Mater-University Study of Pregnancy (MUSP), the association between maternal smoking in pregnancy and externalising behaviour was independent of a large number of possible confounding variables (Williams *et al.*, 1998). Loeber *et al.* (1995) have also found that parental substance abuse predicted the onset of CD in a six-year follow-up study of 177 boys aged 7 to 12 years.

Perinatal factors

Several factors relating to pregnancy and birth have been associated with behaviour problems in childhood and adolescence. Loeber *et al.* (1995) found that maternal age was a significant predictor of the onset of CD in at-risk boys. Other studies have shown that low birthweight and prematurity predict (albeit only weakly) attentional and behavioural problems in preschoolers (Minde *et al.*, 1989). However, the association between these perinatal factors

and preschool behaviour has been attributed to a combination of developmental delay and family dysfunction (Campbell, 1995). Campbell (1995) suggests that birth complications appear to lead to negative behavioural outcomes in preschoolers only when other environmental risk factors are present. Risk factors during infancy appear to be additive (Sameroff, Seifer, Baldwin and Baldwin, 1993; Sanson, Oberklaid, Pedlow and Prior, 1991).

Violent offending and, by implication, aggressive behaviour in adolescence and adulthood have also been associated with complications at delivery, minor physical anomalies and neuromotor deficits (Brennan, Mednick and Kandel, 1991). The authors also found that minor physical anomalies at age 12 were associated with violent offending at age 21. They hypothesise that minor physical anomalies may indicate disturbance to the development of the foetus and in particular the development of the central nervous system.

Infant temperament and behaviour

Temperament has been defined as behavioural "style" as opposed to behavioural "content". Style here is taken to refer to the way behaviour is expressed, that is such factors as activity level, intensity of reaction, persistence and adaptability. These stylistic tendencies are believed to be largely genetic or constitutionally based, in part because such differences are observed very early in life. Behavioural content, by contrast, refers to the behaviours themselves, e.g. eating, sleeping, recreational activities, interaction with peers. While all youth must engage in a range of behavioural activities, their style of engagement will differ, in large part for what are believed to be biological reasons. Presumably such stylistic differences are adapted to the demands of society as the child grows up.

Although early temperament appears to be functionally related to the emergence of early onset behavioural problems and conduct disorder, efforts aimed at predicting such problems from temperamental indices have produced mixed results (Slabach, Morrow and Wachs, 1991). Only a low to moderate relationship has been found between infant temperament and subsequent behaviour problems (Sanson, Oberklaid, Pedlow and Prior, 1991). Nonetheless, a difficult temperament in early childhood does appear to be related to subsequent development of antisocial behaviour.

Findings from the Australian Temperament Study show that infants perceived by their mothers as "much more difficult than others" were also more likely to be rated as having behaviour problems at preschool (Sanson, Oberklaid, Pedlow and Prior, 1991). These results are consistent with other studies of the relationship between temperament and behaviour problems in community samples (e.g. Campbell and Ewing, 1990; Wolkind and Salis, 1982).

Although many authors regard temperament as being determined by genetic influences, Moffitt (1993b) has suggested that subtle neuropsychological variations in the infant's central nervous system resulting from a variety of prenatal, perinatal and postnatal difficulties (e.g. exposure to toxic agents, birth complications, heredity) can increase the likelihood that the infant will be "temperamentally difficult," displaying such characteristics as irritability, irregularity, hyperactivity and impulsivity. Campbell (1995) argues that infant temperament interacts with parenting and biological factors to produce negative or positive outcomes.

4.5 Biological Correlates

It is important to note that much of the research attributing aggressive and antisocial behaviour to biological factors has involved samples of violent youth and antisocial adults.

Genetic

Many twin studies have shown a higher concordance for monozygotic twins over dyzygotic twins for criminal behaviour. Generally, adoption studies have supported the conclusions of twin studies (Mednick, Moffitt, Pollock, Talovic and Gabvielle, 1986), with the adopted sons of biologically criminal fathers having higher rates of criminal behaviour. Lewis (1996b) has summarised the developing evidence of a link between specific sites on genes and abnormalities of neurotransmitter production, dopamine receptor structure and temperament such as novelty seeking. She sounds a word of caution, arguing that genetic factors do not account for the majority of causal influences on violent behaviour.

Hormonal

The one genetic syndrome that has been consistently associated with aggression is the male sex. Across cultures and species, the male sex is more aggressive than the female. This consistent finding has led to examination of the gonadal hormones and others and its effects on behaviour in animals and humans. While there has been extensive research there has been no consistent finding suggesting a hormonal marker for aggression in humans (Lewis, 1996a).

Neuroanatomical

Excitatory and inhibitory neuroanatomical centres of aggression have been identified in animal studies and include the orbitofrontal cortex, septal area, hippocampus, amygdala, caudate, thalamus, hypothalamus, midbrain, tegmentum, pons and cerebellum (Marzuk and Barchas, 1996). In humans, specific lesions to any one of the above areas is rare. However, there is more convincing evidence of a close relationship between specific brain regions and behaviour from aggressive adults who have experienced damage to the frontal areas of the brain. Further support comes from the poor performance of delinquents on subtle neuropsychological tests (Lewis, 1994).

Neurotransmitters and psychobiology

Lahey, McBurnett, Loeber and Hart (1995) have reviewed the growing and complex field of neurotransmitters and psychophysiological abnormalities in aggressive yet hyporesponsive subjects who find it hard to learn from experience. The authors suggest that a small number of central nervous system mechanisms could explain a number of correlates of aggressive behaviour. Common central nervous system pathways may influence skin conduction, heart rate and blood pressure as well as the production of cortisol via the hypothalamus. These pathways are under the control of neurotransmitters such as serotonin which has been found to be at reduced levels in aggressive subjects. The authors suggest that these findings may provide a robust biological explanation for a subgroup of undersocialised aggressive people.

Hyperactivity-impulsivity-attention deficit

Farrington (1994) has summarised the evidence that hyperactivity-impulsivity-attention deficit (HIA) may be an important factor in the aetiology of persistent aggression. Hyperactivity begins early in life and persists into adolescence, as does aggression. It is associated with problems in delaying gratification and a short-term view of the world. Farrington has demonstrated that HIA in childhood is predictive of future offending independent of early conduct problems. Rutter and Rutter (1993) suggest that HIA could explain many different behaviours, e.g. impulsive actions and daring. Farrington, Loeber and Van Kamen (1990) found that children with HIA disproportionately had criminal parents, low intelligence and large family size while children with conduct problems had poor supervision and poor parenting. These results raise the possibility that HIA is associated with a cognitive disability while conduct problems are associated with poor parenting.

CHAPTER 5

THE DEVELOPMENT OF AGGRESSION AND DELINQUENCY

Any explanation of the stability of aggression must account for how behaviours which begin in early childhood exhibit a continuity which leads to subsequent criminal activity. Rutter and Rutter (1993) propose three broadly based explanations. First, genetic mechanisms may produce personality attributes that persist over time. This would include other biological factors such as neurological, neurotransmitter and hyperactivity-impulsivity-inattention vulnerabilities that could be seen to predispose the psychological functioning of the child to mainly aggressive responses. Second, aggression may be the outcome of a lengthy process of socialisation beginning in infancy and continuing through the first ten or fifteen years of a child's life. This mechanism is essentially a psychosocial one. Third, they advance a theory that incorporates the transactions between biologically vulnerable children and their environment.

The transactional model of as described by Sameroff (1993) is an overarching theoretical position that enables the incorporation of numerous biological and psychosocial correlates into a coherent model of development. This model essentially supports the third position as proposed by Rutter and Rutter (1993). It proposes that development is the product of a continuous dynamic interaction between the child, that child's experience in his or her family and his or her social context. The transactional model allows for the effect of the child on his or her environment as well as for the effect of the

environment on the child. Sameroff (1993) argues that a genuine transaction occurs when the child's or infant's behaviour influences the parents to respond in a particular way and that the parents would not have responded in this way if the child's behaviour had been different. Sameroff employs the concept of the envirotype to describe how the infant's and child's social world is hierarchically structured with factors that are proximal (e.g. the nuclear family) having the most influence and distal factors having the least influence (e.g. the socialising effect of culture).

5.1 Psychosocial Mechanisms

The psychosocial explanation of aggression is based on the principle that the child experiences adverse socialisation within the family. This explanation implies that the child's behaviour is contingent on parental reinforcement of an aggressive behavioural style. Support for such an explanation would need to identify evidence of adverse socialising environments.

Aggression and Disorganised Attachment

Attachment theory predicts that psychopathology emerges in childhood as a result of disruptions in attachment. Positive interactions with primary caregivers result in a positive model of self, and *vice versa.* A negative view of self is associated with long-term problems in forming relationships and low social competence (Wolfe, Wekerle and McGee, 1992).

According to attachment theory, aggressive behaviour emerges as a result of disorganised attachment relationships between the infant and the primary caregiver. The classification of disorganised attachment was

developed in the 1980s when it became apparent to researchers using the Ainsworth, Blehar, Waters and Wall (1978) infant strange situation response that the original three attachment classifications (secure, avoidant and anxious/ambivalent) did not adequately capture the range of attachment behaviour observed in empirical studies (Lyons-Ruth, Repacholi, McLeod and Silva, 1991; Main and Solomon, 1990). Disorganised attachment involves marked variability and inconsistency in attachment behaviours in the infant strange situation, particularly under conditions of stress (Lyons-Ruth, 1996). Disorganised attachment appears to be more prevalent when other factors such as maternal alcohol consumption, maternal depression, adolescent parenthood and low SES are present (Lyons-Ruth, 1996).

Empirical studies have demonstrated a relationship between disorganised attachment and aggression. In a study by Lyons-Ruth, Alpern and Repacholi (1993), 71 per cent of hostile preschoolers were classified as disorganised in their infant attachment relationships. These authors argue that mothers with psychosocial problems have more hostile and intrusive interactions with their children. Hostile interactions which are predictive of later aggression are observable as early as at six months of age, before the child has developed overt aggression. Lyons-Ruth (1996) argues that infants experiencing hostile interactions show helplessness, dysphoria and apprehension rather than aggressive behaviour. It appears that disorganised attachment in infancy predicts externalising behaviour at age seven (Lyons-Ruth, Repacholi, McLeod and Silva, 1992).

Patterson's social learning theory of the development of antisocial behaviour

Patterson, DeBaryshe and Ramsey (1989) and Patterson, Capaldi and Bank (1991) adopt a social learning perspective in proposing a theory of the development of aggression. They argue that antisocial behaviour in young boys is learnt in the home. Parenting which is characterised by harsh and inconsistent discipline, lack of supervision of children and little positive parental involvement with the child teaches children antisocial behaviours. By failing to provide positive reinforcement for prosocial behaviour and appropriate punishment for antisocial behaviour, aggressive behaviours in the child are reinforced. Aggressive child behaviours are then hypothesised to lead to rejection by peers and academic failure, both of which reinforce commitment to deviant peer groups and participation in delinquent behaviour. Patterson *et al.* (1989) view parenting practices as the outcome of family demographics, generational traits, parental traits and family stressors.

Summary

While attachment and social learning theory have much empirical support, the evidence for continuity of adverse environments is sparse (Sameroff, 1993). The degree of continuity of risk factors over key periods of the infant's/child's socialisation needs to be examined in relation to the severity and chronicity of later aggression. Limited data on this point are available. Bor *et al.* (1997) found that the more frequently a family experienced low family income over a five-year period, the higher the prevalence of child behaviour problems. The influence of low family income was mediated by the

presence of maternal depression, a known causal factor in child psychopathology. In the Rochester Longitudinal Study, Sameroff, Seifer, Baldwin and Baldwin (1993) found a correlation of 0.76 between environmental risk scores at two ages (four years and thirteen years). This finding points to significant adverse environmental continuity and the limiting role that environment places on individual development. Richman *et al.*'s (1982) longitudinal study also demonstrated a significant degree of continuity in poor family relationshipS over the five-year period of the study. For example, 60 per cent of marriages which were poor when the child was three years old were still poor when the child was eight years old.

5.2 Transactional Mechanisms

Transactional mechanisms appear to depend upon previously considered biological processes which interact with psychosocial mechanisms to produce childhood aggressive behaviour. There are a variety of different ways in which a multitude of factors could interact to produce persistent aggression and criminal behaviour. Different workers have chosen to emphasise different aspects of these interactions. The conceptual position of Moffitt (1993a) incorporates the biopsychosocial and educational factors already summarised above.

Moffitt's dual taxonomy of antisocial behaviour

On the basis of her distinction between adolescence limited and life course persistent antisocial behaviour, Moffitt (1993a) proposes two theories which address the development of the two types of antisocial behaviour. Her theory of the aetiology of persistent antisocial behaviour entails the interaction of

neuropsychological deficit at birth (Moffitt, 1993b) with the family and social environment in a manner which reinforces antisocial behaviour. Neural development in the infant may be adversely affected by a variety of genetic, biological and environmental factors. As temperament and personality are partly heritable (Plomin, Chipuer and Loehlin, 1990), children with difficult temperaments are also likely to have parents with difficult temperaments so that parents with difficult children are less likely to be able to manage them. Families with difficult children are more likely to be socially disadvantaged and less likely to be able to afford professional help.

Moffitt (1993a) argues that neuropsychological deficits in infancy and early childhood are manifested in temperament and that children with difficult temperaments evoke negative and dysfunctional reactions from adults. Difficult children may adopt habitual coercion as a means of achieving their goals. Children with neuropsychological deficits may also underachieve at school. Moffitt (1993a) argues that many of these problems combine to prevent the person with persistent antisocial behaviours from acquiring a repertoire of prosocial behaviours. Moreover, lack of self-control and impulsivity which often characterise youth with antisocial behaviour may increase the risk of behaviours such as teenage parenthood, drug addiction and incarceration, all of which limit success in later life.

Rather than attributing antisocial behaviour to an underlying trait or environmental contingencies, Moffitt (1993a) argues that it is the "constant process of reciprocal interaction between personal traits and environmental reactions to them" that underlies the continuity of antisocial behaviour. Since it is unusual for career criminals to commit their first offence after adolescence,

she argues that life-course persistent behaviour is fixed by about the age of 18 years.

Delinquency which is limited to the adolescent period shows both temporal instability (criminal careers which are sporadic) and cross-situational inconsistency (may obey the school rules but take drugs on the weekend). Moffitt (1993a) believes that adolescence-limited delinquency may be explained largely in terms of psychological/social learning theory and the maturity gap between biological and social maturity. The freedom and autonomy of life-course persistent offenders are believed to be envied and mimicked by the adolescent onset delinquents. Reaching adulthood provides many legitimate avenues of achievement and autonomy, leading most adolescent limited offenders to relinquish their delinquent behaviour.

Lewis (1996a), in a similar model to that of Moffitt, has stressed the role played by abusive parenting in the aetiology of violent delinquency. She has outlined a complex pathway involving modelling and reinforcement of violence, brain injury with alteration of neurotransmitter production and increased paranoid perceptual processing and decreased verbal capacity to describe subjective inner states.

Psychoanalytic contributions

Missing from all the above theoretical and evidence-based formulations is any reference to psychoanalytical thinking on aggression (Elliot, 1994). As psychoanalytic theory is predominantly concerned with the emotional life of the subject, it is noteworthy that the contribution of psychoanalysis, especially object relations theory, has received scant attention. The growth of the study of infant attachment supports the view that, from the beginning, an intense

relationship exists between the parent system and the infant which can be seen as providing the mechanism for the development of a loving or persecutory internal schemata. The emergence of cognitive difficulties, struggling attachments, punitive parenting, poorly functioning schools in an increasing global community that marginalises the inarticulate and unskilled, and stresses material accumulation as a sign of success, invites the subject to respond by a rejection of dominant social values.

5.3 The Path to Delinquency

Farrington (1991b) has articulated a theory of offending behaviour that outlines a balance between the antisocial traits in individuals and the opportunities for offending. His model assumes that everyone has some capacity for antisocial behaviour. This capacity may be influenced by a variety of short-term offending opportunities. Of course, some individuals have a greater capacity for antisocial behaviour than others. As numerous opportunities exist in our society for offending, those children and adolescents predisposed to antisocial behaviour readily move into a delinquent lifestyle. For others, short-term situationally induced motivating factors may occur often in the form of boredom, peer group demands for material goods, drug intoxication or relationship breakdowns and disappointments.

CHAPTER 6

THE MATER–UNIVERSITY OF QUEENSLAND STUDY OF PREGNANCY AND ITS OUTCOMES

6.1 Rationale and Hypotheses

The Mater University of Queensland Study of Pregnancy (MUSP) began in 1981 (Keeping *et al.*, 1989). Mothers were enrolled at their first prenatal visit at the Mater hospital and followed up at the birth of their child, and again six months later. The mother and child were again assessed when the child was 5 years and 14 years. The data collected enable an assessment of the development of aggression and delinquency in adolescence. Such information facilitates the identification of risk factors for delinquency. The aim of the present study was therefore to identify factors, from the prenatal period through to the age of 5, which predict aggression and delinquency in adolescence.

6.2 Description of the Sample

Mothers were enrolled in the study as public patients at their first clinic visit. Of the 8,556 mothers invited to participate in the study only 98 (1 per cent) declined to participate. Of the 8,458 women who agreed to participate, 7,604 gave birth to a live baby at the study hospital (women giving up their children for adoption and multiple births being excluded). These 7,604 mothers were asked to complete a second questionnaire 3 to 5 days after the birth of their child. Some 7,444 (98 per cent) completed the second interview.

Complete medical history and record of the pregnancy and birth, including birthweight, apgar scores, gestation at delivery and any evidence of complications and other details, were abstracted from the medical records. The mothers (and their children) were approached subsequently to provide details of their own health and well being and that of their baby. Information was also obtained on their pattern of child rearing. A total of 6,930 mothers (91 per cent of the birth cohort) completed the six month follow-up.

At five years of age data were obtained on the mother and the child's health and behaviour, and there was a paediatric assessment. A total of 5,627 of the children and their mothers were assessed. This comprised 74 per cent of the birth cohort. At the 14-year follow-up both mothers and children were assessed. A total of mothers completed this follow-up. The mother completed a questionnaire which included questions about herself, her partner and her child. The child completed a questionnaire about himself or herself and undertook a cognitive and physical assessment.

6.3 Measures

In keeping with the aims of this study, the only variables from the 14 year follow-up that were analysed were those measuring delinquency and aggression. The predictors of child behaviour problems were all measured in the earlier phases of the study. In the following section variable names are capitalised and the complete variables list is summarised in Table 6.1. Most continuous variables were also recoded as categorical. These variables have the same name as the continuous variables except that the first letter of their variable name is "R". Recoded variables are not included in Table 6.1.

6.3.1 Outcome measures

At the five-year follow-up a short form of the CBCL was completed by the mother. A complete version of the CBCL was completed by the mother at the 14-year follow-up. The CBCL was developed to measure the child's competencies and behaviour problems from ages 4 to 18. (Achenbach, 1991) It comprises three competence scales and eight problem or syndrome scales. As adapted in this study, mothers were asked to indicate whether each item described their child "a lot", "sometimes" or "rarely/never". Only the problem scales of aggressive behaviour (at ages 5 and 14) and delinquent behaviour (at age 14) were analysed for the present study. These scales combined produce the "Externalising" syndrome which is one of the two major dimensions of behaviour problems described by the CBCL. Extensive studies have been conducted to establish the external validity, cross-cultural validity and reliability of the CBCL (see Achenbach, 1991 for details of a series of validation studies).

1. AGGRESS-5 was a measure of aggression at age 5 derived from a shortened form of the CBCL (Achenbach and Edelbrock, 1983). The problems included "Argues a lot", "Demands a lot of attention", "Destroys his/her own things", "Destroys others' things", "Disobedient at home", "Gets into many fights", "Screams a lot", "Sudden changes in mood or feelings", "Stubborn, sullen or irritable" and "Temper tantrums or hot temper". Response items included "Often", "Sometimes", "Never". Internal consistency of this measure was 0.83 measured by Cronbach's alpha.

2. AGGRESS-14 was the same 10 item scale administered at the 14 year follow-up. Internal consistency of this measure was 0.85 measured by Cronbach's alpha.
3. DELINQ-14 was the delinquency subscale of the CBCL consisting of 13 items. These items refer to whether the child lies, cheats, sets fires, steals from home, steals outside the home, swears, thinks about sex too much, truants, vandalises, takes alcohol and drugs, runs away from home, keeps bad company and lacks guilt. In our sample this measure had an internal consistency of alpha = 0.76 (Cronbach's alpha).
4. POLICE was a dichotomous measure of whether or not the child had been in contact with the police or juvenile aid in the past 12 months. This information was obtained from the mother's questionnaire.

6.3.2 Predictor variables

Six classes of predictor variables were measured from the prenatal period through to the 5 year follow-up. These classes include maternal socio-demographics, maternal lifestyle, maternal mental health, maternal attitude to the child and child-rearing, perinatal and child health and cognitive variables.

Maternal socio-economic status

5. AGE is the mother's age at entry to the study.
6. EDUCATION is the level of maternal educational attainment at entry to the study (i.e. assessed prenatally).
7. CHILDNUM is the total number of children present in the target child's household at six-month follow-up.

8. MCHANGE is the number of maternal partner changes reported as experienced between the prenatal period and five-year follow-up.

9. POOR is a composite index of chronic family poverty derived from estimates of gross annual income obtained at each assessment phase up to 5 years.

10. ARREST is a categorical variables derived from a question asking whether or not the mother's partner had ever been arrested, asked at the 5-year follow-up.

Maternal lifestyle

11. SMOKE is an index of the cigarette smoking obtained on information from the first clinic assessment during pregnancy (usually during the first trimester). It was calculated by multiplying the number of cigarettes smoked per day by the number of days per week that the mother smoked. For categorical analysis, subjects were classified into one of three categories of prenatal cigarette use as either (a) non-smokers (65.2 per cent); (b) some/moderate smokers (27.5 per cent); or (c) heavy smokers (7.3 per cent).

12. DRINK is the self-reported maternal alcohol consumption at the first clinic visit usually referring to consumption during the first trimester of pregnancy. It was assessed by multiplying the number of drinks consumed on a given alcohol drinking occasion by how often subjects said they typically drank per week. For categorical analyses subjects were classified into one of three categories of prenatal alcohol

consumption as either (a) abstainers (49.6 per cent); (b) light drinkers (48.2 per cent); or (c) consistent drinkers (1.4 per cent).

13. BINGE is the presence or absence of maternal prenatal binge drinking defined as greater than five drinks at a single sitting at the first clinic visit. For categorical analysis subjects are classified into one of three groups of prenatal binge drinking as either (a) never binge (79.1 per cent); (b) occasionally binge (16.9 per cent); or (c) binge at least half the time (2.8 per cent).

14. BREASTFEED is a measure of breastfeeding asked at the six-month follow-up, and details the length of time the mother breast-fed up to the six month follow-up.

Maternal mental health

15. DYADTOT is a measures of maternal marital satisfaction based on the Dyadic Satisfaction items from the Spanier Dyadic Adjustment Scale (DAS) (Spanier, 1976). The eight items comprising the *Dyadic Satisfaction* subscale had alphas ranging from 0.82 (post-natal) to 0.86 (six-month and five-year follow-up). By summing subscale scores across phases, an index of chronic dyadic instability/conflict was derived for the current study.

16. DEP-5 is a measure of maternal depression obtained at the 5-year follow-up and derived from the depression subscale of the Delusions Symptoms-States Inventory (DSSI) of Bedford *et al.* (1976). The DSSI was developed for detecting persons who are disturbed and living in the community (Bedford and Foulds, 1978), and has been validated against

groups with diagnosed mental illness. It is intended to detect signs and symptoms of mental illness that limit a persons ability to function and maintain relationships (Bedford and Foulds, 1975; Foulds and Bedford, 1975). For the current cohort, the seven-item depression subscale had Cronbach alphas ranging from 0.77 (pre-natal) to 0.86 (five-year follow-up). For categorical analyses, the sample was divided into depressed (6.8 per cent) and non-depressed creating a variables called RDEP5.

17. TIMEDEP is a measure of depression (DSSI scores from the prenatal assessment, the postnatal assessment and the 6 month follow-up) which details the experience of depression over time. For categorical analyses the sample were divided into nil symptoms (77.8 per cent), some symptoms (11.8 per cent) and many symptoms (11.1 per cent).

18. ANX-5 is a measure of maternal anxiety at the five year follow-up based on the anxiety subscale of the DSSI. For categorical analyses, the sample is divided into those who are currently anxious (16.3 per cent) and those who are non-anxious creating a variable called RANX5.

19. TIMEANX is an average measure of anxiety from the DSSI scores from the prenatal assessment, the postnatal assessment and the six- month follow-up.

20. STRESS-5 is a measure of maternal stress at the 5 year follow-up based on the four-item Los Angeles Stress Scale (Reeder, Schrama and Dirken, 1973). It had Cronbach alpha coefficients ranging from 0.84 (six-month follow-up) to 0.88 (postnatal). For categorical analyses, the sample is divided into those currently experiencing stress

(11.1 per cent) and non-stressed groups creating a variable called RSTRESS5.

21. A subjective stress index is used to distinguish three groupings of past stress (TIMESS3) based on the presence of (a) "little or no stress" (82.4 per cent); (b) "some stress" (9.0 per cent); or (c) "continual stress" (8.6 per cent).

Maternal attitudes to child and parenting/discipline practices

22. BABWANT is a measure of the degree to which the target pregnancy was planned and/or wanted and assessed prenatally with a four-item index (Cronbach alpha = 0.89) asking mothers to what extent the pregnancy was planned, wanted, and/or whether the subject's method of family planning had failed. Subjects were then classified into one of three categories of pregnancy intent as either (a) unplanned/unwanted pregnancy (19.3 per cent); (b) unsure (24.1 per cent); or (c) planned/wanted pregnancy (56.6 per cent).

23. BABGOOD is a measure of maternal attitude towards caregiving at the six-month follow-up and was assessed with a six-item index (Cronbach alpha = 0.76). Mothers were asked at the six month follow-up how positively they currently felt about interacting with and caring for their baby. They were then classified into one or three categories as feeling either (a) not always (5.8 per cent); (b) mostly (54.7 per cent); or (c) always (39.5 per cent) positive about caring for their child.

24. BABTCH is a measure assessing the degree to which mothers make an effort to stimulate or teach their babies during infancy and was obtained at six-month follow-up using a four-item index (Cronbach alpha = 0.70). Mothers at the five-year follow-up were asked how often they try to encourage their baby to be interested in things, talk to or play with their baby, or spend time actively teaching their babies. This index was then used to dichotomise the sample into "not always" (14.4 per cent) and "always" (85.6 per cent) teaching or stimulating their baby.

25. FREE is a measure of the degree of maternal supervision and was assessed with a five-item scale (Cronbach alpha = 0.84). At the five-year follow-up, mothers were asked at what age they would allow the child to engage in a variety of unsupervised socially-related activities (e.g. going out; going on holiday; staying home alone; drinking alcohol). Subjects were then classified into one of three categories as allowing (a) little (8.0 per cent), (b) some (81.7 per cent) or (c) a lot (10.3 per cent) of unsupervised "freedom."

Maternal discipline style was also assessed at five-year follow-up by presenting subjects with a range of five situations involving their child (i.e. refusing to clean up room, taking something belonging to another child, cruelty, touching hot stove, being noncompliant and breaking something), and asking them to nominate in each case how likely it was that they would use one of three discipline strategies: (a) smacking the child; (b) using explanation or reasoning; and (c) by taking away something enjoyed by the child. We were particularly interested in assessing the potential differential impact of maternal

use of physical punishment on observed incidence of child behavior problems in the current sample. Based on the above five items or scenarios, the three discipline subscales derived in the current design were

26. SMACK (Cronbach alpha = 0.74).

27. REASON (Cronbach alpha = 0.82).

28. TAKE (Cronbach alpha = 0.90).

29. HRSCARE-6MO is the number of hours per week the study child spent in child care at 6 months.

30. HRSCARE-5yr is a the number of hours per week the study child spent in care child care at 5 years.

Maternal and child health

Several measures assessing maternal health and well-being associated with the pregnancy and delivery of the target child were obtained post-natally and used in the current design.

31. MOTHSYM is a seven-item index administered 3-5 days after the birth. Mothers were asked if and to what degree they experienced a range of common pregnancy related difficulties (e.g. morning sickness, constipation, backache, leg cramps, vaginal problems). Three categories measuring degree of difficulties experienced during pregnancy were created, with respondents classified as reporting either (a) few (14.9 per cent); (b) some (80.7 per cent); or (c) many (4.4 per cent) symptoms experienced during pregnancy.

32. PREGOOD is a variable created to measure maternal global perceptions of the study pregnancy using a three-item index asking subjects (a) whether the pregnancy was straightforward; (b) whether they experienced complications; and (c) whether they were physically well during the pregnancy. The questions were administered at the six-month follow-up. The index was then used to create three categories, with subjects classified as reporting either (a) few (84.2 per cent), (b) some (13.5 per cent); or (c) a lot (2.3 per cent) of medically related difficulties experienced during the pregnancy.

33. DELPROB is a measure of maternal report of problems and complications experienced during the target delivery, as recalled by the mother 3-5 days after the birth. It was assessed with a six-item index asking subjects whether they had experienced a range of common delivery related problems (e.g. pre-delivery enema/pubic shave; severe pain during labour; labor was induced; vaginal episiotomy/tear). This index was used to create three categories of problematic delivery, with subjects classified as reporting either (a) few (20.3 per cent); (b) some (71.2 per cent); or (c) a lot (8.5 per cent) of problems associated with the study delivery.

In addition to the above measures a range of infant neonatal biological indices obtained from the target children's medical records were assessed in the current design.

34. BIRTHWEIGHT of study children was obtained and used to create three categories with subjects classified as either (a) very low

birthweight (0.4 per cent); (b) low birthweight (3.8 per cent); or (c) normal birthweight (95.8 per cent).

35. GENDER. The cohort of children comprises 52.2 per cent male subjects and 47.8 per cent female subjects.

36. BABPROB measured the degree to which target children experienced post-delivery medical problems. It was assessed with a five-item index at 3-5 days after the birth. Respondents were asked if and to what degree their newborns had experienced a range of symptoms since delivery (e.g. skin rash, sticky or infected eye, medical problems, feeding difficulties, whether baby needed special care nursing). This index was used to dichotomise the sample into subjects reporting either (a) none/few (90.4 per cent) or (b) some/many (9.6 per cent) post-delivery infant medical problems.

There were also several measures of the child's medical status and constitutional predisposition during the first six months of life and obtained at the six-month follow-up.

37. MEDATTN is a measure of how often study children had needed medical attention during the first six months based on maternal report of doctor visits. This measure is used to classify subjects into three categories based on reporting either (a) no medical visits (18.9 per cent); (b) one to five visits (70.5 per cent); or (c) six or more visits (10.5 per cent).

38. CHILDHLTH is a measure of general child health during the first six months of life and was assessed with a nine-item index asking subjects

how often target children had experienced a range of infant medical complaints (e.g. colic, sleeplessness, vomiting, diarrhoea, feeding problems, skin problem, overactivity, cough/cold and convulsions/fits). This index was then used to classify subjects into three categories reporting either (a) 0-3 symptoms (85.7 per cent); (b) 4 symptoms (7.6 per cent); or (c) 5 or more symptoms (6.7 per cent) of infant medical difficulties during the first six months of life.

39. BEHPROB was a six-item scale (alpha = 0.74) of troublesome behaviour between the ages of 2 to 4 based on maternal report at the five-year follow-up. The items included irregular sleeping habits; irregular eating/bowel habits; difficult behavior; messy or dirty; tantrums and disobedience; and restlessness at meal times. These items were intercorrelated with a Cronbach alpha reliability coefficient of 0.74. For categorical analysis the scale was dichotomised (RBEHPROB) and children scoring in the highest decile (11.4 per cent) were classified as having behaviour problems.

Cognitive

40. DENVER is the result of the Denver Developmental Screening Test (DDST) administered at the five-year follow-up. It is a widely used measure of developmental delay. This test has high specificity (a low false positive rate) but questionable sensitivity (a high false negative rate). It underestimates the number of children who are developmentally delayed. However, those who are classified as delayed on this test are truly delayed.

41. PEABODY is the result of the administration of the Peabody Picture Vocabulary Test-Revised. In this test of verbal comprehension a word is read to the subject aloud by the experimenter and the child must respond by selecting one of four pictures on a card which corresponds to the word. The PPVT-R gives a general measure of language ability in children. This was administered at the five-year follow-up.

Table 6.1: Summary of variable names and labels

Variable Label	Description
1. OUTCOME MEASURES	
AGGRESS-5	Child's level of aggression at age 5
AGGRESS-14	Child's level of aggression at age 14
DELINQ-14	Child's level of delinquency at age 14
POLICE	Child's contact police or juvenile aid past 12 mths
2. SOCIODEMOGRAPHIC	
AGE	Mother's age at study index
EDUCATION	Mother's level of education at study index
CHILDNUM	No. of children in household at six month followup
MCHANGE	No. of maternal partner changes - prenatal to 5 yrs
POOR	Index of chronic poverty from prenatal to 5 years
ARREST	Mother's partner at 5 years ever arrested
3. MATERNAL LIFESTYLE	
SMOKE	Index of smoking early in pregnancy
DRINK	Index of drinking alcohol early in pregnancy
BINGE	Presence of maternal binge drinking in pregnancy
BREASTFEED	Length of time mother breastfed the study child
4. MATERNAL MENTAL HEALTH	
DYADTOT	Marital satisfaction at 5 year follow-up
DEP-5	Maternal depression at 5 year follow-up
TIMEDEP	Average maternal depression prenatal to 5 years
ANX-5	Maternal anxiety at 5 year follow-up
TIMEANX	Average maternal anxiety prenatal to 5 years
STRESS-5	Maternal stress at 5 year follow-up
TIMESS3	Average maternal stress prenatal to 5 years
5. MOTHER'S ATTITUDE TO CHILD AND CHILDREARING	
BABWANT	Whether mother wanted baby at prenatal assessment
BABGOOD	Mother's attitude to caregiving at 6 month follow-up
BABTCH	Amount mother stimulates/teaches baby at 6 months
FREE	Maternal supervision at 5 year follow-up
SMACK	Smack to discipline at 5 years
REASON	Reason to discipline at 5 years
TAKE	Take to discipline at 5 years
HRSCARE-6MO	Hours childcare at 6 months
HRSCARE-5YR	Hours childcared at 5 years
6. PERINATAL FACTORS	
MOTHSYM	Mother's health problems during pregnancy
PREGOOD	Perceptions of pregnancy
DELPROB	Problems and complications during delivery
BIRTHWEIGHT	Birthweight
GENDER	Gender
BABPROB	Post-delivery medical problems experienced by child
MEDATTN	Medical attention required by child in first 6 months
CHILDHLTH	Child health during first 6 months
BEHPROB	Troublesome behaviour 2 to 4 years
7. COGNITIVE FACTORS	
DENVER	Neuromotor delay at 5 years
PEABODY	Language development at 5 years

CHAPTER 7

DESCRIPTIVE CHARACTERISTICS OF THE SAMPLE

7.1 Demographic Characteristics

The sample for this study comprised 8,556 mothers who attended the Mater Mothers Hospital over the period 1981, to 1983. Of these, 8,458 were assessed prenatally, 7,241 were assessed postnatally, 6,837 were assessed at 6 months and 5,354 were assessed at 5 years. At the 14 year follow-up 5,277 mothers were assessed. For the present study, cases for which an entire follow-up was missing at any phase of data collection were deleted. This left 4,679 valid cases for analysis. The descriptive statistics for the mother at the 14 year follow-up are shown in Table 7.1. The mean age of the children in the sample was 13.9 (*SD* = 0.33), 48.2 per cent of whom were female. The majority of women in the sample (74.5 per cent) were married and 69.6 per cent reported that their present partner was the father of the study child. Over 60 per cent of the mothers reported their gross annual household income to be less that $36,349.

Table 7.1: Demographic characteristics ofmothers as reported at 14-year follow-up

	N	Percentage
Mother's Occupational Group		
Home duties or not employed	1,914	41.3
Labourers and related	475	10.2
Tradesperson	1,386	29.9
Managers/administrative	861	18.6
Partner's Occupational Group		
No partner	661	14.2
Home duties or not employed	436	9.4
Labourers and related	531	11.4
Tradesperson	1,987	42.7
Managers/administrative	1,035	22.3
Present Marital Status		
Single	98	2.1
Living together	353	7.6
Married	3,473	74.5
Separated/divorced	653	14.0
Widowed	63	1.4
Other	22	0.5
Present Partner Child's Father		
Yes	3,240	69.6
No	807	17.3
No partner	606	13.0
Gross Family Income		
Less than $15,559	390	8.5
$15,600-36,349	2,440	53.6
More than $36,350	1,727	37.9

7.2 Evaluation of Sample Attrition

The demographic characteristics of those lost to follow-up at 5 and 14 years of age are shown in Table 7.2. Apart from gender, there were significant differences between groups in the rate lost to follow-up, and consequently those remaining in the sample. The mothers of children most likely to be lost to follow-up were those with lower levels of education, those

were teenagers at their first clinic visit. Indeed the data are consistent in indicating that loss to follow-up appears to be a function of socio-economic disadvantage. The impact of this on the present study is likely to be to reduce the magnitude of the relationships among early predictors and aggressive and delinquent behaviour at age 14. This means that the results of the present study may well be conservative.

Table 7.2: Percentage of children (non-multiple birth) discharged from hospital followed up at ages 5 and 14 by sociodemographic characteristics of mother (n = 7,662)

	Initial n	Age 5 %	Age 14 %	Cohort - Both Ages 5 and 14 %
Children in study at each phase	7,662	69.9	68.9	61.1
Gender				
Male	3,975	70.1	68.6	60.9
Female	3,686	69.6	69.1	61.2
P-value		= 0.616	= 0.622	= 0.806
Poor				
Consistent poverty	585	54.9	49.9	42.2
Mid-income	6,185	71.7	70.9	62.7
High income	690	83.9	83.5	78.6
P-value		< 0.001	< 0.001	< 0.001
Education				
Incomplete high	1,407	66.0	63.3	54.9
Complete high	4,799	70.9	70.3	62.4
Post-high	1,306	75.3	74.0	67.2
P-value		< 0.001	< 0.001	< 0.001
Age of Mother at FCV				
13 to 19 years	1,271	57.7	57.6	47.0
20 to 34 years	6,042	72.3	71.1	63.9
35 years +	349	71.3	70.8	62.5
P-value		< 0.001	< 0.001	< 0.001

7.3 Gender Differences in Externalising and Internalising Behaviours

Table 7.3 provides descriptive statistics for aggression, delinquency and externalising behaviours for boys and girls in the sample at the 14-year follow-up. Boys were rated by their mothers as more aggressive and delinquent than girls. These gender differences are consistent with those reported in the literature (Achenbach, 1991).

Table 7.3 Comparison of responses for male and female children on the CBCL subscales for aggression (10 Q short form), delinquency and externalising males and females

	n	Males	Females	P-value
AGGRESS-14*				0.052
M	2,359	4.57	4.36	
SD	2,197	3.70	3.33	
DELINQ-14†				< 0.001
M	2,325	2.99	2.07	
SD	2,187	2.89	2.28	
EXTERNALISING‡				< 0.001
M	2,271	11.93	9.75	
SD	2,128	9.01	7.69	

*Based on ten items for each item, scores are: 2 = Often; 1 = Sometimes; 0 = Rarely/never.

CHAPTER 8

CONTINUITY OF AGGRESSION FROM AGE 5 TO AGE 14

Determining the extent to which there is continuity of aggressive behaviour by children is important for both theoretical and practical reasons. Continuity of aggression was evaluated in two ways. Firstly, we asked how many children who were aggressive at age 5 were still aggressive at age 14. Secondly, we evaluated the stability of aggression in the entire sample.

The top 10 per cent of the distribution of aggression on the CBCL was taken as the cut-off for the aggressive group. Table 8.1 shows that, consistent with previous studies (e.g. Campbell, 1995), 37.4 per cent (186/497) of those children who were aggressive at age 5 remained in the aggressive group at age 14. In comparison, only 8.8 per cent (366/4,182) of those children who were not aggressive at age 5 were rated as aggressive by their mothers at age 14. Those children who were rated by their mothers as aggressive at age 5 were 4.3 times more likely to be rated as aggressive by their mothers at age 14. The stability of the aggressive behaviour in the whole sample measured by the correlation between maternal rated aggression at age 5 and maternal rated aggression at age 14 was 0.47.

Table 8.1: Cross-tabulation of aggressive versus non-aggressive children as measured by short form of CBCL aggressive subscale at 5 and 14 (10 per cent cut-off)

	Aggressive (Age 14)	Non-aggressive (Age 14)
Aggressive (age 5)	186	311
Non-aggressive (age 5)	366	3,816

Another way of looking at the level of continuity of aggressive behaviour in children is presented in Table 8.2. We have disaggregated aggressive behaviour scores at age 5 and 14 into quintiles and compared the level of continuity of aggressive behaviour for each quintile. It is clear that the higher level quintiles of aggressive behaviour at age 5 all have higher than average levels of aggressive behaviour at age 14. Thus almost half of the children in the top quintile of aggressive behaviour at age 5 are in the top quintile of aggressive behaviour at age 5. The data suggest that children generally move from one quintile to a nearby quintile. Dramatic changes in perceptions of the child's behaviour seem uncommon.

Table 8.2: Quintile - aggression (short form of CBCL aggression scale) at age 5 (row) compared with aggression (short form of CBCL aggression scale at age 14 (n = 4,679)

Age 5/Age 14	0.0-21.2%	21.2-45.7%	45.7-58.2%	58.2-77.1%	77.1-100.0%	
0.0-15.7%	46.8	29.1	9.0	9.4	5.6	n = 731; 15.7%
15.7-36.6%	26.4	31.3	13.1	18.0	11.2	n = 973; 20.9%
36.6-60.7%	18.7	27.4	14.3	20.4	19.2	n = 1,124; 24.1%
60.7-78.2%	12.8	23.1	14.7	24.2	25.1	n = 815; 17.5%
78.2-100.0%	7.4	12.7	10.7	20.3	48.9	n = 1,015; 21.8%
	n = 966 21.2%	n = 1,116 24.5%	n = 571 12.5%	n = 859 18.9%	n = 1,045 22.9%	

The frequency of selected aggressive child behaviours at age 5 are presented in Table 8.3. Most commonly, five year old children were seen to argue a lot and demand a lot of attention. They were rarely observed to fight, destroy things or scream a lot.

Table 8.3: Frequency of aggressive behaviours (items in short form of CBCL subscale) for cohort sample at age 5

	n	Rarely/Never	Sometimes	Often
Argues a lot	4,679	15.2	65.7	19.1
Demands a lot of attention	4,679	29.1	57.0	13.9
Destroys own things	4,679	69.1	27.0	3.9
Destroys others' things	4,679	73.2	24.5	2.4
Disobedient at home	4,679	14.0	77.4	8.6
Gets in many fights	4,679	64.5	33.3	2.2
Screams a lot	4,679	70.6	25.5	3.8
Sudden changes in mood or feelings	4,679	57.3	39.0	3.6
Stubborn	4,679	36.4	56.3	7.3
Temper tantrums	4,679	45.6	46.6	7.8

The frequency of particular aggressive behaviours reported by the mother at age 14 is shown in Table 8.4. With the exception of being perceived to argue a lot, most of the listed aggressive behaviours were less common at age 14 than they were when the child was aged 5. The most common behaviour problems reported for 14-year-old children tend to be less destructive than at age 5, and more focussed on demanding attention, disobedience and stubbornness and sudden changes in mood/temper.

Table 8.4: Frequency of aggressive behaviours (items in short form of CBCL subscale) for cohort sample at age 14

	n	Rarely/Never	Sometimes	Often
Argues a lot	4,664	20.0	56.7	23.3
Demands a lot of attention	4,664	60.3	32.9	6.8
Destroys own things	4,659	89.9	8.8	1.3
Destroys others' things	4,658	89.8	9.1	1.1
Disobedient at home	4,653	39.4	54.4	6.2
Gets in many fights	4,659	84.0	14.1	1.8
Screams a lot	4,662	80.8	16.5	2.7
Sudden changes in mood or feelings	4,651	51.9	41.5	6.6
Stubborn	4,648	38.3	54.2	7.5
Temper tantrums	4,658	60.2	33.1	6.7

In sum, we find that over the ages 5 to 14 there is a high level of continuity of aggressive behaviour. This is despite the fact that there are changes to the specific ways in which this aggressive behaviour is manifested.

CHAPTER 9

THE LINK BETWEEN AGGRESSION AND DELINQUENCY

One of the major objectives of the present study was to examine the association between aggressive and delinquent behaviours. This connection was evaluated by looking at the association between the aggressive and delinquent subscales of the CBCL and the mother's reports of police contact. The correlation between aggression and delinquency at age 14 was 0.67. This is high and suggests that delinquency and aggression share about 44 per cent of their variance.

Table 9.1 shows that of those children with scores in the top 10 per cent of the aggression subscale of the CBCL, 51.3 per cent (283/552) also scored the top 10 per cent of the delinquency subscale of the CBCL. In comparison, of those who were not in the aggressive group, only 6.1 per cent (252/4,127) were classified as delinquent. Aggressive children were therefore 8.7 times more likely to be delinquent than non-aggressive children. [52.9 per cent (283/535) delinquent children also aggressive]

Table 9.1: Cross-tabulation of aggressive/non-aggressive (short form) and delinquent/non-delinquent children at ages 5 and 14

	Delinquent (Age 14)	Non-delinquent (Age 14)
Aggressive (age 14)	283	269
Non-aggressive (age 14)	252	3,875

Children who were aggressive at age 5 were also more likely to become delinquent than children who were not aggressive at age 5. Table 9.2 shows

that 32.3 per cent (161/497) of the children with aggression scores in the top 10 per cent of the distribution were in the top 10 per cent of delinquency scores by age 14. Children who were rated as borderline cases or cases of aggression at age 5 were also much more likely to be rated as delinquent at age 14 than children who were rated as non-aggressive at age 5 (data not presented).

Table 9.2: Cross-tabulation of aggression (short form) at age 5 with delinquency at age 14

	Delinquent (Age 14)	Non-delinquent (Age 14)
Aggressive (age 5)	161	336
Non-aggressive (age 5)	374	3,808

9.1 Delinquency, Aggression and Police Contact

The analysis so far has used the delinquency subscale of the CBCL as a measure of the construct of delinquency. It is also helpful to examine the relationship between aggression and delinquency in terms of more objective delinquent outcomes. Ideally, such outcomes would include police records of contact with study children. Obtaining this type of information was beyond the scope of the present study, however, we did have the mothers' reports of whether the study child had ever been in contact with the police or juvenile aid. According to the mothers' reports, a total of 395 (8.9 per cent) children had been in contact with police or juvenile aid, with 65.5 per cent of these being male. Table 9.3 shows that, of children who were in the top 10 per cent of those with aggressive behaviour at age 5, 15.3 per cent (71/465) were

reported to have contact with the police by age 14. Of those who were not in the top 10 per cent of those with aggressive behaviour at age 5, 8.1 per cent had contact with police or juvenile aid by the age of 14.

Table 9.3: Cross-tabulation of aggression (short form) at age 5 with mother's report of the child being in contact with police or juvenile aid in the past 12 months

	Police Contact	No Police Contact
Aggressive (age 5)	71	394
Non-aggressive (age 5)	324	3,672

Some 35.9 per cent of the top 10 per cent of children on the CBCL delinquency subscale had been in contact with police or juvenile aid. This compared with 22.3 per cent of those who scored in the top 20 per cent on the CBCL delinquency subscale who had been in contact with police or juvenile aid. When those scoring in the top 5 per cent of the CBCL delinquency subscale were examined, 50.2 per cent were reported to have been in contact with the police or juvenile aid. This points to a dose-response relationship between severity of delinquency reported by the mother on the CBCL and probability of the mother reporting that the child had been in contact with the police or juvenile aid. Such a set of results provides a measure of external validity for the delinquency subscale of the CBCL.

Dose-response relationships were also evident between the level of aggression at ages 5 and 14 and the probability of the child being in contact with police or juvenile aid at age 14. Figure 9.1 shows the probability of police contact according to aggression score at age 5. Children with scores of 12 or

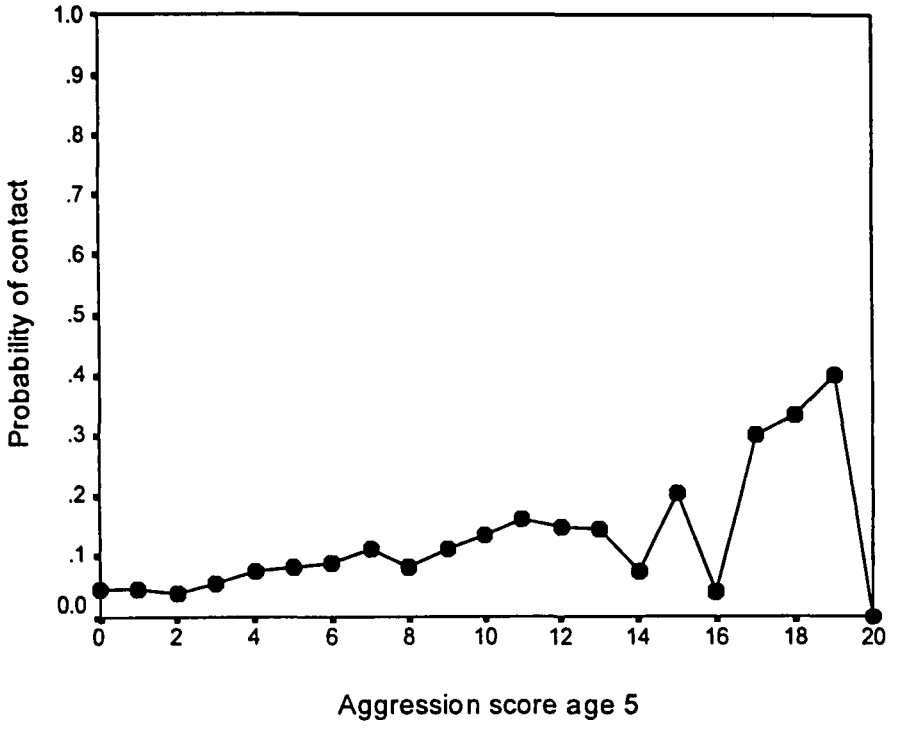

Fig 9.1 Probability of police or juvenile contact by aggression score (CBCL subscale - short form) at age 5.

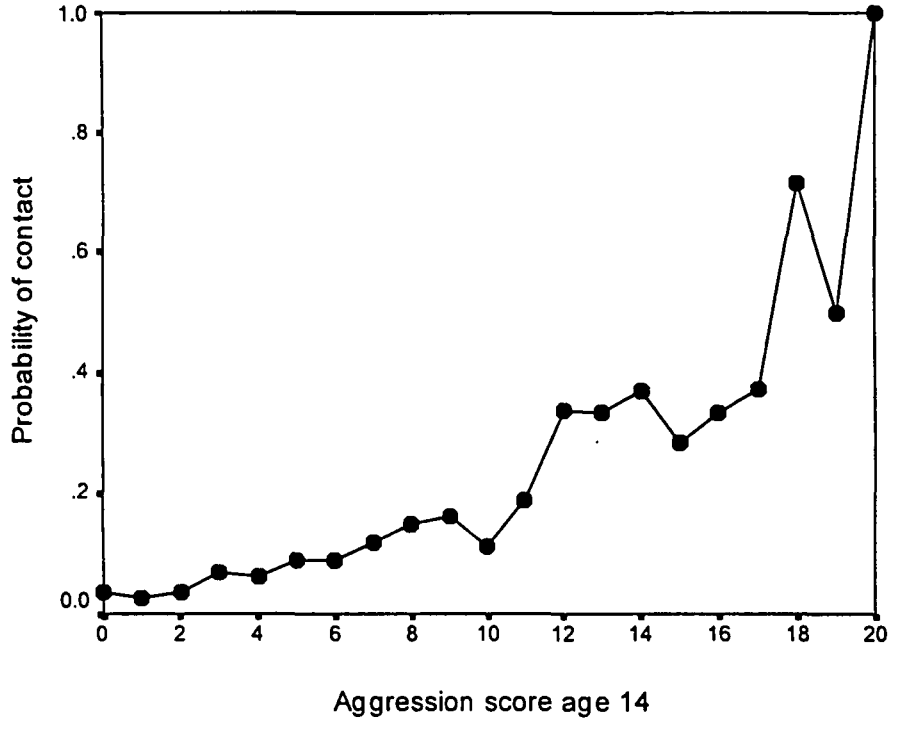

Fig 9.2 Probability of police or juvenile contact by aggression score (CBCL subscale - short form) at age 14.

higher on the aggression scale had a much greater probability that they would be in contact with police or juvenile aid by the age of 14 (Figure 9.2). Indeed, the probability of contact with the police increases dramatically once aggression scores exceed about 14.

Those children who had been in contact with police or juvenile aid were also compared with those who had not on measures of behaviour problems at ages 2 to 4, aggression at age 5 and aggression and delinquency at age 14. Notably, the means for the group of children who had been in contact with the police were all higher than the means for the group of children who had not been in contact with the police. Means, standard deviations and p-values are given in Table 9.4.

Table 9.4: T-test comparisons of Z-scores for measures of behaviour problems, aggression (CBCL subscale short form age 5) and aggression (CBCL subscale short form age 14) for groups with contact with police or juvenile contact or no contact (contact n = 3,947; no contact n = 377)

	M	SD	P-value
Behprob			= 0.007
Contact	13.3	3.7	
No contact	12.7	3.9	
Aggress-5			< 0.001
Contact	7.2	3.7	
No contact	5.8	3.5	
Aggress-14			< 0.001
Contact	7.2	4.5	
No contact	4.2	3.3	

9.2 Summary of Results on the Relationship Between Aggression and Delinquency

We approached the issue of the relationship between aggression and delinquency from four perspectives. Firstly, we asked how strong the association was between these two factors measured cross-sectionally at age 14. The answer to this question was that there was a strong association (r = 0.67). Secondly, we asked whether children whom we considered "at risk", because they were aggressive at age 5, were more likely to be delinquent at age 14. The answer to this question was that children in this group were 3.6 times more likely to score highly on the delinquency subscale at age 14 than children who were not "at risk" at age 5. Thirdly, we asked whether children who were at risk because they were aggressive at age 5 were more likely to have been in contact with the police by age 14. The answer was that they were 1.9 times more likely to have been in contact with the police or juvenile aid. Finally, we asked whether those children who had had contact with police or juvenile aid showed higher levels of behaviour problems at ages 2 to 4, aggression at age 5 and aggression and delinquency at age 14. Again we found highly significant differences between these two groups on all measures of behaviour problems, aggression and delinquency. These results are extremely important because they show that the antecedents of delinquency at 14 are evident in children in the preschool years.

There are a number of additional points which must be considered when interpreting these results. Some 69.9 per cent (374/535) of those children with high scores on the delinquency measure (at age 14) were not aggressive at

age 5. It is possible and indeed likely that a large proportion of this group may be "late starters" or "adolescence-limited" delinquents. Another possibility is that there is a group of children for whom delinquency is not preceded by behaviour problems and aggression. Finally, it is possible that a proportion of children may have been misclassified due to measurement error. However, our main finding is unequivocal: children who are aggressive at age 5 have a higher risk of becoming aggressive and/or delinquent by age 14.

CHAPTER 10

PREDICTORS OF AGGRESSION AT AGE 5

The present study has access to very detailed information collected on the sample from before birth to the 14 year follow-up. This enables the consideration of a wide range of predictors which has rarely been possible in previous studies. The longitudinal design also permits an assessment of the importance of various classes of predictors at different ages: for example, whether perinatal factors associated with aggression at age 5 are still influencing aggression at age 14.

However, the breadth of the dataset suggests the need for a categorical approach to analysing the data. As described in Chapter 6, we defined our data in terms of six classes of categories or predictor (or independent) variables. These included sociodemographic, maternal lifestyle, maternal mental health, attitudes to childrearing and the child, perinatal and cognitive factors. Undertaking the analysis in classes of variables allows for the importance of each class to be evaluated, as well as individual variables within each class. In many cases, variables within a class are intercorrelated. For example, measures of income, education and occupation are all intercorrelated. Likewise measures of maternal depression, anxiety and stress are intercorrelated and point to the mother's mental health as a factor influencing child mental health. It was therefore decided to use a series of multivariate simultaneous models which would permit a consideration of (a) the importance of each group of predictors can be evaluated, and (b) an

assessment of the independent effects of individual variables when controlling for the association between that variable and variables within the same group.

Another consideration in our choice of method of analysis was that the relationship between individual predictor variables and our behavioural measures were not always linear. For example, although maternal age is often a significant predictor of aggression it is younger mothers who are at risk of having an aggressive child. Likewise, cognitive ability is often related to behavioural problems, but the association is largely found in the lower end of the distribution of cognitive ability rather than across the entire range of this variable. We therefore used Analysis of Variance with the predictors being divided into levels. For example, Age (maternal age at the study index) was divided into three groups (13 to 19, 20 to 34 and 35+) rather than using age as a continuous variable. Variables within the same class were analysed simultaneously. This produced an estimate of the total variance explained by the group of variables, and adjusted means for each value of each variable. When reading the ANOVA tables reported in this chapter, the adjusted means can be directly compared. The means are adjusted for the effects of all other variables in the table. Significance tests were not conducted to determine the exact nature of the difference between levels of a variable as this would have resulted in hundreds more pairwise tests being performed on the data. The results were therefore interpreted in terms of general trends in the adjusted means. For example, in Table 10.1, the income variable shows a statistically significant difference with the means of aggression at age 5 decreasing as the amount of income increases. This result is interpreted to show generally that

lower income is associated with aggressive behaviour in five-year-old children, although we have not specifically tested the differences between pairs of income levels. Occasionally further analyses were conducted on key variables to provide a better understanding of the nature of their effects.

10.1 Sociodemographic Predictors

Table 10.1 shows the analysis of variance of demographic variables with aggression at age 5 as the dependent variable. Apart from the number of children in the household at the study index and age of mother, all demographic variables were significantly related to childhood aggression at age 5. The direction of effects of the sociodemographic variables consistently shows that socially disadvantaged women are more likely to have children who became aggressive. These women are more likely be less educated and poorer at the time their child was born. They are also more likely to have had more than one partner. One-way analysis of variance with contrasts of aggression at age 5 by partner change showed that there was no significant difference in aggression scores between children whose mothers had had one or more partner changes and children whose mothers had had only one partner change. There was a significant difference in aggression between children of all women who had partner changes when compared with children of women who had not changed partners in the first five years of the child's life. These results suggest that it is partner change *per se*, rather than the number of partner changes which may be associated with an increase in childhood aggression. Altogether sociodemographic variables accounted for a total of only 3 per cent of the variance in aggression at age 5.

Table 10.1: ANOVA results for sociodemographic predictors of aggression (CBCL short scale) at age 5 (mean of total sample = 5.96; n = 4,294)

	n	Unadjusted Mean	Adjusted Mean	P-value
RAGE				0.111
13 to 19 years	536	6.33	5.98	
20 to 34 years	3,561	5.95	5.99	
35 years plus	197	5.24	5.43	
RPOOR				0.003
Consistent	220	6.96	6.54	
Mid-income	3,562	5.98	5.98	
High income	512	5.39	5.56	
RCHILDNUM				0.018
Study child only	1,726	6.04	6.01	
Two to four	2,426	5.96	5.97	
Five or more	142	5.04	5.11	
RMCHANGE				< 0.001
Nil part change	3,576	5.78	5.81	
One	397	7.06	6.87	
Two plus	321	6.62	6.51	
REDUCATION				< 0.001
Incomplete high	701	6.48	6.44	
Complete high	2,758	5.91	5.89	
Post-high	835	5.72	5.80	
RARREST				0.001
No	3,379	5.80	5.88	
Yes	690	6.52	6.40	
No partner	225	6.67	5.86	

Note: Multiple R = 0.17; R^2 = 0.03.

10.2 Maternal Lifestyle Predictors

Maternal lifestyle variables accounted for only 2 per cent of the variance in aggression at age 5. Table 10.2 shows that mothers who smoke more in the early stages of pregnancy and mothers who breastfeed less are more likely to report that their children are aggressive at age 5. The interpretation of such findings is difficult. As discussed in the literature review, smoking early in pregnancy may affect child development through a biological effect on neural development or by compromising the health of the mother. At this time there appears to be little basis for proposing a direct causal relationship between breastfeeding and lower levels of aggression. This relationship may be explained by a third variable, such as maternal attachment or attitude to the child, health of the mother or child or socio-economic factors. Alcohol consumption during pregnancy was not associated with reports of aggressive behaviour by the five-year-old child.

Table 10.2: ANOVA results for maternal lifestyle predictors of aggression (CBCL short scale) at age 5 (mean of total sample = 5.96; n = 4,454)

	n	Unadjusted Mean	Adjusted Mean	P-value
RSMOKE				< 0.001
Nil smoked	2,969	5.67	5.70	
Light-moderate	1,185	6.46	6.40	
Heavy	300	6.94	6.81	
RDRINK				0.988
Abstainer	2,181	5.92	5.95	
Light	2,223	6.00	5.97	
1+ per day	50	6.40	5.91	
RBINGE				0.690
Never binge	3,609	5.89	5.94	
Occasionally binge	742	6.22	6.03	
Binge half-time	103	6.59	6.19	
RBREASTFEED				0.001
Still feeding 6 mths	1,495	5.58	5.68	
2 wks-6 mths	2,121	6.10	6.06	
Not breastfeed	838	6.31	6.20	

Note: Multiple R = 0.14; R^2 = 0.02.

10.3 Maternal Mental Health

Measures of maternal mental health from the prenatal period through to the five-year follow-up were significantly associated with aggression in the child at age 5 as rated by the mother. In particular, Table 10.3 shows independent effects of maternal stress at age 5 such that more stressed mothers rated their children as more aggressive. It is possible that this result is due to biased perceptions of stressed and depressed mothers which may result in their being more likely to perceive their children negatively. However, the fact that several measures of maternal mental health taken at different times are all associated with increased aggression suggests that this finding reflects, at least in part, a true association between maternal mental health and childhood aggression.

Mothers who reported conflict in their relationship also rated their children as more aggressive at age 5. The measures of maternal mental health accounted for a much larger proportion of variance (8 per cent) than any other group of predictors of aggression at 5 years.

Table 10.3: ANOVA results for maternal mental health predictors of aggression (CBCL short scale) at age 5 (mean of total sample = 5.95; n = 3,861)

	n	Unadjusted Mean	Adjusted Mean	P-value
RSTRESS-5				< 0.001
Not stressed	3,430	5.71	5.80	
Stressed	431	7.90	7.14	
RDEP-5				0.583
Non-depressed	3,652	5.85	5.94	
Depressed	209	7.80	6.09	
RANX-5				< 0.001
Non-anxious	3,274	5.67	5.84	
Anxious	587	7.50	6.58	
RDYADTOT				< 0.001
Good	2,458	5.50	5.65	
Some conflict	639	6.52	6.39	
Conflict	340	7.64	7.07	
No partner	424	6.36	6.22	
RTIMESS3				0.022
Little or no stress	3,199	5.72	5.93	
Some stress	343	7.08	6.38	
Continued stress	319	7.07	5.68	
RTIMEDEP				0.001
Nil	3,028	5.65	5.82	
Some symptoms	430	6.69	6.33	
Lot symptoms	403	7.43	6.52	
RTIMEANX				0.150
Nil symptoms	3,090	5.65	5.88	
Some symptoms	339	6.83	6.25	
Lot symptoms	432	7.38	6.18	

Note: Multiple R = 0.29; R^2 = 0.08.

10.4 Mother's Attitude to the Child and Child Rearing

The mother's attitude to the child at 6 months and reported styles of parenting were also significant independent predictors of aggression at age 5. Table 10.4 shows that mothers who reported taking something away from the child to discipline them, and smacking their child to discipline them reported higher levels of aggression in their 5 year old children. Mothers who felt positive about their child at 6 months also reported lower levels of aggression in their children at age 5. The amount of time the child spent in child care was not associated with aggression at age 5, nor was whether the mother wanted to become pregnant as reported at the first clinic visit. The mother's attitude to the child and her style of parenting account for about 5 per cent of the variance in the aggressive behaviour of the five-year-old child.

Table 10.4: ANOVA results for mother's attitude to child and child rearing predictors of aggression (CBCL short scale) at age 5 (mean of total sample = 5.95; n = 3,587)

	n	Unadjusted Mean	Adjusted Mean	P-value
RHRSCARE-5YR				0.092
Nil	1,671	5.86	5.84	
1-10 hrs pw	126	5.97	5.98	
11-20 hrs pw	1,915	6.11	6.13	
21+ hrs	306	5.92	5.87	
RTAKE				< 0.001
Always	153	6.29	6.33	
Sometimes	2,387	6.21	6.16	
Never	1,478	5.60	5.68	
RREASON				0.017
Always	2,153	5.88	5.89	
Sometimes	1,643	6.30	6.15	
Never	222	5.42	5.62	
RFREE				0.073
Controlled	328	6.29	6.23	
Some freedom	3,316	6.00	5.99	
Lot freedom	374	5.57	5.65	
RHRSCARE-6M0				0.306
Nil	1,966	5.91	5.97	
4 hours or less	1,574	6.03	5.99	
5-10 hours	263	6.48	6.28	
11-20 hours	90	5.33	5.42	
21+ hours	125	6.12	6.19	
RBABTCH				0.752
Not always	581	6.19	5.94	
Always	3,437	5.95	5.99	
RBABWANT				0.544
Unplan-want	776	6.06	6.06	
Unsure	920	6.13	6.05	
Plan-want	2,322	5.91	5.94	
RSMACK				< 0.001
Always	408	6.10	5.98	
Sometimes	2,847	6.15	6.12	
Never	763	5.34	5.51	
RBABGOOD				< 0.001
Not always	232	7.68	7.63	
Mostly	2,216	6.26	6.23	
Always	1,570	5.35	5.40	

Note: Multiple R = 0.22; R^2 = 0.05.

10.5 Perinatal Factors

Perinatal factors were also independent predictors of aggression at age 5 accounting for a total of 4 per cent of the variance. Table 10.5 shows that mothers reporting they had health problems during pregnancy and that the baby had health problems in the first 6 months also reported that their children were more aggressive at age 5. Boys were more likely to be rated as aggressive than girls. Delivery problems reported by the mother were not associated with aggression at 5 years. The means of aggression for the various levels of birthweight also appear to be different, with low birthweight babies more likely to be subsequently found to manifest aggressive behaviour. The very low number in the very low birthweight category indicates that the mean for this subgroup is unstable. When the very low and low categories were collapsed, a significant difference was found such that low birthweight babies were more likely to be aggressive at age 5.

Table 10.5: ANOVA results for perinatal factors predictors of aggression (CBCL short scale) at age 5 (mean of total sample = 5.93; n = 3,779)

	n	Unadjusted Mean	Adjusted Mean	P-value
RBIRTHWEIGHT				0.019
Very low bwt	12	6.42	5.77	
Low bwt	116	6.96	6.84	
Normal	3,651	5.90	5.91	
GENDER				< 0.001
Male	1,969	6.28	6.29	
Female	1,810	5.55	5.56	
RMEDATTN				0.002
No dr visits	739	5.37	5.55	
1-5 dr visits	2,700	6.03	6.04	
6+ medical visits	340	6.40	5.96	
RBABPROB				0.108
Few problems	3,488	5.88	5.91	
Some-many problems	291	6.63	6.26	
RPREGOOD				0.093
Few problems	3,240	5.83	5.89	
Some problems	470	6.52	6.25	
Lots of problems	69	6.91	6.23	
RDELPROB				0.894
Few problems	717	5.86	5.99	
Some problems	2,755	5.93	5.92	
Lots of problems	307	6.91	5.97	
RCHILDHLTH				< 0.001
0-3 symptoms	3,263	5.76	5.79	
4 symptoms	279	6.53	6.43	
5+ symptoms	237	7.65	7.40	
RMOTHSYM				< 0.001
Few symptoms	545	5.28	5.40	
Some symptoms	3,088	5.97	5.97	
Many symptoms	146	7.51	7.23	

Note: Multiple R = 0.22; R^2 = 0.05.

10.6 Cognitive Factors

Consistent with the literature, we found that cognitive factors were also associated with aggressive behaviour of the child at age 5. Children showing neuromotor delay on the Denver battery had higher levels of aggression than those showing no delay. Higher levels of aggression were also found for children with lower scores on the Peabody picture vocabulary test (a measure of language comprehension).

Table 10.6: ANOVA results for cognitive predictors of aggression (CBCL short scale) at age 5 (mean of total sample = 5.99; n = 3,574)

	n	Unadjusted Mean	Adjusted Mean	P-value
RDENVER				< 0.001
Delay	65	7.83	7.57	
No delay	3,509	5.96	5.96	
RPEABODY				< 0.001
Below norm	425	6.55	6.43	
Norm	2,723	5.99	6.00	
Above norm	426	5.47	5.49	

Note: Multiple R = 0.10; R^2 = 0.01.

10.7 Summary of Predictors of Aggression at Age 5

The variables that predicted aggression at age 5 included family income from 0 to 5 years, the number of mother's partner changes in the past five years, smoking early in pregnancy, breastfeeding, maternal stress, maternal anxiety at age 5, dyadic adjustment at age 5, aspects of childhood discipline, birthweight, gender, problems during pregnancy, the mother's attitude to the child at 6 months, language ability and neuromotor development. These variables come from all the six categories of predictors.

It is clear from these results that various types of factors are associated with, and might be causes of, childhood aggressive behaviour. Some of these variables may be associated with aggression via biological or genetic pathways, including smoking during pregnancy, cognitive and language performance, birthweight, and problems during pregnancy. Some predictors represent environment influences on child development such as partner change, maternal depression, income and dyadic adjustment.

CHAPTER 11

PREDICTORS OF AGGRESSION AT AGE 14

If the prevention of aggressive (and externalising) behaviours is to be successful, predictors of adolescent aggression and delinquency need to be identified in early childhood. For this reason, it was important to determine whether those characteristics that predicted aggressive children at age 5 remained important over the next nine years. The same six classes of variables were examined in relation to aggression at age 14 as were examined in relation to aggression at age 5.

11.1 Sociodemographic Variables

At age 14, whether or not the mother's partner had been arrested by the time the child was five and the number of children in the household at the time the study child was born were not significant predictors of aggression. The mother's age at the birth of the child, poverty, the mother's educational level at the first clinic visit and her number of partner changes still had significant effects on aggression at age 14. This suggests the enduring impact of sociodemographic factors on the development of child behaviour. However, only 2 per cent of the variation in the aggressive behaviour of 14 year old children can be attributed to these sociodemographic variables.

When interpreting these longitudinal results we must also consider the possibility that the significant associations may be due to third variable effects. For example, it may not be the effect of poverty at age 5 that is influencing aggression at age 14 but, instead, poverty at age 5 may predict poverty at age 14 which in turn influences aggression. The fact that these predictors are important at ages 5 and 14 is likely to indicate continuity in the environment

of the child. Therefore, although the effects of these variables are clearly significant even after nine years, it is possible that the causal pathway between these predictors and aggression is direct or indirect.

Table 11.1: ANOVA results for sociodemographic predictors of aggression (CBCL short scale) at age 14 (mean of total sample = 4.44; n = 4,201)

	n	Unadjusted Mean	Adjusted Mean	P-value
RAGE				< 0.001
13 to 19 years	525	5.24	5.01	
20 to 34 years	3,483	4.35	4.38	
35 years plus	193	3.85	3.98	
RPOOR				0.005
Consistent	216	5.26	4.79	
Mid-income	3,476	4.49	4.49	
High income	509	3.78	3.98	
RCHILDNUM				0.194
Study child only	1,686	4.52	4.44	
Two to four	2,376	4.42	4.47	
Five or more	139	3.77	3.90	
RMCHANGE				< 0.001
Nil part change	3,495	4.28	4.32	
One	392	5.23	5.01	
Two plus	314	5.22	5.03	
REDUCATION				0.039
Incomplete high	677	4.78	4.72	
Complete high	2,712	4.45	4.42	
Post-high	812	4.15	4.26	
RARREST				0.710
No	3,307	4.35	4.42	
Yes	673	4.64	4.52	
No partner	221	5.20	4.57	

Note: Multiple R = 0.15; R^2 = 0.02.

11.2 Maternal Lifestyle Variables

The same maternal lifestyle variables that were significant at age 5 were significant predictors of aggression at age 14. These included smoking early in pregnancy and breastfeeding. Altogether the amount of variance in aggression at age 14 explained by maternal lifestyle during pregnancy and breastfeeding was 2 per cent.

Table 11.2: ANOVA results for maternal lifestyle predictors of aggression (CBCL short scale) at age 14 (mean of total sample = 4.46; n = 4,369)

	n	Unadjusted Mean	Adjusted Mean	P-value
RSMOKE				< 0.001
Nil smoked	2,915	4.18	4.21	
Light-moderate	1,159	4.85	4.81	
Heavy	295	5.62	5.52	
RDRINK				0.990
Abstainer	2,143	4.46	4.47	
Light	2,177	4.45	4.45	
1+ per day	49	4.67	4.44	
RBINGE				0.553
Never binge	3,549	4.42	4.47	
Occasionally binge	718	4.62	4.44	
Binge half-time	102	4.49	4.07	
RBREASTFEED				< 0.001
Still feeding 6 mths	1,462	3.99	4.09	
2 wks-6 mths	2,080	4.63	4.61	
Not breastfeed	827	4.84	4.74	

Note: Multiple R = 0.14; R^2 = 0.02.

11.3 Maternal Mental Health

Table 11.3 shows that measures of maternal mental health from the prenatal assessment through to the 5 year assessment were also associated with aggression at 14 years, accounting for a total of 5 per cent of the variance in the aggressive behaviour of 14-year-old children. Comparison of the means of maternal ratings of child aggression at 14 years for mothers who were stressed and anxious at age 5 shows that they were more likely to report that their children were aggressive at age 14. Mothers who were more likely to be anxious over an extended period of time and mothers reporting poor dyadic adjustment with their partners when the study child was 5 years old also rated their children as more aggressive on average at age 14. These results argue for the long-term effects of maternal mental health on child behaviour.

Table 11.3: ANOVA results for maternal mental health predictors of aggression (CBCL short scale) at age 14 (mean of total sample = 4.44; n = 3,779)

	n	Unadjusted Mean	Adjusted Mean	P-value
RSTRESS-5				0.002
Not stressed	3,358	4.28	4.37	
Stressed	421	5.63	4.98	
RDEP-5				0.163
Non-depressed	3,576	4.34	4.42	
Depressed	203	6.06	4.82	
RANX-5				0.001
Non-anxious	3,207	4.22	4.35	
Anxious	572	5.65	4.96	
RDYADTOT				< 0.001
Good	2,401	4.07	4.20	
Some conflict	627	4.84	4.74	
Conflict	333	5.66	5.22	
No partner	418	4.96	4.75	
RTIMESS3				0.099
Little or no stress	3,131	4.27	4.44	
Some stress	338	5.28	4.72	
Continued stress	310	5.16	4.12	
RTIMEDEP				0.001
Nil	2,959	4.17	4.30	
Some symptoms	423	5.17	4.89	
Lot symptoms	397	5.65	4.99	
RTIMEANX				0.184
Nil symptoms	3,021	4.19	4.38	
Some symptoms	333	5.21	4.75	
Lot symptoms	425	5.57	4.64	

Note: Multiple R = 0.22; R^2 = 0.05.

11.4 Mother's Attitude to the Child and Childrearing (0 to 5)

Consistent with the results reported so far, a similar pattern was found for predictors of aggression at ages 5 and 14 for measures of the mother's attitude to the child and her pattern of childrearing. Table 11.4 shows that childrearing practices at age 5 remained significant (RSMACK and RTAKE) as did a measure of how positively the mother felt about caring for her child at 6 months.

Table 11.4: ANOVA results for mother's attitude to child and child rearing predictors of CBCL delinquency at age 14 (mean of total sample = 2.53; n = 3,488)

	n	Unadjusted Mean	Adjusted Mean	P-value
RHRSCARE-5YR				0.800
Nil	1,637	4.55	4.53	
1-10 hrs pw	122	4.57	4.57	
11-20 hrs pw	1,884	4.39	4.41	
21+ hrs	301	4.54	4.51	
RTAKE				0.001
Always	151	4.86	4.72	
Sometimes	2,348	4.67	4.62	
Never	1,445	4.11	4.21	
RREASON				0.356
Always	2,116	4.41	4.42	
Sometimes	1,610	4.60	4.56	
Never	218	4.11	4.30	
RFREE				0.849
Controlled	316	4.64	4.57	
Some freedom	3,265	4.47	4.46	
Lot freedom	363	4.35	4.44	
RHRSCARE-6M0				0.772
Nil	1,928	4.38	4.42	
4 hours or less	1,541	4.54	4.52	
5-10 hours	263	4.74	4.57	
11-20 hours	89	4.28	4.33	
21+ hours	123	4.72	4.71	
RBABTCH				0.182
Not always	573	4.46	4.30	
Always	3,371	4.48	4.45	
RBABWANT				0.001
Unplan-want	760	4.58	4.59	
Unsure	905	4.88	4.81	
Plan-want	2,279	4.28	4.31	
RSMACK				< 0.001
Always	408	4.81	4.71	
Sometimes	2,788	4.62	4.64	
Never	748	3.73	3.81	
RBABGOOD				< 0.001
Not always	228	5.69	5.64	
Mostly	2,182	4.62	4.64	
Always	1,534	4.09	4.14	

Note: Multiple R = 0.17; R^2 = 0.03.

11.5 Perinatal Factors

Perinatal predictors of aggression at age 5 also remained important at age 14. Table 11.5 shows that these included the mother's reports of problems during pregnancy and the mother's reported number of symptoms during pregnancy. Altogether these variables explained 3 per cent of the variance in maternal rated aggression at age 14.

Table 11.5: ANOVA results for perinatal factors predictors of aggression (CBCL short scale) at age 14 (mean of total sample = 4.43; n = 3,706)

	n	Unadjusted Mean	Adjusted Mean	P-value
RBIRTHWEIGHT				0.055
Very low bwt	11	7.27	6.72	
Low bwt	114	4.87	4.80	
Normal	3,581	4.40	4.41	
GENDER				0.089
Male	1,928	4.52	4.52	
Female	1,778	4.32	4.33	
RMEDATTN				0.095
No dr visits	724	4.09	4.23	
1-5 dr visits	2,648	4.49	4.51	
6+ medical visits	334	4.60	4.24	
RBABPROB				0.765
Few problems	3,425	4.40	4.44	
Some-many problems	281	4.74	4.37	
RPREGOOD				< 0.001
Few problems	3,176	4.28	4.34	
Some problems	463	5.17	4.93	
Lots problems	67	5.94	4.46	
RDELPROB				0.638
Few problems	704	4.31	4.43	
Some problems	2,702	4.42	4.41	
Lots of problems	300	4.76	4.61	
RCHILDHLTH				< 0.001
0-3 symptoms	3,206	4.28	4.30	
4 symptoms	270	5.03	4.95	
5+ symptoms	230	5.80	5.63	
RMOTHSYM				< 0.001
Few symptoms	532	3.81	3.96	
Some symptoms	3,031	4.46	4.46	
Many symptoms	143	5.91	5.54	

Note: Multiple R = 0.18; R^2 = 0.03.

11.6 Cognitive Factors

Cognitive factors also remained significant predictors of aggression in children at 14 years of age. Lower scores on the Peabody were associated with higher levels of aggression at age 14. However, only 1 per cent of the variance in the aggressive behaviour of 14 year old children is possibly attributable to cognitive factors.

Table 11.6: ANOVA results for cognitive predictors of aggression (CBCL short scale) at age 14 (mean of total sample = 4.49; n = 3,497)

	n	Unadjusted Mean	Adjusted Mean	P-value
RDENVER				0.167
Delay	59	5.51	5.13	
No delay	3,438	4.48	4.48	
RPEABODY				< 0.001
Below norm	417	5.16	5.11	
Norm	2,661	4.51	4.51	
Above norm	419	3.75	3.75	

Note: Multiple R = 0.10; R^2 = 0.01.

11.7 Overall Comparison of Predictors of Aggression at Ages 5 and 14

Overall, the patterns of predictors of aggression at ages 5 and 14 were very similar. At age 14 all classes of variables explained a smaller proportion of variance in aggression (than when the child was aged 5). The decline in importance of the groups of predictors is not surprising given the nine year interval between the two assessments. The relative importance of each group of predictors remained roughly the same, with maternal mental health variables explaining the most variance in aggression at both 5 and 14 years. The fact that predictors from the first five years of life remain important for adolescent

behavioural outcomes is extremely important for early identification of children who are at risk of becoming delinquent. It also suggests that the environment of the child during the first five years of life may have critical and long-term consequences for behaviour in adolescence.

CHAPTER 12

PREDICTORS OF DELINQUENCY AT AGE 14

Given the high correlation between aggression and delinquency at age 14, we expected that similar variables would predict these outcomes. However, we also expected that environmental factors might contribute by precipitating delinquency in an already aggressive child. Therefore, we hypothesised that demographic variables would be more important for delinquency than the other predictors.

12.1 Sociodemographic Predictors of Delinquency at 14

Table 12.1 shows that similar sociodemographic variables predicted delinquency and aggression in 14-year-old children. A total of 5 per cent of the variance in delinquency at age 14 was explained by sociodemographic variables. A plausible explanation for this finding is that sociodemographic factors reflect the increasing importance of the child's environment in determining whether an already aggressive child becomes delinquent.

Table 12.1: ANOVA results for sociodemographic predictors of CBCL delinquency at age 14 (mean of total sample = 2.51; n = 4,168)

	n	Unadjusted Mean	Adjusted Mean	P-value
RAGE				< 0.001
13 to 19 years	518	5.35	3.18	
20 to 34 years	3,458	2.40	2.42	
35 years plus	192	2.30	2.31	
RPOOR				< 0.001
Consistent	210	3.56	3.06	
Mid-income	3,456	2.53	2.53	
High income	502	1.94	2.17	
RCHILDNUM				0.006
Study child only	1,676	2.46	2.36	
Two to four	2,356	2.56	2.63	
Five or more	136	2.32	2.38	
RMCHANGE				< 0.001
Nil part change	3,473	2.33	2.38	
One	381	3.34	3.05	
Two plus	314	3.51	3.30	
REDUCATION				0.005
Incomplete high	677	2.87	2.76	
Complete high	2,685	2.52	2.51	
Post-high	806	2.19	2.31	
RARREST				0.007
No	3,289	2.37	2.44	
Yes	658	2.90	2.79	
No partner	221	3.39	2.66	

Note: Multiple R = 0.22; R^2 = 0.05.

12.2 Maternal Lifestyle Factors

The same maternal lifestyle variables were associated with delinquency at age 14 as were associated with aggression at ages 5 and 14, namely, smoking early in pregnancy and maternal breastfeeding.

Table 12.2: ANOVA results for maternal lifestyle predictors of CBCL delinquency at age 14 (mean of total sample = 2.53; n = 4,327)

	n	Unadjusted Mean	Adjusted Mean	P-value
RSMOKE				< 0.001
Nil smoked	2,886	2.28	2.32	
Light-moderate	1,150	2.91	2.85	
Heavy	291	3.47	3.31	
RDRINK				0.094
Abstainer	2,113	2.50	2.54	
Light	2,166	2.53	2.50	
1+ per day	48	3.81	3.35	
RBINGE				0.307
Never binge	3,512	2.45	2.50	
Occasionally binge	715	2.81	2.65	
Binge half-time	100	3.26	2.79	
RBREASTFEED				< 0.001
Still feeding 6 mths	1,450	2.15	2.24	
2 wks-6 mths	2,049	2.66	2.64	
Not breastfeed	828	2.88	2.77	

Note: Multiple R = 0.17; R^2 = 0.03.

12.3 Maternal Mental Health

Dyadic adjustment, maternal stress, depression and anxiety at age 5 were all significant predictors of delinquency at age 14. Table 12.3 shows that depression from the prenatal period to 6 months was not a significant predictor of delinquency at 14. About 6 per cent of the child's delinquent behaviour at age 14 is possibly attributable to the mother's prior mental health.

Table 12.3: ANOVA results for maternal mental health predictors of CBCL delinquency at age 14 (mean of total sample = 2.51; n = 3,753)

	n	Unadjusted Mean	Adjusted Mean	P-value
RSTRESS-5				0.411
Not stressed	3,339	2.44	2.50	
Stressed	414	3.12	2.62	
RDEP-5				0.018
Non-depressed	3,555	2.44	2.48	
Depressed	198	3.87	3.00	
RANX-5				0.001
Non-anxious	3,190	2.36	2.44	
Anxious	563	3.38	2.90	
RDYADTOT				< 0.001
Good	2,391	2.17	2.24	
Some conflict	627	2.77	2.73	
Conflict	327	3.62	3.39	
No partner	408	3.20	3.03	
RTIMESS3				0.022
Little or no stress	3,108	2.44	2.57	
Some stress	340	2.79	2.35	
Continued stress	305	2.90	2.10	
RTIMEDEP				0.001
Nil	2,948	2.33	2.41	
Some symptoms	418	2.88	2.70	
Lot symptoms	387	3.52	3.07	
RTIMEANX				0.378
Nil symptoms	3,007	2.35	2.47	
Some symptoms	335	2.95	2.67	
Lot symptoms	421	3.31	2.65	

Note: Multiple R = 0.23; R^2 = 0.06.

12.4 Mother's Attitude to the Child and Childrearing

Table 12.4 shows that aspects of the mother's attitude to the child and childrearing had similar associations with delinquency and aggression. Of particular interest here is the finding that whether or not the mother wanted the child (as reported at the first clinic visit) and the mother's attitude to the child as early as six months, had a statistically significant association with the child's delinquent behaviour at age 14. Only 3 per cent of the child's delinquent

behaviour at age 14 is possibly attributable to the mother's attitude to the child and her pattern of child-rearing.

Table 12.4: ANOVA results for mother's attitude to child and child rearing predictors of aggression (CBCL short scale) at age 14 (mean of total sample = 2.53; n = 3,488)

	n	Unadjusted Mean	Adjusted Mean	P-value
RHRSCARE-5YR				0.672
Nil	1,625	2.57	2.55	
1-10 hrs pw	122	2.56	2.55	
11-20 hrs pw	1,861	2.48	2.50	
21+ hrs	296	2.74	2.70	
RTAKE				0.026
Always	152	2.86	2.78	
Sometimes	2,318	2.64	2.62	
Never	1,434	2.34	2.39	
RREASON				0.084
Always	2,099	2.46	2.47	
Sometimes	1,590	2.68	2.66	
Never	215	2.32	2.42	
RFREE				0.005
Controlled	315	3.03	2.99	
Some freedom	3,227	2.49	2.49	
Lot freedom	362	2.55	2.60	
RHRSCARE-6M0				0.204
Nil	1,922	2.48	2.50	
4 hours or less	1,516	2.54	2.54	
5-10 hours	257	2.70	2.59	
11-20 hours	87	2.48	2.52	
21+ hours	122	3.12	3.10	
RBABTCH				0.143
Not always	563	2.79	2.69	
Always	3,341	2.50	2.51	
RBABWANT				< 0.001
Unplan-want	748	2.53	2.53	
Unsure	893	2.89	2.84	
Plan-want	2,263	2.41	2.39	
RSMACK				< 0.001
Always	399	2.82	2.76	
Sometimes	2,764	2.63	2.62	
Never	741	2.07	2.14	
RBABGOOD				< 0.001
Not always	227	3.30	3.21	
Mostly	2,156	2.62	2.59	
Always	1,521	2.32	2.37	

Note: Multiple R = 0.17; R^2 = 0.03.

12.5 Perinatal Factors

Table 12.5 shows that the relationship between perinatal factors and delinquency at age 14 is similar to those observed for aggression at age 14. The only difference in this table is the borderline significance of the association between birthweight and delinquency. When the very low birthweight and the low birthweight categories were collapsed, and the analysis rerun, the significance of this variable increased to the 0.05 level. Figure 12.1 shows the difference in univariate delinquency and aggression scores for very low, low and normal birthweights. While low birthweight appears to have a linear association with child aggression at age 14, it is apparent that the association between low birthweight and childhood delinquency is less marked.

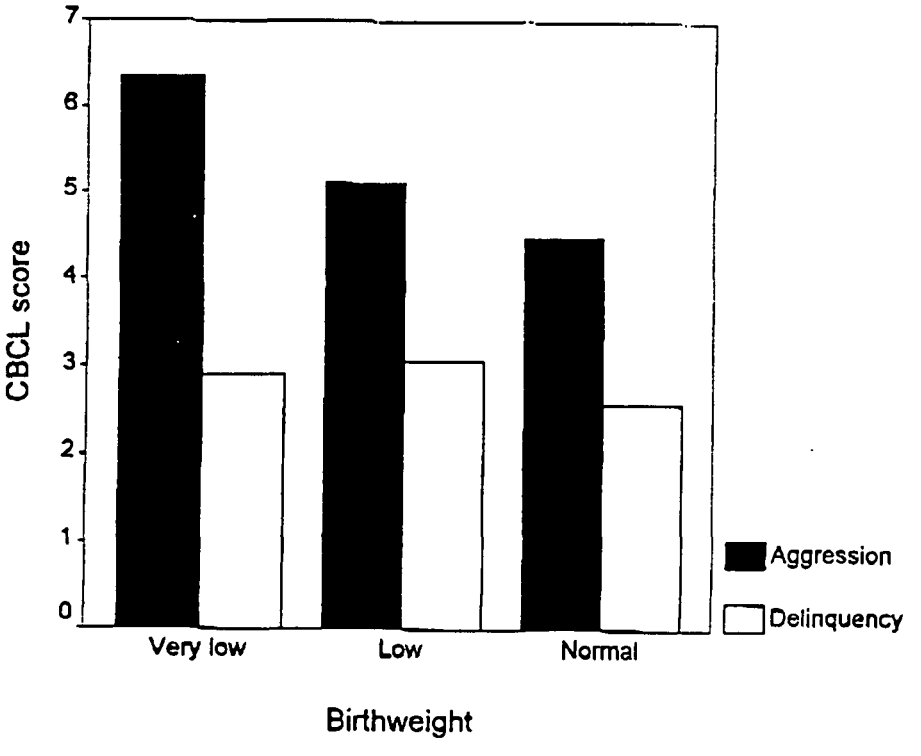

Figure 12.1: Mean levels of CBCL aggression (short form) and delinquency at age 14 by birthweight.

Table 12.5: ANOVA results for perinatal factors predictors of CBCL delinquency at age 14 (mean of total sample = 2.49; n = 3,678)

	n	Unadjusted Mean	Adjusted Mean	P-value
RBIRTHWEIGHT				0.082
Very low bwt	12	2.50	2.16	
Low bwt	114	2.99	3.01	
Normal	3,552	2.47	2.47	
GENDER				< 0.001
Male	1,908	2.94	2.94	
Female	1,770	2.00	2.00	
RMEDATTN				0.098
No dr visits	714	2.22	2.32	
1-5 dr visits	2,635	2.54	2.55	
6+ medical visits	329	2.66	2.41	
RBABPROB				0.878
Few problems	3,393	2.47	2.49	
Some-many problems	285	2.71	2.47	
RPREGOOD				0.003
Few problems	3,155	2.39	2.43	
Some problems	454	3.00	2.85	
Lots problems	69	3.36	2.90	
RDELPROB				0.655
Few problems	690	2.44	2.52	
Some problems	2,690	2.47	2.47	
Lots of problems	298	2.71	2.61	
RCHILDHLTH				0.001
0-3 symptoms	3,180	2.41	2.43	
4 symptoms	269	2.84	2.78	
5+ symptoms	229	3.17	3.03	
RMOTHSYM				< 0.001
Few symptoms	534	2.16	2.21	
Some symptoms	3,002	2.48	2.49	
Many symptoms	142	3.82	3.61	

Note: Multiple R = 0.24; R^2 = 0.06.

12.6 Cognitive Predictors

Table 12.6 shows that children at age 5 who have language difficulties are more likely to be aggressive at age 14 than children who do not have language difficulties. However, only 1 per cent of the variance in childhood (adolescent) delinquency is possibly attributable to these cognitive factors.

Table 12.6: ANOVA results for cognitive predictors of CBCL delinquency at age 14 (mean of total sample = 2.53; n = 3,470)

	n	Unadjusted Mean	Adjusted Mean	P-value
RDENVER				0.552
Delay	59	3.05	2.73	
No delay	3,411	2.52	2.53	
RPEABODY				< 0.001
Below norm	411	3.06	3.05	
Norm	2,647	2.55	2.56	
Above norm	412	1.84	1.84	

Note: Multiple R = 0.12; R^2 = 0.01.

12.7 Summary of the Predictors of Aggression and Delinquency

One broad approach to the six classes of predictors is to compare how much of the variance in aggression and delinquency might be attributed to each class of predictor variables. Figure 12.2 illustrates this by showing that the proportion of variance in aggression at age 5, aggression at age 14 and delinquency at age 14 is potentially explained by the various classes of predictors.

The first important point to make about these results is that no group of predictors is **unimportant** at 14 years. In particular, perinatal and maternal lifestyle factors do not decrease in importance over the follow-up period, suggesting that although the overall contribution of these variables is small, it is reasonably immutable up to 14 years at least. Another general observation is that maternal mental health appears to be the most important of the groups of predictors. Relative to other groups of variables, the cognitive variables explain the least proportion of variance in aggression and delinquency.

Finally, demographic variables appear to be more important for delinquency than for aggression.

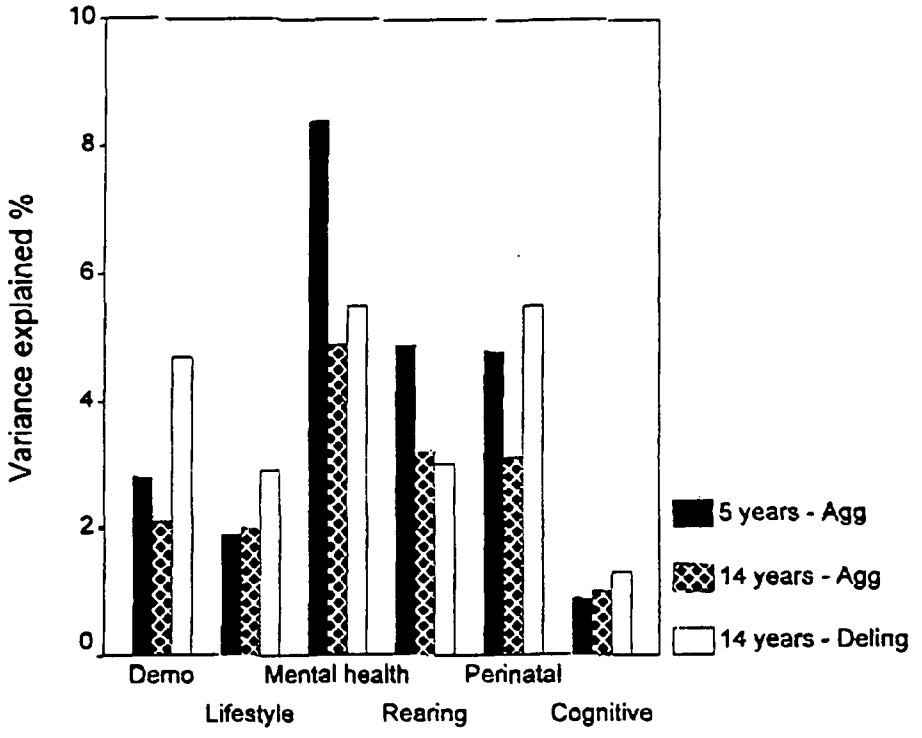

Figure 12.2: Proportion of variance in aggression at ages 5 and 14 and delinquency explained by the six classes of predictors.

The ANOVAs conducted so far have shown that a complex range of variables predict aggression and delinquency. However, we know that variables from different classes are often intercorrelated. For example, sociodemographic variables are often associated with mental health. Therefore, a multivariate analysis combining the important variables from each class is required to evaluate which predictors are important independent of all other predictors. In the following chapter we present results of discriminant function analysis which allow the independent effects of individual variables to be evaluated.

CHAPTER 13

AGGRESSIVE AND DELINQUENT BEHAVIOUR: A MULTIVARIATE LOGISTIC REGRESSION MODEL

The study is concerned with the factors in early childhood which discriminate between children who become (or do not become) aggressive or delinquent in adolescence. We approached this issue by categorising the sample in terms of whether or not they were aggressive at age 14. The top 10 per cent on the CBCL subscale categorised as "Aggressive". Logistic regression analyses were then undertaken to determine which factors from the prenatal period through to five years could be used to identify aggressive or delinquent children. This approach allowed the multivariate effects of predictors to be evaluated. Relative risks (RR) were estimated using odds ratios (OR) which were calculated for each independent variable. There was simultaneous control for all the other variables entered into the model.

Variables which were significant in the ANOVAs at the $p < 0.01$ level were chosen as predictors of child behaviour problems at ages 5 and 14. Analyses were conducted separately for males and females. Missing data were deleted listwise. This explains the small sample sizes in some analyses. As mentioned in relation to the analysis of sample attrition, it is likely that missing data are not random, but occur more frequently among mothers and children of lower SES and educational level. Therefore, listwise deletion of missing data is likely to lead to an underestimation of the effect sizes.

13.1 Aggressive Outcomes in "At Risk" Children

Table 13.1 shows the logistic regression analysis conducted to determine which factors distinguished aggressive behaviour in males at 5 years of age. The independent statistically significant predictors of male aggressive behaviour at age 5 are: poverty (high income families less aggressive), marital partner change (changes in partner associated with increased aggression), maternal smoking (smoking mothers at first clinic visit have more aggressive children), subjective stress (more concurrently stressed mothers have more aggressive children), positive attitude to baby (mothers with more positive attitudes have less aggressive boys), child health (sicker boys after birth are subsequently more aggressive) and mothers' health (sicker mothers have a higher rate of aggressive boys). A similar pattern of results is evident for girls at five years of age (Table 13.2). Breastfeeding emerges as a predictor of female aggressive behaviour at age 5, while the socio-economic factors make no significant contribution.

Table 13.3 examines the predictors of aggressive behaviour in 14-year-old boys. By far the strongest predictor is aggressive behaviour at the 5-year follow-up. Indeed, some 38.2 per cent of the boys who were aggressive at age 5 were still classified as aggressive at age 14. Interestingly, maternal smoking at the first clinic visit remains an independent predictor of subsequent aggressive behaviour even after controlling for the other variables in the model. Maternal stress, attitude to the baby and the mother's health are all predictors of aggressive behaviour in boys 14 years of age.

Table 13.1: Logistic regression analysis for set of ten predictors of aggression (CBCL-aggression subscale-short form) at age 5 for male (n = 2,422) children

	n	Unadjusted Percentage	Adjusted Odds Ratio	P-value
RPOOR				0.040
Consistent pov	134	19.4	1	
Mid-income	1,991	12.6	0.67	
High income	294	7.8	0.40*	
RMCHANGE				< 0.001
Nil	1,994	10.8	1	
One	219	22.4	2.40*	
Two plus	187	17.6	1.98*	
RSMOKE				0.004
Nil smoked	1,599	9.9	1	
Light-moderate	672	16.1	1.48*	
Heavy	151	23.2	1.99*	
RSTRESS-5				< 0.001
Not stressed	2,116	10.3	1	
Stressed	272	29.0	2.23*	
RANX-5				0.157
Non-anxious	2,034	10.1	1	
Anxious	388	24.7	1.30	
RDYADTOT				0.012
Good	1,304	9.8	1	
Some conflict	340	15.3	1.06	
Conflict	194	23.2	1.24	
No partner	233	12.9	0.44*	
Missing	351	-	0.74	
RSMACK				0.130
Always	281	13.2	1	
Sometimes	1,669	13.1	1.21	
Never	385	8.3	0.81	
RBABGOOD				< 0.001
Not always	145	27.6	1	
Mostly	1,316	13.8	0.55*	
Always	899	8.0	0.32*	
RCHILDHLTH				0.020
0-3 symptoms	2,005	10.8	1	
4 symptoms	176	19.3	1.46	
5+ symptoms	153	26.1	1.80*	
RMOTHSYM				0.015
Few symptoms	358	6.1	1	
Some symptoms	1,859	12.6	1.44	
Many symptoms	89	31.5	2.80*	

*95 per cent CI excludes unity.

Table 13.2: Logistic regression analysis for set of eight predictors of aggression (CBCL-aggression subscale-short form) at age 5 for female (n = 2,256) children

	n	Unadjusted Percentage	Adjusted Odds Ratio	P-value
REDUCATION				0.232
Post-high	432	7.2	1	
Complete high	1,427	8.3	1.01	
Incomplete high	378	11.6	1.43	
RBREASTFEED				0.016
Still feeding	724	5.5	1	
2 weeks-6 mths	1,032	8.6	1.51	
Not breastfeed	415	12.3	1.99*	
RSTRESS-5				0.007
Not stressed	1,978	7.4	1	
Stressed	252	18.7	1.88*	
RANX-5				< 0.001
Non-anxious	1,911	6.8	1	
Anxious	345	19.4	2.13*	
RSMACK				0.027
Always	272	9.6	1	
Sometimes	1,456	9.8	1.22	
Never	443	5.2	0.64	
RBABGOOD				0.036
Not always	117	19.7	1	
Mostly	1,171	8.7	0.49*	
Always	829	6.6	0.46*	
RCHILDHLTH				0.016
0-3 symptoms	1,857	7.4	1	
4 symptoms	161	10.6	0.15	
5+ symptoms	140	20.7	2.15*	
RDENVER				0.109
Delay	18	27.8	1	
No delay	1,700	7.9	0.26*	
Missing	538	10.6	0.30	

*95 per cent CI excludes unity.

Table 13.3: Logistic regression analysis for set of seven predictors of aggression (CBCL-aggression subscale-short form) at age 14 for male (n = 2,422) children

	n	Unadjusted Percentage	Adjusted Odds Ratio	P-value
RAGG10				< 0.001
Non-aggressive	2,121	9.4	1	
Aggressive	301	38.2	4.62*	
RPOOR				0.024
Consistent pov	134	13.4	1	
Mid-income	1,991	13.9	1.37	
High income	294	6.5	0.71	
RSMOKE				0.001
Nil smoked	1,599	10.4	1	
Light-moderate	672	16.1	1.46*	
Heavy	151	25.8	2.26*	
RSTRESS-5				0.003
Not stressed	2,116	11.3	1	
Stressed	272	25.4	1.77*	
RSMACK				0.002
Always	281	18.1	1	
Sometimes	1,669	13.4	0.69	
Never	385	7.0	0.39*	
RPREGOOD				0.038
Few problems	1,974	11.7	1	
Some problems	304	18.4	1.54*	
Many problems	57	24.6	1.74	
RMOTHSYM				0.052
Few symptoms	358	6.7	1	
Some symptoms	1,859	13.2	1.60*	
Many symptoms	89	29.2	2.26*	

*95 per cent CI excludes unity.

The comparable model for 14-year-old girls is very similar to the model for boys (see Table 13.4). Girls who were aggressive at age 5 were disproportionately likely to continue to be aggressive at age 14. Mothers who report they are stressed, who have a less positive attitude to the baby at an earlier phase and who describe their pregnancy as having had problems are all more likely to perceive their 14-year-old daughter as more likely to be aggressive.

Table 13.5 provides a prediction model of delinquent behaviour in 14-year-old boys. The strongest predictor of adolescent delinquent behaviour in boys is prior aggressive behaviour (at 5 years of age). Some 36.5 per cent of the boys who were classified as aggressive at 5 years of age are subsequently found above the cut-off for delinquency on the CBCL. Boys who have experienced changes of parent are also much more likely to be classified as delinquent at 14 years of age. Maternal smoking, childrearing and child cognitive development all appear to contribute independently to the development of delinquent behaviour in 14-year-old boys. When we examine the prediction model for delinquent behaviour in adolescent (14-year-old) females we note some similarities (as well as some differences) from the model for adolescent males (Table 13.6) Prior aggressive behaviour remains the main predictor of delinquency in females, with aggressive females at age 5 over five times more likely subsequently to be classified as delinquent. Daughters of younger mothers and those living in poverty are also more likely to be subsequently seen as delinquent. Maternal smoking in the first trimester, conflict between the parents and a pregnancy described as having more problems all appear to contribute to an increased risk of delinquency in 14-year-old females.

Table 13.4: Logistic regression analysis for set of seven predictors of aggression (CBCL-aggression subscale-short form) at age 14 for female (n = 2,256) children

	n	Unadjusted Percentage	Adjusted Odds Ratio	P-value
RAGG10				< 0.001
Non-aggressive	2,060	8.1	1	
Aggressive	196	36.2	5.43*	
RAGE				0.008
13-19 years	288	18.1	1	
20-34 years	1,867	9.3	0.53*	
35+ years	101	11.9	0.69	
RSTRESS-5				0.014
Not stressed	1,978	9.4	1	
Stressed	252	19.0	1.67*	
RTIMEDEP				0.366
Nil	1,745	8.9	1	
Some symptoms	272	15.8	1.32	
Lot symptoms	239	16.3	0.95	
RBABGOOD				0.002
Not always	117	21.4	1	
Mostly	1,171	11.8	0.63	
Always	892	7.0	0.39*	
RPREGOOD				0.008
Few problems	1,848	9.5	1	
Some problems	276	17.0	1.80*	
Many problems	32	18.8	2.11	
RPEABODY				0.072
Below norm	163	17.2	1	
Norm	1,336	10.6	0.72	
Above norm	217	8.3	0.58	
Missing	540	9.3	0.49*	

*95 per cent CI excludes unity.

Table 13.5: Logistic regression analysis for set of seven predictors of delinquency (CBCL scale) at age 14 for male (n = 2,422) children

	n	Unadjusted Percentage	Adjusted Odds Ratio	P-value
RAGG10				< 0.001
Non-aggressive	2,121	12.1	1	
Aggressive	301	36.5	3.60*	
RCHILDNUM				0.143
Study child only	950	13.1	1	
2 to 4	1,325	16.4	1.28*	
5 or more	76	14.5	3.02*	
RMCHANGE				< 0.001
Nil	1,994	12.6	1	
One	219	22.8	1.56*	
Two plus	187	33.2	3.02*	
RSMOKE				< 0.001
Nil smoked	1,559	11.8	1	
Light-moderate	672	20.5	1.67*	
Heavy	151	27.2	2.08*	
RFREE				0.001
Controlled	223	24.2	1	
Some freedom	1,785	14.1	0.49*	
Much freedom	131	14.5	0.54*	
RSMACK				0.028
Always	281	19.9	1	
Sometimes	1,669	15.5	0.72	
Never	385	10.6	0.53*	
RPEABODY				0.070
Below norm	265	19.6	1	
Norm	1,396	15.3	0.78	
Above norm	212	7.5	0.44*	
Missing	435	15.7	0.75	

*95 per cent CI excludes unity.

Table 13.6: Logistic regression analysis for set of eight predictors of delinquency (CBCL scale) at age 14 for female (n = 2,256) children

	n	Unadjusted Percentage	Adjusted Odds Ratio	P-value
RAGG10				< 0.001
Non-aggressive	2,060	5.6	1	
Aggressive	196	26.0	5.22*	
RAGE				0.034
13-19 years	288	13.5	1	
20-34 years	1,867	6.5	0.54*	
35+ years	101	6.9	0.51	
RPOOR				0.010
Consistent pov	113	19.5	1	
Mid-income	1,889	6.8	0.36*	
High income	248	6.5	0.32*	
RSMOKE				0.012
Nil smoked	1,500	6.1	1	
Light-moderate	585	10.3	1.82*	
Heavy	171	9.4	0.24	
RDYADTOT				0.145
Good	1,206	5.3	1	
Some conflict	309	7.4	1.25	
Conflict	158	16.5	1.93*	
No partner	208	11.5	0.88	
Missing	375	8.0	0.88	
RBABGOOD				0.002
Not always	117	10.3	1	
Mostly	1,171	9.2	1.33	
Always	892	4.3	0.64	
RPREGOOD				0.005
Few problems	1,848	6.2	1	
Some problems	276	12.7	2.05*	
Many problems	32	15.6	2.75	
RMOTHSYM				0.151
Few symptoms	295	7.5	1	
Some symptoms	1,744	6.9	0.67	
Many symptoms	84	16.7	1.13	

*95 per cent CI excludes unity.

13.2 Summary of Logistic Regression Analyses

Across all analyses, the most consistent predictors of delinquency and aggression at age 14 were aggression at age 5, partner change and maternal mental and physical health. The best individual predictor of aggression and delinquency at age 14 is aggression at age 5.

Measures of maternal mental health showed consistent differences between aggressive and non-aggressive groups and delinquent and non-delinquent groups. The effect of maternal mental health may be confounded by the association between maternal mental health and maternal ratings of child behaviour. That is, mothers who are stressed, depressed or anxious may rate their children more negatively than mothers who are not depressed or anxious. To this extent, maternal ratings of childhood aggression may, in part, be a measure of maternal mental health and so explain the variance that maternal mental health shares with aggression and delinquency at age 14.

Despite our comprehensive coverage of classes of predictors and our large sample, we are unable to explain the larger part of the variance in delinquency/aggression at age 14. Many of the predictors we identified had small but significant effects, showing that many factors do influence the development of aggression and delinquency. However, there are a number of factors to be considered when evaluating the variance explained. Firstly, we do know that a large minority of the "at risk" group will remain aggressive at age 14. Secondly, our effect sizes are weakened by sample attrition, and by the fact that we do not know which of our delinquent 14 year olds are late starters.

CHAPTER 14

PREVENTION OF PERSISTENT ADOLESCENT CRIMINAL BEHAVIOUR

This study has established that, in a preschool aged cohort, those children reported as experiencing high levels of aggression have a high risk of future adolescent aggression and delinquency. Because of the relative stability of aggression, the serious nature and cost of delinquency and its adult psychiatric sequelae, the challenge is whether prevention programs aimed at reducing childhood aggression can decrease delinquency especially recidivism. The need for prevention programs has evolved due to the relative unresponsiveness of delinquency to treatment.

14.1 Interventions into Juvenile Delinquency

The classic treatment study of predelinquent children, the Cambridge - Sommerville Study (Powers and Witmer, 1951) has been subject to much debate (Vosburgh and Alexander, 1980). Predelinquent boys were identified and randomly allocated to an experimental or control group. The controls were involved in community service while the experimental group experienced a range of different interventions including counselling, remedial education and summer camps over a 2-8 year period. Follow-up studies have consistently shown that the intervention group demonstrated no improvement on indicators such the number of subjects becoming criminal, the number of crimes, the type of crime, or the commitment to reform school. A 30-year follow-up of this study by McCord (1978) concluded that the experimental group was slightly worse than controls. McCord's pessimistic conclusions have been criticised by others

(Vosburgh and Alexander, 1980) on methodological grounds, especially the conclusion that the negative effects of intervention were greatest the farther in time from the end of therapy.

Shamsie (1981) reviewed all intervention studies bases on case work, individual therapy, behaviour modification, group counselling, family therapy, institutional programs, milieu therapy and therapeutic community. All approaches were unsuccessful no matter whether correctional systems or mental health systems were used for treatment. Rutter and Giller (1983) undertook a major review of delinquency in the United Kingdom for the Home Office and Department of Health and Social Security. Interventions examined included behavioural approaches, counselling and psychotherapy, varieties of institutional care, custodial, non-custodial methods, community, diversionary and policing programs. Rutter and Giller (1983) conclude that a limited number of approaches could be said to be useful. Behavioural strategies seem to be the most successful in changing delinquent youths behaviour but the effects on recidivism may be depleted after the exposure to therapy ceases. The review emphasises the importance of changing the home environment and teaching the offender social problem solving and social competence skills.

Farrington (1985), while generally supporting the findings of the Rutter and Giller review, is critical of the lack of emphasis given to positive evidence from research on the scope for prevention of delinquency. He cites the evidence for a preschool prevention program based on the Perry Preschool project, a variation of the Head Start Program where disadvantaged black

preschoolers were randomly allocated to an experimental and control group. The experimental group received a daily preschool program and weekly home visits over two years. While the gains in cognitive ability were not sustained, there was evidence of lower rates of self-reported offending in adolescence. Farrington notes that similar preschool intervention projects, while not recording the same effects on delinquency rates, did demonstrate similar positive changes in school performance.

More recently Lipsey (1992) concluded that treatment programs do demonstrate a modest statistically significant positive effect on delinquency outcomes, however recidivism rates were only 10 per cent lower than controls. Similar to the Rutter and Giller (1983) review, Lipsey (1992) found that the most successful programs had a behavioural and skill training focus. Overall the less than optimistic conclusions cited above have reinforced the view that a prevention approach may result in more successful outcomes.

14.2 Prevention of Delinquent Recidivism

It has been confirmed in this study that one of the important pathways to juvenile aggression and delinquency is laid down in the period of preschool and early primary school years. It is conservatively estimated that one-quarter of the aggressive young children will have commenced delinquent activities by age fourteen. In theory such a clear risk trajectory, beginning so early in the life of children, should open up the opportunities for prevention of serious offending behaviour in late childhood, adolescence and adulthood. As aggression in young children is a readily recognisable set of behaviours, the capacity to identify those at risk should make an early prevention program

readily feasible. Many of the arguments for the early prevention of delinquency have evolved from research which has established positive evidence of a range of effective interventions into the reduction of aggressive behaviour in childhood.

14.3 Promising Prevention and Treatment Approaches to Disruptive and Conduct Disorders of Childhood

Interventions with infants and preschool children

Grant (1996) reviewed the impact of primary prevention on mental health of children and adolescents. Prenatal/infant preventive interventions have been shown to produce both beneficial short- and long-term results. Most such programs involve home visiting at-risk families. A large number of overlapping social/educational/psychological areas are given assistance including mother-child relationship. Positive outcomes include better child physical health, less child abuse and improved parenting skills. In the long-term such programs have demonstrated declines in child aggression and delinquency and higher rates of family employment.

Pre school prevention strategies are best characterised by the work of Head Start Compensatory Preschool Program (Zigler, Taussig and Black, 1992). The authors reviewed studies carried out in the 1960s whose aim was to reduce educational deterioration in disadvantaged children. Findings from these longitudinal studies produced the unexpected results of decline in juvenile delinquency. In contrast to the prenatal studies discussed above, these interventions were more broad brush in their approach. They had the

aim of improving a range of functional areas involving parent support of the child's physical ,cognitive and socio-emotional development.

One of the most well known of these programs is the Perry Preschool Project (Weikart and Schweinhart, 1992). This project was aimed at preventing school failure in poor African-American preschoolers. One hundred and twenty-three children were randomly assigned to control and intervention conditions. The later group received a combination of cognitively orientated education plus teacher based home visits to encourage parental involvement and small group information exchange monthly meetings. At follow up the treatment group had a number of positive outcomes including less arrests. If they were arrested it was usually for less severe crimes.

The Houston Parent-Child Development Centre researched an intervention program aimed at prevention of disruptive behaviour disorders (Johnson and Walker, 1987). This program focused on one-year-old Hispanic children at risk due to low socio-economic status. The target group were exposed to a range of interventions from individual support and advice on childcare to workshops on management of child behaviour. When comparisons were made of the children in the primary school years, the intervention group had less aggressive behaviour problems and had made educational gains.

Interventions with older children

Kazdin (1987a) has reviewed the treatment of antisocial behaviour in children. He has focused on four types of promising interventions. First is Parent Management Training (PMT) based around the social learning

principles of teaching parents new skills in reinforcement of prosocial behaviour and appropriate punishment of aggressive behaviour. PMT has been extensively evaluated demonstrating reduction in the children's behaviour to those of the normal population. PMT is superior in effectiveness to family based therapy. Such improvements have remained robust up to 4.5 years after therapy. As well, family dysfunction and sibling behaviour show improvement. While there are problems with PMT it remains one of the most encouraging and well researched treatment approaches. PMT is similar in principle to Behavioural Family Intervention (BFI) (Sanders and Markie-Dadds, 1992) which is described in more detail below.

Second, Functional Family Therapy (FFT), integrates systems theory and behaviourism. The aim of treatment of FFT is to change family patterns of communication and interchanges towards more healthy forms of interaction. The intervention process has the objective of changing the family's perception of the child's behaviour problem in order to develop a new understanding of the interaction between members. Increasing more positive exchanges, clarifying communication and negotiating are key skills that the family acquires. Evaluation of the results of FFT have demonstrated that it is better than a variety of other therapies and lowers the rates of referral to juvenile courts.

Third, Cognitive Problem Solving Training has been extensively developed and researched by Kazdin, Esveldt-Dawson, French and Unis (1987). The treatment focuses on changing thought processes by teaching the child interpersonal problem solving by self-instruction. A number of studies have shown that following one year after treatment there are positive changes

across multiple settings. Lochman (1992) carried out a school based program of problem solving therapy. At three-year follow-up, while self-reported delinquency and class room behaviour had not improved, on other measures such as lower levels of substance abuse, higher levels of self-esteem and social problem solving were demonstrated.

Fourth, community based interventions are based on large-scale programs of intervention of antisocial behaviours in community settings with the antisocial youths mixing with "normal" peers. In one such study (Feldman, Caplinger and Wodarski, 1983), the problem youths were exposed to a variety of interventions such as group social work, behaviour modification and minimal treatment. The adolescents also took part in a large number of sports, art and craft activities within a community centre. The results showed that those youth placed with experienced leaders, in mixed (problem as well as non-problem youth) groups, with an emphasis on behaviour modification did the best.

In a review of a number of treatment programs for aggressive children Webster-Stratton (1993) expressed a cautionary note about current treatment approaches. These concerns were, first, that parent management training needs to include assistance for marital discord and parental depression. Second, the failure of the gains in parent management to generalise to other settings, especially school, for a large number of children suggests the need to use combined school-home therapies. This is especially the case where the child has academic/learning difficulties. The author notes the poor response of some children to parent management training. About 30 per cent to 40 per cent of parents following a training program still report child behaviour

problems. Third, the advantages of child training in altering the cognitive set of the child have only been systematically researched with older children. Many such approaches have not been well designed to met the developmental level of young children.

Since Kazdin's review there has been research into combining social problem solving with parental management training. Kazdin, Siegel and Bass (1992) investigated the effects of randomly allocating antisocial children to a combined parent management and social problem solving program or the children were assigned to individual treatment modalities. At one-year follow-up the combined group showed the most positive change. Webster-Stratton and Hammond (1997) designed a combined parent and child training approach for younger (4-8 year old) conduct disordered children. At one-year follow-up the combined parent and child training group had the most significant improvements as measured by parent reports of behaviour problems, parent-child interaction at home, as well as child social problem-solving skills, conflict management with peers and consumer satisfaction. The combined approach did not produce changes in teacher reported behaviours.

14.4 At What Age Should a Prevention Strategy be Commenced?

Reid (1993) reviewed the evidence for prevention before and after the school entry period and notes that once aggression is established by age three it achieves considerable stability. Conformation of the importance of the three-year-old starting point for stable aggression has come from a number of studies noted in the review. Reid stresses that at an early age children and

parents are already enmeshed in intense conflict. Of special importance is the evidence that intervention in the preschool period does produce changes in child behaviour that are more generalised and that there are higher success rates for treating young aggressive children.

Combined with the evidence cited above it is important to note that the preschool period is characterised by a smaller number of possible adverse environmental influences compared to the school aged child. For preschool children their world is limited to their family and other child-care settings. The school aged child has to face the former as well as the influences of school aged peers, the school community, struggles with academic material and the neighbourhood. Any intervention/prevention program will need to control an increasing number of variables once the child enters school. Finally parental factors crucial in the genesis of aggressive behaviour may be less entrenched during the preschool years. The parent/s may still have large residues of energy and affection for the child; the marital discord may not have reached the point of an acrimonious separation; and importantly the period of coercive parenting may be of shorter duration compared with the life history of a child in late primary school.

14.5 A Model of Prevention of Delinquency

The model of a prevention supported by this study derives from the terminology recommended by the Committee on Prevention of Mental Disorders of the National Institute of Medicine (1994). Three groups of conceptual approaches are outlined. First, "Universal Prevention" is provided to the total population eg every mother of a new born child is offered a basic

parenting program. Second, "Selective Prevention" seeks to target groups who have risks significantly higher than the average for developing a disorder. An example of a program in this category might include identification and intervention with sons of criminal fathers. The third type of prevention is termed "Indicated Prevention" and is directed towards high-risk individuals or groups recognised as experiencing significant psychological problems that could develop into mental disorder. Such groups may not fulfil the diagnostic criteria for DSM-IV conditions.

There have been a number of well constructed arguments for the prevention of disruptive disorders and/or conduct disorders of childhood (Sanders and Markie-Dadds, 1992; Offord and Bennett, 1994; Reid, 1993). As there is significant overlap in the evidence-driven arguments of the above authors, this study will discuss only one approach as it represents thinking developed in the context of the Australian scene.

Sanders and Markie-Dadds (1992) focus on the role of family interactional factors such as rejecting attitudes, inadequate standards of care and supervision of the child, household disorganisation, poorly defined rules and inconsistent and ineffective family management techniques. These factors are strong predictors of antisocial conduct and have all be encountered in association with conduct disorders. Based on the success of Behavioural Family Intervention (BFI) in the treatment of aggressive and oppositional primary school aged children (described earlier in the section on Parent Management Training), its role in prevention seems promising. BFI's success

is based on its capacity to teach parents new skills, via instructions, modelling, practice, feedback and goal setting.

The authors argue that any prevention program should have a number of characteristics. First, it should be provided for the whole parenting community. Second, the behavioural goals of any such program should be focussed on improving specific aspects of parenting practice and child behaviour. Third, Sanders and Markie-Dadds advocate commencing the program during toddlerhood. Fourth, the authors recommend that the program be available in many settings so as to improve access. Fifth, it should have the capacity to deliver interventions for a broad menu of the common difficulties encountered by parents in raising children. By the means of improved parental self-management, family well being is enhanced, and the risks of generating disruptive disorders are decreased.

The model proposed by Sanders and Markie-Dadds (1992) has been further developed into a research based prevention strategy called Positive Parenting Program (Triple P). Key elements in the program have been the endeavour to identify preschool children with early disruptive behaviour in association with parental risk factors such as marital conflict, coercive parenting, parental depression and low socioeconomic status (Sanders, Bor and Markie-Dadds, 1994; Sanders and Markie-Dadds, 1996).

A major innovation of Triple P is that the intervention menu has been conceptualised as a range of choices with five different levels of strength depending on the nature of the child's problems and parenting risk variables. Level 1 offers self-help information only; Level 2 offers information plus

minimal therapist contact; Level 3 involves information plus active skills training; while Levels 4 and 5 require increasing expertise of the therapists to deal with more formal child disruptive behaviours and complex parental risk factors, e.g. depression, marital conflict.

Summary

The Mater University Study of Pregnancy (MUSP) has provided a research opportunity to examine the earliest predictors of aggression and delinquency. This study has confirmed that aggression beginning in the preschool years is a major predictor of adolescent aggression and delinquency. In this respect the MUSP finding is consistent with a growing body of research. Other contextual predictors, although significant, were not as important as aggression itself.

As well, the MUSP data do tend to support the view that once aggression has commenced in early childhood, it achieves significant stability. Few children who commenced as aggressive individuals moved out of this behavioural repertoire. Childhood aggression increases the risk of an antisocial lifestyle with its associated social/economic costs. As well childhood aggression is linked to a range of other adult psychiatric and maladaptive social outcomes. There is an overwhelming need for a prevention strategy commencing in the preschool years which is structured around the principles of proven and successful treatments of childhood aggression.

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