

## *Conduct Disorder, Aggression and Delinquency*

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Within the limits of a short chapter, it is obviously impossible to provide an exhaustive review of all aspects of conduct disorder, aggression, and delinquency in adolescence. There are many extensive reviews of these topics (Anderson & Huesmann, 2003; Coie & Dodge, 1998; Connor, 2002; Farrington & Welsh, 2007; Hill & Maughan, 2001; Rutter, Giller, & Hagell, 1998). In this chapter, I will be very selective in focusing on what seem to me the most important findings obtained in the highest quality studies. I will particularly focus on risk factors discovered in prospective longitudinal surveys and on successful interventions demonstrated in randomized experiments. The major longitudinal surveys are detailed in Farrington and Welsh (2007, pp. 29–36) and Thornberry and Krohn (2003), while major experiments in criminology are reviewed by Farrington and Welsh (2006).

My emphasis is mainly on young people aged 10–17 and on research carried out in North America, Great Britain, and similar Western democracies. Most research has been carried out with males, but studies of females are included where applicable (Moffitt, Caspi, Rutter, & Silva, 2001; Moretti, Odgers, & Jackson, 2004; Pepler, Madsen, Webster, & Levine, 2005; Zahn et al., 2008). My focus is on substantive results rather than on methodological or theoretical issues.

In general, all types of antisocial behavior tend to coexist and are intercorrelated. I have chosen to concentrate on conduct disorder, aggression, and delinquency because

these are the most important types of adolescent antisocial behaviors studied in different fields: conduct disorder in clinical psychology and child/adolescent psychiatry, aggression in developmental psychology, and delinquency in criminology and sociology. While there is sometimes inadequate communication among different fields, it should be borne in mind that these behaviors are logically and empirically related, so that risk factors and successful interventions that apply to one of these types of antisocial behavior are also likely to apply to the other two types. Other types of antisocial behavior, such as drug use, will not be reviewed here. Although there is nowadays a great deal of interest in promotive and protective factors (e.g., Loeber, Farrington, Stouthamer-Loeber, & White, 2008), I do not have space to discuss them here. Before reviewing risk factors and successful interventions, I will briefly review the definition, measurement, and epidemiology of each type of antisocial behavior.

### **CONDUCT DISORDER**

#### **Definition and Measurement**

Robins (1999) has traced the development of conduct disorder (CD) definitions over time. According to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV; American Psychiatric Association, 1994, p. 85), the essential feature of CD is a repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate societal norms are violated.

Also, the disturbance of behavior must cause clinically significant impairment in social, academic or occupational functioning. According to the DSM-IV diagnostic criteria, 3 or more out of 15 specified behaviors, including aggression to people or animals, property destruction, stealing or lying, and violating rules (e.g., truancy, running away), must be present for CD to be diagnosed. The prevalence of CD is lower if evidence of impairment is required as well as specified behaviors (Romano, Tremblay, Vitaro, Zoccolillo, & Pagani, 2001). Frequent, serious, persistent behaviors that are shown in several different settings are most likely to be defined as symptoms of a disorder. Additions to the diagnostic protocol for CD in DSM-V were considered by Moffitt et al. (2008), including a childhood-limited subtype; callous-unemotional traits; female-specific criteria; and biomarkers. Overall, Moffitt and colleagues concluded that the current CD protocol was adequate and that the existing evidence base was not sufficiently compelling to justify alterations.

CD can be diagnosed by a clinician in a psychiatric interview with a child and the parents, or it can be assessed using a structured interview administered by a nonclinician, such as the Diagnostic Interview Schedule for Children (DISC; Shaffer et al., 1996) or Child and Adolescent Psychiatric Assessment (CAPA; Angold & Costello, 2000). Childhood antisocial behavior can also be assessed using rating scales or behavior problem checklists such as the Child Behavior Checklist (CBCL), typically completed by a parent, and its associated Teacher Report Form (TRF) and Youth Self-Report (YSR; Achenbach, 1993). These yield broadband scales such as "externalizing behavior" and more specific scales of aggression, delinquency, and hyperactivity, with impressive cross-cultural replicability (Achenbach, Verhulst, Baron, & Althaus, 1987). The aggression and delinquency scales are highly correlated (Pakiz, Reinherz, & Frost, 1992). The delinquency scale of the CBCL is closely related to the diagnosis of CD on the

DISC (Kasius, Ferdinand, van den Berg, & Verhulst, 1997).

### Prevalence

Nottelmann and Jensen (1995) have usefully summarized findings obtained in epidemiological studies of conduct disorder. One problem in interpreting prevalence results concerns the time period to which they refer, which may be 3 months, 6 months, 12 months, or cumulatively over a period of years. Prevalence rates are greater among males than females and vary at different ages. Also, prevalence rates change as the DSM definitions change (Lahey et al., 1990). In the Great Smoky Mountains Study of Youth, only 79% of conduct-disordered youths had functional impairment (Costello et al., 1996). There is not space here to review measurement issues or changes in prevalence over time (e.g., Achenbach, Dumenci, & Rescorla, 2003; Collishaw, Goodman, Pickles, & Maughan, 2007).

The instantaneous (as opposed to cumulative) prevalence of CD is about 6%–16% of adolescent boys and about 2%–9% of adolescent girls (Mandel, 1997). For example, in the Ontario Child Health Study in Canada, the 6-month prevalence of CD at age 12–16 was 10% for boys and 4% for girls (Offord et al., 1987). In the New York State longitudinal study, the 12-month prevalence of CD for boys was 16% at both ages 10–13 and 14–16 (Cohen et al., 1993a). For girls, it was 4% at age 10–13 and 9% at age 14–16. Zoccolillo (1993) suggested that CD criteria may be less applicable to the behavior of girls than to the behavior of boys, and hence that gender-specific CD criteria should be developed. Gender differences in CD have been discussed by Lahey et al. (2006).

It is not entirely clear how the prevalence of CD varies over the adolescent age range, and this may depend on how CD is measured. For example, in the Methodology for Epidemiology of Mental Disorders in Children and Adolescents (MECA) study, which was a cross-sectional survey of 1,285 adolescents

aged 9–17, the DISC was completed by parents and by adolescents (Lahey et al., 2000). The prevalence of CD (in the previous 6 months) did not vary significantly over this age range according to parents, but it increased with age according to adolescent self-reports. According to adolescents, the prevalence of CD increased for boys from 1.3% at age 9–11 to 6% at age 12–14 and 11% at age 15–17. For girls, prevalence increased from 0.5% at age 9–11 to 3% at age 12–14 and 4% at age 15–17. Hence, the male-to-female ratio for CD was greatest at age 15–17. In a large-scale study of over 10,000 British children aged 5–15, Maughan, Rowe, Messer, Goodman, and Meltzer (2004) found that the prevalence of CD increased with age for both boys and girls, and that the male preponderance in CD was most marked in childhood and early adolescence. The CD measure was derived from children, parents, and teachers.

In the Great Smoky Mountains Study of Youth, Maughan, Pickles, Rowe, Costello, and Angold (2000) investigated developmental trajectories of aggressive and nonaggressive conduct problems. Between ages 9 and 16, they found that there were three categories of adolescents, with stable high conduct problems, stable low conduct problems, and decreasing conduct problems. Boys were more likely to have stable high or decreasing conduct problems over time, whereas girls were more likely to have stable low conduct problems over time. Similarly, Shaw, Lacourse, and Nagin (2005) investigated trajectories of conduct problems between ages 2 and 10, and van Lier, van der Ende, Koot, and Verhulst (2007) studied such trajectories between ages 4 and 18.

### Onset and Continuity

DSM-IV classified CD into childhood-onset versus adolescent-onset types. Childhood-onset CD typically begins with the emergence of oppositional defiant disorder (ODD), characterized by temper tantrums and defiant, irritable, argumentative, and annoying behavior (Hinshaw, Lahey, & Hart, 1993). Mean or

median ages of onset for specific CD symptoms have been provided by various researchers, but they depend on the age of the child at measurement and the consequent cumulative prevalence of the symptoms. Retrospectively in the Epidemiological Catchment Area project, Robins (1989) reported that the mean age of onset (before 15) for stealing was 10 for males and females, while for vandalism it was 11 for males and females. However, ages of onset were generally later for girls than for boys.

While exact onset ages varied, some CD symptoms consistently appeared before others. This observation led Loeber et al. (1993) to postulate a model of three developmental pathways in disruptive childhood behavior. The overt pathway began with minor aggression (e.g., bullying) and progressed to physical fighting and eventually serious violence. The covert pathway began with minor nonviolent behavior (e.g., shoplifting) and progressed to vandalism and eventually serious property crime. The authority conflict pathway began with stubborn behavior and progressed to defiance and eventually authority avoidance (e.g., running away). Typically, progression in the overt pathway was accompanied by simultaneous progression in the covert pathway. Tolan and Gorman-Smith (1998) found that the hypothesized pathways were largely confirmed in the U.S. National Youth Survey and the Chicago Youth Development Study. The pathways model has also been replicated in Denver and Rochester (Loeber, Wei, Stouthamer-Loeber, Huizinga, & Thornberry, 1999), with African American and Hispanic adolescents (Tolan, Gorman-Smith, & Loeber, 2000), and with antisocial girls (Gorman-Smith & Loeber, 2005).

There is considerable continuity or stability in CD, at least over a few years. In the Ontario Child Health Study, 45% of children aged 4–12 who were CD in 1983 were still CD 4 years later, compared with only 5% of those who had no disorder in 1983 (Offord et al., 1992). CD was more stable than attention-deficit/hyperactivity disorder (ADHD) or emotional disorder. Also, stability was greater for

children aged 8–12 (60% persisting) than for children aged 4–7 (25% persisting). However, the interpretation of results was complicated by comorbidity: 35% of those with CD in 1983 had ADHD 4 years later, and, conversely, 34% of those with ADHD in 1983 had CD 4 years later. In a Dutch follow-up study using the CBCL, Verhulst and van der Ende (1995) found a significant correlation (0.54) between externalizing scores over an 8-year period spanning adolescence.

Similar results have been reported by other researchers. In their New York State study, Cohen, Cohen, and Brook (1993b) found that 43% of CD children aged 9–18 were still CD 2.5 years later (compared with 10% of non-CD children). There were no significant age or gender differences in stability, but stability increased with the severity of CD. In the Developmental Trends Study, Lahey et al. (1995) reported that half of CD boys aged 7–12 were still CD 3 years later. Persistence was predicted by parental antisocial personality disorder (APD) and by low verbal IQ, but not by age, socioeconomic status (SES), or ethnicity. In the same study, CD in childhood and adolescence predicted APD in adulthood (Lahey, Loeber, Burke, & Applegate, 2005).

## AGGRESSION

### Definition and Measurement

Aggression is defined as behavior that is intended to, and actually does, harm another person (Coie & Dodge, 1998). Many different types of aggression have been distinguished, including physical versus verbal aggression, reactive versus proactive aggression, and hostile versus instrumental aggression (Raine et al., 2006; Vaillancourt, Miller, Fagbemi, Cote, & Tremblay, 2007). There is not space here to review special types of aggression such as soccer hooliganism (Farrington, 2006; Lösel & Bliesener, 2003). Instead, I will focus on school bullying, which is one of the most clearly defined and most researched types of adolescent aggression (Farrington, 1993b;

Smith, Pepler, & Rigby, 2004). Its definition typically includes physical, verbal, or psychological attack or intimidation that is intended to cause fear, distress, or harm to a victim; an imbalance of power, with the more powerful child oppressing the less powerful one; and repeated incidents between the same children over a prolonged time period.

Aggression is measured in a variety of ways, including self-reports, parent reports, teacher ratings, peer ratings, and school records. Solberg and Olweus (2003) argued that self-reports were the best method of measuring school bullying. Systematic observation is also used (e.g., Pepler & Craig, 1995). It is important to investigate the concordance of results obtained by these different methods, but these types of measurement issues will not generally be discussed in this chapter. Many aggressive acts committed by adolescents are not witnessed by teachers, parents, or peers. For example, in a Dublin study, O'Moore and Hillery (1989) found that teachers identified only 24% of self-reported bullies. In an observational study in Canada, Craig, Pepler, and Atlas (2000) discovered that the frequency of bullying was twice as high in the playground as in the classroom. However, Stephenson and Smith (1989) in England reported that teacher and peer nominations about which children were involved in bullying were highly correlated (0.8).

### Prevalence

The prevalence of physical aggression (hitting) increases up to age 2 and then decreases between ages 2 and 4, when verbal aggression increases (Coie & Dodge, 1998). Most aggression at the preschool ages is directed against siblings or peers. The incidence of physical aggression continues to decrease in the elementary school years (Tremblay, 2000) as language and abstract thinking improve, children increasingly use words rather than aggressive actions to resolve conflicts, and internal inhibitions and the ability to delay gratification also improve. Research on the

prevalence of physical aggression has been reviewed by Lee, Baillargeon, Vermunt, Wu, and Tremblay (2007).

In a cross-sectional survey of a large representative sample of Canadian children, Tremblay et al. (1999) found that the prevalence of hitting, kicking, and biting (as reported by mothers) decreased steadily from age 2 to age 11. Furthermore, in the Montreal longitudinal study, the prevalence of teacher-rated physical aggression of boys decreased steadily from age 6 to age 15. Nagin and Tremblay (1999) identified four different trajectories of aggression in the Montreal Longitudinal Experimental Study: consistently high, consistently low, high/decreasing, and moderate/decreasing. There have been many other studies of trajectories of physical aggression. Among the most important are the nationwide longitudinal study of Canadian children (Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006) and the analysis of data from six sites in three countries by Broidy et al. (2003).

Interestingly, in a cross-sectional survey of a large sample of American children (Fitzpatrick, 1997), the prevalence of self-reported physical fighting decreased from grade 3 (age 8) to grade 12 (age 17). Also, in the Pittsburgh Youth Study, the prevalence of parent-rated physical aggression of boys decreased between ages 10 and 17 (Loeber & Hay, 1997). Similarly, in the large-scale British survey of Maughan et al. (2004), the only CD symptom that decreased between ages 8 and 15 was physical fighting. Of course, it is possible that the seriousness of aggression (e.g., according to injuries to participants) may increase between ages 10 and 17. Criminal violence will be discussed in the delinquency section.

The prevalence of bullying is often very high. For example, in the Dublin study of O'Moore and Hillery (1989), 58% of boys and 38% of girls said that they had ever bullied someone. The prevalence is lower when bullying is restricted to "sometimes or more often this term." With this definition, 11% of boys and 2.5% of girls were bullies in secondary

schools in Norway (Olweus, 1991); and 8% of boys and 4% of girls were bullies in secondary schools in Sheffield, England (Whitney & Smith, 1991). The prevalence of bullying decreases with age from elementary to secondary schools, especially for girls. Cross-national comparisons of the prevalence of bullying have been published by Smith et al. (1999) and Due et al. (2005).

Gender differences in aggression are not very great in infancy and toddlerhood (Loeber & Hay, 1997), but they increase from the preschool years onward. Boys use more physical and verbal aggression, both hostile and instrumental. However, indirect or relational aggression—spreading malicious rumors, not talking to other children, excluding peers from group activities—is more characteristic of girls (Bjorkvist, Lagerspetz, & Kaukiainen, 1992; Crick & Grotpeter, 1995). Gender differences in aggression tend to increase in adolescence, as female physical aggression decreases more than male physical aggression (Fontaine et al., 2008).

### Continuity

There is significant continuity in aggression over time. In a classic review, Olweus (1979) found that the average stability coefficient (correlation) for male aggression was 0.68 in 16 surveys covering time periods of up to 21 years. Huesmann, Eron, Lefkowitz, and Walder (1984) in New York State reported that peer-rated aggression at age 8 significantly predicted peer-rated aggression at age 18 and self-reported aggression at age 30. Similarly, in Finland, Kokko and Pulkkinen (2005) found that aggression at ages 8 and 14 predicted aggression at ages 36 and 42. Female aggression is also significantly stable over time; stability coefficients were similar for males and females in the Carolina Longitudinal Study (Cairns & Cairns, 1994, p. 63). However, Loeber and Stouthamer-Loeber (1998) pointed out that a high (relative) stability of aggressiveness was not incompatible with high rates of desistance from physical

aggression (absolute change) from childhood to adulthood.

Olweus (1979) argued that aggression was a stable personality trait. However, theories of aggression place most emphasis on cognitive processes. For example, Huesmann and Eron (1989) put forward a cognitive script model, in which aggressive behavior depends on stored behavioral repertoires (cognitive scripts) that have been learned during early development. In response to environmental cues, possible cognitive scripts are retrieved and evaluated. The choice of aggressive scripts, which prescribe aggressive behavior, depends on the past history of rewards and punishments and on the extent to which adolescents are influenced by immediate gratification as opposed to long-term consequences. According to this theory, the persisting trait of aggressiveness is a collection of well-learned aggressive scripts that are resistant to change. A similar social information-processing theory was proposed by Dodge (1991) and updated by Dodge (2003). There is not space here to discuss other cognitive or decision-making theories of anti-social behavior.

## DELINQUENCY

### Definition and Measurement

Delinquency is defined according to acts prohibited by the criminal law, such as theft, burglary, robbery, violence, vandalism, and drug use. There are many problems in using legal definitions of delinquency. For example, the boundary between what is legal and what is illegal may be poorly defined and subjective, as when school bullying gradually escalates into criminal violence. Legal categories may be so wide that they include acts which are behaviorally quite different, as when "robbery" ranges from armed bank holdups carried out by gangs of masked men to thefts of small amounts of money perpetrated by one schoolchild on another. Legal definitions rely on the concept of intent, which is difficult to measure reliably and validly, rather

than the behavioral criteria preferred by social scientists. Also, legal definitions change over time. However, their main advantage is that, because they have been adopted by most delinquency researchers, their use makes it possible to compare and summarize results obtained in different projects.

Delinquency is commonly measured using either official records of arrests or convictions or self-reports of offending. The advantages and disadvantages of official records and self-reports are to some extent complementary. In general, official records include the worst offenders and the worst offenses, while self-reports include more of the normal range of delinquent activity. In the Pittsburgh Youth Study, Farrington, Jolliffe, Loeber, and Homish (2007) found that there were 2.4 self-reported offenders per official court offender, and 80 self-reported offenses per officially recorded offense. The worst offenders may be missing from samples interviewed in self-report studies (Cernkovich, Giordano, & Pugh, 1985). Self-reports have the advantage of including undetected offenses, but the disadvantages of concealment and forgetting.

By normally accepted psychometric criteria of validity, self-reports of delinquency are valid (Junger-Tas & Marshall, 1999). For example, self-reported delinquency predicted later convictions among undetected boys in the Cambridge Study in Delinquent Development, which is a prospective longitudinal survey of 400 London boys (Farrington, 1989b). In the Pittsburgh Youth Study, the seriousness of self-reported delinquency predicted later court referrals (Farrington, Loeber, Stouthamer-Loeber, van Kammen, & Schmidt, 1996b). However, predictive validity was enhanced by combining self-report and parent and teacher information about offending. Similarly, in the Seattle Social Development Project, self-reported delinquency predicted later court referrals (Jolliffe et al., 2003).

The key issue is whether the same results are obtained with both self-reports and official records. For example, if both show a link

between parental supervision and delinquency, it is likely that supervision is related to delinquent behavior (rather than to any biases in measurement). Generally, the worst offenders according to self-reports (taking account of frequency and seriousness) tend also to be the worst offenders according to official records (Huizinga & Elliott, 1986). In the Cambridge Study, the predictors and correlates of official and self-reported delinquency were very similar (Farrington, 1992c).

### Prevalence

Even when measured by convictions, the cumulative prevalence of delinquency is substantial. In the Cambridge Study, 20% of males were convicted before age 17. The annual prevalence of convictions increased to a peak at age 17 and then declined (Farrington, 1992a). It was 1.5% at age 10, 5% at age 13, 11% at age 17, 6% at age 22, and 3% at age 30. According to national figures for England and Wales (Prime, White, Liriano, & Patel, 2001), about 15% of males and 3% of females born in 1953–1963 were convicted up to age 17 for a “standard list” offense (i.e., a more serious offense, excluding traffic infractions and drunkenness, for example).

Cumulative prevalence is also substantial in the United States. In a longitudinal study of over 27,000 persons born in Philadelphia in 1958, Tracy, Wolfgang, and Figlio (1985) found that 33% of males and 14% of females were arrested before age 18 for nontraffic offenses. The male-to-female ratio was greater for more serious (crime index) offenses: 18% of males versus 4% of females. Cumulative prevalence is surprisingly high even for the most serious offense of homicide. In the Pittsburgh Youth Study, 33 of the 1,500 males were convicted of homicide up to age 26 (Farrington, Loeber, Stallings, & Homish, 2008; Loeber et al., 2005). Weighting back to the population of Pittsburgh public schools, 2.7% of African American males were convicted of homicide, compared with 0.5% of Caucasian males.

National U.S. figures show that, in 2006, the male-to-female ratio for arrests under 18 was

4.7 for index violence and 2.1 for index property offenses (FBI, 2007, Table 33). The peak age for male index property and index violence offenses was about 17–18 (FBI, 2007, Table 39). The peak age for female index property offenses was about 16–17, while female index violence peaked later, at about age 18–21 (FBI, 2007, Table 40).

The prevalence of delinquency according to self-reports is higher than in official records. In the large-scale Denver, Rochester, and Pittsburgh longitudinal studies, the annual prevalence of “street crimes” (burglary, serious theft, robbery, aggravated assault, etc.) increased from less than 15% at age 11 to almost 50% at age 17 (Huizinga, Loeber, & Thornberry, 1993). Similarly, in the U.S. National Youth Survey, the annual prevalence of self-reported violence increased to a peak of 28% of males at age 17 and 12% of females at ages 15–17 (Elliott, 1994). Annual prevalence rates for specific acts have been provided by Loeber, Farrington, Stouthamer-Loeber, & van Kammen (1998, p. 94). For example, shoplifting increased from 10% of boys at age 10 to 19% at age 13. Carrying a weapon increased from 12% of boys at age 10 to 23% at age 13.

In both official records and self-reports, the age-crime curve—obtained cross-sectionally—usually increases to a peak in the late teenage years and then decreases (Kirk, 2006). In the Pittsburgh Youth Study, Loeber et al. (2008) presented age-crime curves obtained longitudinally rather than cross-sectionally. Whether based on official records or on reports by boys, mothers, and teachers, the curves usually peaked in the mid to late teenage years. The oldest cohort of boys (born about 1974) had a higher prevalence and frequency of offending than the youngest cohort (born about 1980), probably because the teenage years of the oldest boys coincided with a big increase in the violent crime rate (in Pittsburgh and in the United States) to a peak in 1993–1994 (Fabio et al., 2006).

There have been many studies of trajectories of offending at different ages, reviewed by Piquero (2008). While many offenders follow

the traditional age-crime curve, with offending peaking in late adolescence and then declining, most studies also find groups of offenders with other developmental trajectories. For example, in the Cambridge Study there were a group of low-rate chronic offenders whose offending did not peak until the mid-20s (Piquero, Farrington, & Blumstein, 2007). In the Pittsburgh youth study, there was a group whose offending declined steadily from age 13 to age 24 (Loeber et al., 2008). Trajectories based on self-reports are sometimes different from trajectories based on official records (Wiesner, Capaldi, & Kim, 2007). Attempts have been made to investigate risk factors for different trajectory groups (e.g., Barker et al., 2007; Fergusson & Horwood, 2002; Harachi et al., 2006), but this topic will not be reviewed here.

The age distributions of CD, aggression, and delinquency seem somewhat inconsistent. While the prevalence of physical aggression (hitting and kicking) and bullying decrease from age 10 to age 17, the prevalence of CD and violent and property offenses generally increase over this age range. It may be that most children "grow out" of minor types of antisocial behavior, perhaps because of increasing internal inhibitions inculcated by parents, but that more serious types increase during adolescence, perhaps because of the increasing importance of peer influence (Farrington, 1986a).

### **Onset and Continuity**

Criminal career research using official records of delinquency generally shows a peak age of onset between 13 and 16. In the Cambridge Study, the peak age of onset was at 14; 5% of the males were first convicted at that age (Farrington, 1992a). The onset curves up to age 25 of working-class males in London and Stockholm were quite similar (Farrington & Wikström, 1994). Sequences of onsets were studied for Montreal delinquents by LeBlanc and Frechette (1989). They discovered that shoplifting and vandalism tended to occur before adolescence (average age of onset, 11),

burglary and motor vehicle theft in adolescence (average onset, 14–15), and sex offenses and drug trafficking in the later teenage years (average onset, 17–19).

In the Seattle Social Development Project, delinquency career features were compared in official court records and self-reports (Farrington et al., 2003). The results showed that there was a sharp increase in the prevalence of court referrals between ages 12 and 13, probably reflecting the reluctance of the U.S. juvenile justice system to deal with very young offenders (Loeber & Farrington, 2001). An early age of onset predicted a high rate of offending in court referrals but not in self-reports, possibly because the very young offenders who were referred to court were an extreme group.

In the Cambridge Study, the males first convicted at the earliest ages (10–13) tended to become the most persistent offenders, committing an average of 9 offenses leading to convictions in an average criminal career lasting 13 years (Farrington et al., 2006). Similarly, Farrington and Wikström (1994), using official records in Stockholm, and LeBlanc and Frechette (1989) in Montreal, using both self-reports and official records, showed that the duration of criminal careers decreased with increasing age of onset. It is generally true that an early age of onset of antisocial behavior predicts a long and serious antisocial career (Loeber & LeBlanc, 1990).

Moffitt (1993a) distinguished between "life-course-persistent" offenders, who had an early onset and a long criminal career, and "adolescence-limited" offenders, who started later and had a short criminal career. Her analyses in the Dunedin (New Zealand) study generally confirmed the features of her postulated model (Moffitt, Caspi, Dickson, Silva, & Stanton, 1996). Childhood- and adolescent-onset cases differed in temperament as early as age 3. (For recent reviews of research on this theory, see Moffitt, 2003; Piquero & Moffitt, 2005.) Life-course-persistent and adolescence-limited offenders were identified

using conviction records in the Cambridge Study (Nagin, Farrington, & Moffitt, 1995). However, according to self-reports, the apparent reformation of the adolescence-limited offenders was less than complete. At age 32, they continued to drink heavily, use drugs, get into fights, and commit criminal acts.

Several researchers have investigated factors that predict early versus late onset offending (Carroll et al., 2006). In the Cambridge Study, the strongest predictors were rarely spending leisure time with the father, troublesome school behavior, authoritarian parents and psychomotor impulsivity (Farrington & Hawkins, 1991). In contrast, late onset offenders tended to be nervous-withdrawn and anxious, suggesting that these factors may have protected children from offending at an early age (Zara & Farrington, 2007). In the Pittsburgh Youth Study, the strongest correlates of early onset were physical aggression, ODD, ADHD, truancy, peer delinquency, and poor parental supervision (Loeber, Stouthamer-Loeber, van Kammen, & Farrington, 1991). There is a great deal of criminological research on other criminal career features such as desistance, duration of careers, escalation and deescalation (Farrington, 1997a), but there is not space to review this here.

Generally, there is significant continuity between delinquency in one age range and delinquency in another. In the Cambridge Study, nearly three-quarters (73%) of those convicted as juveniles at age 10–16 were reconvicted at age 17–24, in comparison with only 16% of those not convicted as juveniles (Farrington, 1992a). Nearly half (45%) of those convicted as juveniles were reconvicted at age 25–32, in comparison with only 8% of those not convicted as juveniles. Furthermore, this continuity over time did not merely reflect continuity in police reaction to delinquency. For 10 specified offenses, the significant continuity between offending in one age range and offending in a later age range held for self-reports as well as official convictions (Farrington, 1989b). In the Seattle Social Development Project, there was

also significant continuity in court referrals and self-reports (Farrington et al., 2003a).

Other studies show similar continuity in delinquency. For example, in Sweden, Stattin and Magnusson (1991) reported that nearly 70% of males registered (by police, social, or child welfare authorities) for committing a crime before age 15 were registered again between ages 15 and 20, and nearly 60% were registered between ages 21 and 29. Also, the number of juvenile offenses is an effective predictor of the number of adult offenses (Wolfgang, Thornberry, & Figlio, 1987). There was considerable continuity in offending between the ages of 10 and 25 in both London and Stockholm (Farrington & Wikström, 1994).

### COMORBIDITY AND VERSATILITY

In general, CD adolescents tend also to be aggressive and delinquent. There is controversy about whether aggressive symptoms should be considered part of ODD or CD (Loeber, Burke, Lahey, Winters, & Zera, 2000). In the Christchurch Study in New Zealand, Fergusson and Horwood (1995) reported that 90% of children with three or more CD symptoms at age 15 were self-reported frequent offenders at age 16 (compared with only 17% of children with no CD symptoms). Fergusson, Horwood, and Ridder (2005) later showed that conduct problems at ages 7–9 predicted offending at ages 21–25. Similarly, in the Great Smoky Mountains Study, Copeland, Miller-Johnson, Keeler, Angold, and Costello (2007) found that CD under age 16 predicted serious and violent crimes between ages 16 and 21. In the Denver Youth Survey, Huizinga and Jakob-Chien (1998) found that about half of male and female self-reported violent offenders had a large number of externalizing symptoms on the CBCL. In Cyprus, Kokkinos and Panayiotou (2004) reported that CD adolescents were likely to be bullies.

Numerous studies show that aggression in childhood and adolescence predicts

later delinquency and crime. For example, Hamalainen and Pulkkinen (1995, 1996) in Finland followed up nearly 400 children between ages 8 and 32 and found that early aggression and conduct problems predicted later criminal offenses. In the Cambridge Study, teacher ratings of aggression at age 12–14 (disobedient, difficult to discipline, unduly rough, quarrelsome and aggressive, overcompetitive) significantly predicted self-reported violence at age 16–18 (physical fighting) and convictions for violence up to age 32 (Farrington, 1991).

Generally, delinquents are versatile rather than specialized in their offending. In the Cambridge Study, 86% of violent offenders also had convictions for nonviolent offenses (Farrington, 1991). Violent and nonviolent but equally frequent offenders were very similar in their childhood and adolescent features in the Oregon Youth Study (Capaldi & Patterson, 1996) and in the Philadelphia Collaborative Perinatal Project (Piquero, 2000). Studies of transition matrices summarizing the probability of one type of offense following another show that there is a small degree of specificity superimposed on a great deal of generality in juvenile delinquency (Farrington, Snyder, & Finnegan, 1988).

The Cambridge Study shows that delinquency is associated with many other types of antisocial behavior. The boys who were convicted before age 18 (most commonly for offenses of dishonesty, such as burglary and theft) were significantly more antisocial than the nondelinquents on almost every factor that was investigated at that age (West & Farrington, 1977). The convicted delinquents drank more beer, got drunk more often, and were more likely to say that drinking made them violent. They smoked more cigarettes, had started smoking at an earlier age, and were more likely to be heavy gamblers. They were more likely to have been convicted for minor motoring offenses, to have driven after drinking at least 10 units of alcohol (e.g., 5 pints of beer), and to have been injured in road accidents.

The delinquents were more likely to have taken prohibited drugs such as marijuana or LSD, although few of them had convictions for drug offenses. Also, they were more likely to have had sexual intercourse, especially with a variety of different girls, and especially beginning at an early age, but they were less likely to use contraceptives. The delinquents were more likely to go out in the evenings, and were especially likely to spend time hanging about on the street. They tended to go around in groups of four or more, and were more likely to be involved in group violence or vandalism. They were much more likely to have been involved in physical fights, to have started fights, to have carried weapons, and to have used weapons in fights. They were also more likely to express aggressive and anti-establishment attitudes on a questionnaire (negative to police, school, rich people, and civil servants).

Because CD, aggression, and delinquency are overlapping problems, they tend to have the same risk factors, and interventions that are effective in reducing one of these types of antisocial behavior tend also to be effective in reducing the other two types. I will focus especially on risk factors for delinquency (for a review of risk factors for CD, see Burke, Loeber, & Birmaher, 2002). Less is known about early risk factors for aggression (Tremblay, 2008). Risk factors that are essentially measuring the same underlying constructs as CD, aggression, and delinquency (e.g., anger; Colder & Stice, 1998) are not reviewed here.

## RISK FACTORS

Longitudinal data are required to establish the time ordering of risk factors and antisocial behavior. As mentioned, in this review I focus especially on results obtained in major prospective longitudinal studies. It is extremely difficult in correlational or cross-sectional studies to draw valid conclusions about cause and effect. Similarly, because of the difficulty of establishing causal effects of factors that vary only between individuals (e.g., gender and ethnicity), and because such factors have no

practical implications for intervention (e.g., it is not practicable to change males into females), unchanging variables will not be reviewed here. In any case, their effects on offending are usually explained by reference to other, modifiable, factors. For example, gender differences in offending have been explained on the basis of different socialization methods used by parents with boys and girls, or different opportunities for offending of males and females. According to Rowe, Vazsonyi, and Flannery (1995), risk factors for delinquency are similar for boys and girls, but boys are generally exposed to more risk factors or higher levels of risk factors.

Risk factors will be discussed one by one; additive, interactive, independent, or sequential effects will not be exhaustively reviewed, although these are important issues (Waschbusch & Willoughby, 2008). Because of limitations of space, and because of their limited relevance for psychosocial interventions, biological factors are not reviewed. For example, one of the most replicable findings in the literature is that antisocial and violent adolescents tend to have low resting heart rates (Raine, 1993, p. 167). In the Cambridge Study, resting heart rate at age 18 was significantly related to convictions for violence and to self-reported violence, independently of all other variables (Farrington, 1997b). There is also little space to review theories of the causal mechanisms by which risk factors might have their effects on antisocial behavior.

It is plausible to suggest that risk factors influence the potential for aggression and antisocial behavior, and that whether this potential becomes the actuality in any situation depends on immediate situational factors such as opportunities and victims. In other words, antisocial acts depend on the interaction between the individual and the environment (Farrington, 1998). However, there is not space here to review immediate situational influences or situational crime prevention (Clarke, 1995).

### **Temperament and Personality**

Personality traits such as sociability or impulsiveness describe broad predispositions to

respond in certain ways, and temperament is basically the childhood equivalent of personality. Temperament is clearly influenced by biological factors but is not itself a biological variable like heart rate. The modern study of child temperament began with the New York longitudinal study of Chess and Thomas (1984). Children in their first 5 years of life were rated on temperamental dimensions by their parents, and these dimensions were combined into three broad categories of easy, difficult and "slow to warm up" temperament. Having a difficult temperament at age 3–4 (frequent irritability, low amenability and adaptability, irregular habits) predicted poor psychiatric adjustment at age 17–24.

Unfortunately, it was not very clear exactly what a "difficult" temperament meant in practice, and there was the danger of tautological conclusions (e.g., because the criteria for difficult temperament and ODD were overlapping). Later researchers have used more specific dimensions of temperament. For example, Kagan (1989) in Boston classified children as inhibited (shy or fearful) or uninhibited at age 21 months, and found that they remained significantly stable on this classification up to age 7 years. Furthermore, the children who were uninhibited at age 21 months were more likely to be identified as aggressive at age 13 years, according to self- and parent reports (Schwartz, Snidman, & Kagan, 1996).

Important results on the link between childhood temperament and later offending have been obtained in the Dunedin longitudinal study in New Zealand (Caspi, 2000). Temperament at age 3 years was rated by observing the child's behavior during a testing session. The most important dimension of temperament was being undercontrolled (restless, impulsive, with poor attention), and this predicted aggression, self-reported delinquency and convictions at age 18–21.

Studies using classic personality inventories such as the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI; Wilson & Herrnstein,

1985, pp. 186–198) often seem to produce essentially tautological results, such as that delinquents are low on socialization. The Eysenck personality questionnaire has yielded more promising results (Eysenck, 1996). In the Cambridge Study, those high on both extraversion and neuroticism tended to be juvenile self-reported delinquents, adult official offenders, and adult self-reported offenders, but not juvenile official delinquents (Farrington, Biron, & LeBlanc, 1982). Furthermore, these relationships held independently of other variables such as low family income, low intelligence, and poor parental child-rearing behavior. However, when individual items of the personality questionnaire were studied, it was clear that the significant relationships were caused by the items measuring impulsiveness (e.g., doing things quickly without stopping to think).

Since 1990, the most widely accepted personality system has been the “Big Five” or five-factor model (McCrae & Costa, 2003). This suggests that there are five key dimensions of personality: neuroticism (N), extraversion (E), openness (O), agreeableness (A), and conscientiousness (C). Openness means originality and openness to new ideas, agreeableness includes nurturance and altruism, and conscientiousness includes planning and the will to achieve. It is commonly found that low levels of agreeableness and conscientiousness are related to offending (Heaven, 1996; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994).

### **Impulsiveness**

Impulsiveness is the most crucial personality dimension that predicts antisocial behavior (Lipsey & Derzon, 1998). Unfortunately, there are a bewildering number of constructs referring to a poor ability to control behavior. These include impulsiveness, hyperactivity, restlessness, clumsiness, not considering consequences before acting, a poor ability to plan ahead, short time horizons, low self-control, sensation-seeking, risk-taking, and a poor ability to delay gratification. Pratt, Cullen, Blevins, Daigle, and Unnever (2002) carried

out a meta-analysis of research on ADHD and delinquency, and concluded that they were strongly associated. Similar conclusions about impulsiveness were drawn by Jolliffe and Farrington (in press).

Many studies show that hyperactivity or ADHD predicts later offending. In the Copenhagen Perinatal project, hyperactivity (restlessness and poor concentration) at age 11–13 significantly predicted arrests for violence up to age 22, especially among boys experiencing delivery complications (Brennan, Mednick, & Mednick, 1993). Similarly, in the Orebro longitudinal study in Sweden, hyperactivity at age 13 predicted police-recorded violence up to age 26. The highest rate of violence was among males with both motor restlessness and concentration difficulties (15%), compared to 3% of the remainder (Klinterberg, Andersson, Magnusson, & Stattin, 1993). In the Seattle Social Development Project, hyperactivity and risk taking in adolescence predicted violence in young adulthood (Herrenkohl et al., 2000).

In the Cambridge Study, boys nominated by teachers as restless or lacking in concentration; those nominated by parents, peers, or teachers as the most daring or taking most risks; and those who were the most impulsive on psychomotor tests at age 8–10 all tended to become offenders later in life. Daring, poor concentration, and restlessness all predicted both official convictions and self-reported delinquency, and daring was consistently one of the best independent predictors (Farrington 1992c). Interestingly, Farrington, Loeber, and van Kammen (1990) found that hyperactivity predicted juvenile offending independently of conduct problems. Lynam (1996) proposed that boys with both hyperactivity and CD were most at risk of chronic offending and psychopathy, and Lynam (1998) presented evidence in favor of this hypothesis from the Pittsburgh Youth Study.

The most extensive research on different measures of impulsiveness was carried out in the Pittsburgh Youth Study by White et al. (1994). The measures that were most strongly

related to self-reported delinquency at ages 10 and 13 were teacher-rated impulsiveness (e.g., acts without thinking), self-reported impulsiveness, self-reported undercontrol (e.g., unable to delay gratification), motor restlessness (from videotaped observations), and psychomotor impulsiveness (on the Trail Making Test). Generally, the verbal behavior rating tests produced stronger relationships with offending than the psychomotor performance tests, suggesting that cognitive impulsiveness was more relevant than behavioral impulsiveness. Future time perception and delay-of-gratification tests were only weakly related to self-reported delinquency. In the Developmental Trends Study, Burke, Loeber, Lahey, and Rathouz (2005) found that ADHD predicted ODD, which in turn predicted CD.

#### **Low IQ and Low Educational Achievement**

Low IQ and low school achievement are important predictors of CD, delinquency, and adolescent antisocial behavior (Moffitt, 1993b). In an English epidemiological study of 13-year-old twins, low IQ of the child predicted conduct problems independently of social class and of the IQ of parents (Goodman, Simonoff, & Stevenson, 1995). Low school achievement was a strong correlate of CD in the Pittsburgh Youth Study (Loeber et al., 1998). In both the Ontario Child Health Study (Offord, Boyle, & Racine, 1989) and the New York State longitudinal study (Velez, Johnson, & Cohen, 1989), failing a grade predicted CD. Underachievement, defined according to a discrepancy between IQ and school achievement, is also characteristic of CD children, as Frick et al. (1991) reported in the Developmental Trends Study.

Low IQ and low school achievement also predict youth violence. In the Philadelphia Biosocial project (Denno, 1990), low verbal and performance IQ at ages 4 and 7 and low scores on the California Achievement test at age 13–14 (vocabulary, comprehension, maths, language, spelling) all predicted arrests for

violence up to age 22. In Project Metropolitan in Copenhagen, low IQ at age 12 significantly predicted police-recorded violence between ages 15 and 22. The link between low IQ and violence was strongest among lower class boys (Hogh & Wolf, 1983).

Low IQ measured in the first few years of life predicts later delinquency. In a prospective longitudinal survey of about 120 Stockholm males, low IQ measured at age 3 significantly predicted officially recorded offending up to age 30 (Stattin & Klackenber-Larsson, 1993). Frequent offenders (with 4 or more offenses) had an average IQ of 88 at age 3, whereas nonoffenders had an average IQ of 101. All of these results held up after controlling for social class. Similarly, low IQ at age 4 predicted arrests up to age 27 in the Perry Preschool Project (Schweinhart, Barnes, & Weikart, 1993) and court delinquency up to age 17 in the Collaborative Perinatal Project (Lipsitt, Buka, & Lipsitt, 1990).

In the Cambridge Study, twice as many of the boys scoring 90 or less on a nonverbal IQ test (Raven's Progressive Matrices) at age 8–10 were convicted as juveniles as of those scoring above 90 (West & Farrington, 1973). However, it was difficult to disentangle low IQ from low school achievement, because they were highly intercorrelated and both predicted delinquency. Low nonverbal IQ predicted juvenile self-reported delinquency to almost exactly the same degree as juvenile convictions (Farrington, 1992c), suggesting that the link between low IQ and delinquency was not caused by the less intelligent boys having a greater probability of being caught. Also, low IQ and low school achievement predicted offending independently of other variables such as low family income and large family size (Farrington, 1990), and were important predictors of bullying (Farrington, 1993b).

Low IQ may lead to delinquency through the intervening factor of school failure. The association between school failure and delinquency has been demonstrated repeatedly in longitudinal surveys (Maguin & Loeber,

1996). In the Pittsburgh Youth Study, Lynam, Moffitt, and Stouthamer-Loeber (1993) concluded that low verbal IQ led to school failure and subsequently to self-reported delinquency, but only for African American boys. An alternative theory is that the link between low IQ and delinquency is mediated by disinhibition (impulsiveness, ADHD, low guilt, low empathy), and this was also tested in the Pittsburgh Youth Study (Koolhof, Loeber, Wei, Pardini, & d'Escury, 2007).

A plausible explanatory factor underlying the link between low IQ and delinquency is the ability to manipulate abstract concepts. Children who are poor at this tend to do badly in IQ tests and in school achievement, and they also tend to commit offenses, mainly because of their poor ability to foresee the consequences of their offending. Delinquents often do better on nonverbal performance IQ tests, such as object assembly and block design, than on verbal IQ tests (Moffitt, 1993b), suggesting that they find it easier to deal with concrete objects than with abstract concepts. Similarly, Rogness (1994) concluded that CD children had deficits in verbal IQ but not in performance IQ.

Impulsiveness, attention problems, low IQ, and low school achievement could all be linked to deficits in the executive functions of the brain, located in the frontal lobes. These executive functions include sustaining attention and concentration, abstract reasoning, concept formation, goal formulation, anticipation and planning, programming and initiation of purposive sequences of motor behavior, effective self-monitoring and self-awareness of behavior, and inhibition of inappropriate or impulsive behaviors (Moffitt & Henry, 1991; Morgan & Lilienfeld, 2000). Interestingly, in the Montreal longitudinal experimental study, a measure of executive functioning based on cognitive-neuropsychological tests at age 14 was the strongest neuropsychological discriminator between violent and nonviolent boys (Seguin, Pihl, Harden, Tremblay, & Boulerice, 1995). This relationship held independently of

a measure of family adversity (based on parental age at first birth, parental education level, broken family, and low SES). In the Pittsburgh Youth Study, the life-course-persistent offenders had marked neurocognitive impairments (Raine et al., 2005).

### Other Individual Factors

Numerous other individual factors have been related to CD, aggression, and delinquency, including low self-esteem (Kokkinos & Panayiotou, 2004), depression (Burke et al., 2005), moral judgment (Stams et al., 2006), and social information processing (Lösel, Bliesener, & Bender, 2007). I will focus on empathy, which is related to other concepts such as having callous-unemotional traits (Frick & White, 2008) and being cold, manipulative, and Machiavellian (Sutton, Smith, & Swettenham, 1999).

A distinction has often been made between cognitive empathy (understanding or appreciating other people's feelings) and emotional empathy (actually experiencing other people's feelings). Jolliffe and Farrington (2004) carried out a systematic review of 35 studies comparing questionnaire measures of empathy with official record measures of delinquent or criminal behavior. They found that low cognitive empathy was strongly related to offending, but low affective empathy was only weakly related. Most importantly, the relationship between low empathy and offending was greatly reduced after controlling for IQ or SES, suggesting that they might be more important risk factors or that low empathy might mediate the relationship between these risk factors and offending.

Empathy has rarely been investigated in prospective longitudinal studies but there have been important large-scale cross-sectional surveys. In Australia, Mak (1991) found that delinquent females had lower emotional empathy than nondelinquent females, but that there were no significant differences for males. In Finland, Kaukiainen et al. (1999) reported that empathy (cognitive and emotional combined)

was negatively correlated with aggression (both measured by peer ratings). In Spain, Luengo, Otero, Carrillo-de-la Pena, and Miron (1994) carried out the first project that related cognitive and emotional empathy separately to (self-reported) offending, and found that both were negatively correlated.

Jolliffe and Farrington (2006a) developed a new measure of empathy called the Basic Empathy Scale. An example of a cognitive item is "It is hard for me to understand when my friends are sad," and an example of an emotional item is "I usually feel calm when other people are scared." In a study of 720 British adolescents aged about 15, they found that low emotional empathy was related to self-reported offending and violence for both males and females, and to an official record for offending by females (Jolliffe & Farrington, 2007). Similar, they found that low emotional empathy (but not low cognitive empathy) was related to bullying (Jolliffe & Farrington, 2006b).

### Child Rearing

In the Pittsburgh Youth Study, poor parental supervision was an important risk factor for CD (Loeber et al., 1998). Poor maternal supervision and low persistence in discipline predicted CD in the Developmental Trends Study (Frick et al., 1992), but not independently of parental APD. Rothbaum and Weisz (1994) carried out a meta-analysis and concluded that parental reinforcement, parental reasoning, parental punishments, and parental responsiveness to the child were all related to antisocial child behavior. There could be reciprocal relationships between parenting and child behavior, as Sheehan and Watson (2008) concluded for aggression.

Of all child-rearing factors, poor parental supervision is the strongest and most replicable predictor of delinquency (Smith & Stern, 1997), and harsh or punitive discipline (involving physical punishment) is also an important predictor (Haapasalo & Pokela, 1999). The classic longitudinal studies by McCord (1979) in Boston and Robins (1979) in St. Louis show

that poor parental supervision, harsh discipline, and a rejecting attitude all predict delinquency. In the Seattle Social Development Project, poor family management (poor supervision, inconsistent rules, and harsh discipline) in adolescence predicted violence in young adulthood (Herrenkohl et al., 2000). Similar results were obtained in the Cambridge Study. Harsh or erratic parental discipline; cruel, passive, or neglecting parental attitudes; and poor parental supervision, all measured at age 8, predicted later juvenile convictions and self-reported delinquency (West & Farrington, 1973). Generally, the presence of any of these adverse family background features doubled the risk of a later juvenile conviction.

Steinberg, Lamborn, Dornbusch, and Darling (1992) distinguished an authoritarian style of parenting (punitively emphasizing obedience) from an authoritative style (granting autonomy with good supervision). In the Cambridge Study (Farrington, 1994), having authoritarian parents was the second most important predictor of convictions for violence (after hyperactivity/poor concentration). Interestingly, having authoritarian parents was the most important childhood risk factor that discriminated between violent offenders and frequently convicted nonviolent offenders (Farrington, 1991). An authoritarian, punitive parenting style is also related to bullying (Baldry & Farrington, 1998).

### Child Abuse

There seems to be significant intergenerational transmission of aggressive and violent behavior from parents to children, as Widom (1989) found in a longitudinal survey of abused children in Indianapolis. Children who were physically abused up to age 11 were significantly likely to become violent offenders in the next 15 years (Maxfield & Widom, 1996). Similarly, in the Rochester Youth Development Study, Smith and Thornberry (1995) showed that recorded child maltreatment under age 12 predicted self-reported violence between ages 14 and 18, independently of gender, ethnicity.

SES, and family structure. Keiley, Howe, Dodge, Bates, and Pettit (2001) reported that maltreatment under age 5 was more damaging than maltreatment between ages 6 and 9. The extensive review by Malinosky-Rummell and Hansen (1993) confirms that being physically abused as a child predicts later violent and nonviolent offending.

Possible causal mechanisms linking childhood victimization and adolescent antisocial behaviors have been reviewed by Widom (1994):

1. Childhood victimization may have immediate but long-lasting consequences (e.g., shaking may cause brain injury).
2. Childhood victimization may cause bodily changes (e.g., desensitization to pain) that encourage later aggression.
3. Child abuse may lead to impulsive or dissociative coping styles that, in turn, lead to poor problem-solving skills or poor school performance.
4. Victimization may cause changes in self-esteem or in social information-processing patterns that encourage later aggression.
5. Child abuse may lead to changed family environments (e.g., being placed in foster care) that have deleterious effects.
6. Juvenile justice practices may label victims, isolate them from prosocial peers, and encourage them to associate with delinquent peers.

#### **Parental Conflict and Disrupted Families**

There is no doubt that parental conflict and interparental violence predict adolescent antisocial behavior, as the meta-analysis of Buehler et al. (1997) shows. Also, parental conflict is related to childhood externalizing behavior, irrespective of whether the information about both comes from parents or children (Jenkins & Smith, 1991). In the Pittsburgh Youth Study, CD boys tended to have parents who had unhappy relationships (Loeber et al., 1998). Parental conflict also predicts delinquency (West & Farrington, 1973).

In the Christchurch Study in New Zealand, children who witnessed violence between their parents were more likely to commit both violent and property offenses according to their self-reports (Fergusson & Horwood, 1998). Witnessing father-initiated violence was still predictive after controlling for other risk factors such as parental criminality, parental substance abuse, parental physical punishment, a young mother, and low family income.

Parental separation and single parenthood predict CD in children. In the Christchurch Study, separations from parents in the first five years of a child's life (especially) predicted CD at age 15 (Fergusson, Horwood, & Lynskey, 1994). In the New York State longitudinal study, CD was predicted by parental divorce, but far more strongly by having a never-married lone mother (Velez et al., 1989). In the Ontario Child Health Study, coming from a single-parent family predicted CD, but this was highly related to poverty and dependence on welfare benefits (Blum, Boyle, & Offord, 1988). Also, children from single-parent female-headed households are two to three times as likely to be rated aggressive by teachers compared to other children (Pearson, Jalongo, Hunter, & Kellam, 1994).

In the Dunedin Study in New Zealand, boys from single-parent families disproportionately tended to be convicted; 28% of violent offenders were from single-parent families, compared with 17% of nonviolent offenders and 9% of unconvicted boys (Henry, Caspi, Moffitt, & Silva, 1996). Based on analyses of four surveys (including the Cambridge Study), Morash and Rucker (1989) concluded that the combination of teenage childbearing and a single-parent female-headed household was especially conducive to the development of offending in children. Later analyses of the Cambridge Study showed that teenage childbearing combined with a large number of children particularly predicted offending by the children (Nagin, Pogarsky, & Farrington, 1997).

Many studies show that broken homes or disrupted families predict delinquency (Wells &

Rankin, 1991). In the Newcastle (England) Thousand-Family Study, Kolvin, Miller, Fleeting, and Kolvin (1988) reported that marital disruption (divorce or separation) in a boy's first 5 years predicted his later convictions up to age 32. Similarly, in the Dunedin study in New Zealand, Henry, Moffitt, Robins, Earls, and Silva (1993) found that children who were exposed to parental discord and many changes of the primary caretaker tended to become antisocial and delinquent.

Most studies of broken homes have focused on the loss of the father rather than the mother, simply because the loss of a father is much more common. McCord (1982) in Boston carried out an interesting study of the relationship between homes broken by loss of the natural father and later serious offending of the children. She found that the prevalence of offending was high for boys reared in broken homes without affectionate mothers (62%) and for those reared in united homes characterized by parental conflict (52%), irrespective of whether they had affectionate mothers. The prevalence of offending was low for those reared in united homes without conflict (26%) and—importantly—equally low for boys from broken homes with affectionate mothers (22%). These results suggest that it is not so much the broken home that is criminogenic as the parental conflict that often causes it, and that a loving mother might in some sense be able to compensate for the loss of a father.

In the Cambridge Study, both permanent and temporary separations from a biological parent before age 10 (usually from the father) predicted convictions and self-reported delinquency, providing that they were not caused by death or hospitalization (Farrington, 1992c). However, homes broken at an early age (under age 5) were not unusually criminogenic (West & Farrington, 1973). Separation before age 10 predicted both juvenile and adult convictions (Farrington, 1992b) and predicted convictions up to age 32 independently of all other factors such as low family income or poor school attainment (Farrington, 1993a).

Explanations of the relationship between disrupted families and delinquency fall into three major classes. Trauma theories suggest that the loss of a parent has a damaging effect on a child, most commonly because of the effect on attachment to the parent. Life-course theories focus on separation as a sequence of stressful experiences, and on the effects of multiple stressors such as parental conflict, parental loss, reduced economic circumstances, changes in parent figures, and poor child-rearing methods. Selection theories argue that disrupted families produce delinquent children because of preexisting differences from other families in risk factors such as parental conflict, criminal or antisocial parents, low family income, or poor child-rearing methods.

Hypotheses derived from the three theories were tested in the Cambridge Study (Juby & Farrington, 2001). While boys from broken homes (permanently disrupted families) were more delinquent than boys from intact homes, they were not more delinquent than boys from intact high-conflict families. Interestingly, this result was replicated in Switzerland (Haas, Farrington, Killias, & Sattar, 2004). Overall, the most important factor was the postdisruption trajectory. Boys who remained with their mother after the separation had the same delinquency rate as boys from intact low-conflict families. Boys who remained with their father, with relatives, or with others (e.g., foster parents) had high delinquency rates. It was concluded that the results favored life-course theories rather than trauma or selection theories.

### Antisocial Parents

It is clear that antisocial parents tend to have antisocial children (Lipsey & Derzon, 1998). In the Developmental Trends Study, parental APD was the best predictor of childhood CD (Frick et al., 1992) and parental substance use was an important predictor of the onset of CD (Loeber, Green, Keenan, & Lahey, 1995). Similarly, in the New York State longitudinal study, parental APD was a strong predictor

of antisocial child behavior (Cohen, Brook, Cohen, Velez & Garcia, 1990). However, children of antisocial parents were almost as likely to develop internalizing disorders, as they were to develop externalizing disorders (Johnson, Cohen, Kasen, & Brook, 2006). In the Pittsburgh Youth Study, parents with behavior problems and substance use problems tended to have CD boys (Loeber et al., 1998).

In their classic longitudinal studies, McCord (1977) and Robins, West, and Herjanic (1975) showed that criminal parents tended to have delinquent sons. In the Cambridge Study, the concentration of offending in a small number of families was remarkable. Less than 6% of the families were responsible for half of the criminal convictions of all members (fathers, mothers, sons, and daughters) of all 400 families (Farrington, Barnes, & Lambert, 1996a). Having a convicted mother, father, brother, or sister significantly predicted a boy's own convictions. Same-sex relationships were stronger than opposite-sex relationships, and older siblings were stronger predictors than younger siblings. Furthermore, convicted parents and delinquent siblings were related to a boy's self-reported as well as official offending (Farrington, 1979). CD symptoms also tend to be concentrated in families, as shown in the Ontario Child Health Study (Szatmari, Boyle, & Offord, 1993).

Similar results were obtained in the Pittsburgh Youth Study. Arrests of fathers, mothers, brothers, sisters, uncles, aunts, grandfathers, and grandmothers all predicted the boy's own delinquency (Farrington, Jolliffe, Loeber, Stouthamer-Loeber, & Kalb, 2001). The most important relative was the father; arrests of the father predicted the boy's delinquency independently of all other arrested relatives. Only 8% of families accounted for 43% of arrested family members. In the Dunedin study in New Zealand, antisocial behavior of grandparents, parents, and siblings predicted antisocial behavior of boys (Odgers et al., 2007).

While arrests and convictions of fathers predicted antisocial behavior of boys, imprisonment of fathers before boys were aged 10

further increased the risk of later antisocial and delinquent outcomes in the Cambridge Study (Murray & Farrington, 2005). Interestingly, the effect of parental imprisonment in Sweden (in Project Metropolitan) disappeared after controlling for parental criminality (Murray, Janson, & Farrington, 2007). This cross-national difference may have been the result of shorter prison sentences in Sweden, more family-friendly prison policies, a welfare-oriented juvenile justice system, an extended social welfare system, or more sympathetic public attitudes toward prisoners.

Farrington et al. (2001) reviewed six different explanations for why offending and antisocial behavior were concentrated in families and transmitted from one generation to the next:

1. There may be intergenerational continuities in exposure to multiple risk factors such as poverty, disrupted families, and living in deprived neighborhoods.
2. Assortative mating (e.g., the tendency of antisocial females to choose antisocial males as partners) facilitates the intergenerational transmission of offending.
3. Family members may influence each other (e.g., older siblings may encourage younger ones to be antisocial).
4. The effect of a criminal parent on a child's offending may be mediated by environmental mechanisms such as poor parental supervision and inconsistent discipline.
5. Intergenerational transmission may be mediated by genetic mechanisms.
6. There may be labeling and police bias against known criminal families.

### Large Families

Many studies show that coming from a large family predicts delinquency (Fischer, 1984). For example, in the English National Survey of Health and Development, Wadsworth (1979) found that the percentage of boys who were officially delinquent increased from 9% for families containing one child to 24% for families containing four or more children. In their

Nottingham study, the Newsoms also concluded that large family size was one of the most important predictors of delinquency (Newsom, Newsom, & Adams, 1993). Large family size also predicts adolescent self-reported violence (Farrington, 2000).

In the Cambridge Study, a boy's having four or more siblings by his 10th birthday doubled his risk of being convicted as a juvenile (West & Farrington, 1973). Large family size predicted self-reported delinquency as well as convictions (Farrington, 1979), and adult as well as juvenile convictions (Farrington, 1992b). Also, large family size was the most important independent predictor of convictions up to age 32 in a logistic regression analysis (Farrington, 1993a). Large family size was similarly important in the Cambridge and Pittsburgh studies, even though families were on average smaller in Pittsburgh in the 1990s than in London in the 1960s (Farrington & Loeber, 1999).

Brownfield and Sorenson (1994) reviewed several possible explanations for the link between large families and delinquency, including those focusing on features of the parents (e.g., criminal parents, teenage parents), those focusing on parenting (e.g., poor supervision, disrupted families) and those focusing on socioeconomic deprivation or family stress. Another interesting theory suggested that the key factor was birth order: large families include more later born children, who tend to be more delinquent. Based on an analysis of self-reported delinquency in a Seattle survey, they concluded that the most plausible intervening causal mechanism was exposure to delinquent siblings. In the Cambridge Study, co-offending by brothers was surprisingly common; about 20% of boys who had brothers close to them in age were convicted of a crime committed with their brother (Reiss & Farrington, 1991, p. 386).

### Socioeconomic Factors

It is clear that antisocial children disproportionately come from low SES families. In the Ontario Child Health Study, CD children

tended to come from low-income families, with unemployed parents, living in subsidized housing and dependent on welfare benefits (Offord, Alder, & Boyle, 1986). In the New York State longitudinal study, low SES, low family income and low parental education predicted CD children (Velez et al., 1989). In the Developmental Trends Study, low SES predicted the onset of CD (Loeber et al., 1995); and, in the Pittsburgh Youth Study, family dependence on welfare benefits was characteristic of CD boys (Loeber et al., 1998).

In general, coming from a low SES family predicts adolescent violence. For example, in the U.S. National Youth Survey, the prevalence of self-reported assault and robbery were about twice as high among lower-class youth as among middle-class ones (Elliott, Huizinga, & Menard, 1989). In Project Metropolitan in Stockholm (Wikström, 1985) and in the Dunedin study in New Zealand (Henry et al., 1996), the SES of a boy's family—based on the father's occupation—predicted his later violent crimes. Several researchers have suggested that the link between a low SES family and adolescent antisocial behavior is mediated by family socialization practices. For example, Dodge, Pettit, and Bates (1994) found that about half of the effect of SES on peer-rated aggression and teacher-rated externalizing problems was accounted for by family socialization.

The relationship between low SES and delinquency varies according to whether SES is measured by income and housing or by occupational prestige. Numerous indicators of SES were measured in the Cambridge Study, both for the boy's family of origin and for the boy himself as an adult, including occupational prestige, family income, housing, and employment instability. Most of the measures of occupational prestige were not significantly related to offending. However, low SES of the family when the boy was aged 8–10 significantly predicted his later self-reported but not his official delinquency. More consistently, low family income and poor housing predicted official and self-reported, juvenile and adult, offending (Farrington, 1992b, 1992c).

It was interesting that the peak age of offending, at 17–18, coincided with the peak age of affluence for many convicted males. In the Cambridge Study, convicted males tended to come from low-income families at age 8 and later tended to have low incomes themselves at age 32 (West & Farrington, 1977, p. 62). However, at age 18, they were relatively well paid in comparison with nondelinquents. Whereas convicted delinquents might be working as unskilled laborers on building sites and getting the full adult wage for this job, nondelinquents might be in poorly paid jobs with prospects, such as bank clerks, or might still be students. These results show that the link between income and offending is quite complex.

Socioeconomic deprivation of parents is usually compared to offending by children. However, when the children grow up, their own socioeconomic deprivation can be related to their own offending. In the Cambridge Study, official and self-reported delinquents tended to have unskilled manual jobs and an unstable job record at age 18. Just as an erratic work record of his father predicted the later offending of the study boy, an unstable job record of the boy at age 18 was one of the best independent predictors of his convictions between ages 21 and 25 (Farrington, 1986b). Between ages 15 and 18, the Study boys were convicted at a higher rate when they were unemployed than when they were employed (Farrington, Gallagher, Morley, St. Ledger, & West, 1986), suggesting that unemployment in some way causes crime, and conversely that employment may lead to desistance from offending. Since crimes involving material gain (e.g., theft, burglary, robbery) especially increased during periods of unemployment, it seems likely that financial need is an important link in the causal chain between unemployment and crime.

Several researchers have suggested that the link between low SES families and antisocial behavior is mediated by family socialization practices. For example, Larzelere and Patterson (1990) in the Oregon Youth Study concluded that the effect of SES on delinquency was

entirely mediated by parent management skills. In other words, low SES predicted delinquency because low SES families used poor child-rearing practices. In the Christchurch Health and Development Study, Fergusson, Swain-Campbell, and Horwood (2004) reported that living in a low SES family between birth and age 6 predicted self-reported and official delinquency between ages 15 and 21. However, this association disappeared after controlling for family factors (physical punishment, maternal care, and parental changes), conduct problems, truancy, and deviant peers, suggesting that these may have been mediating factors.

### Peer Influences

The reviews by Zimring (1981) and Reiss (1988) show that delinquent acts tend to be committed in small groups (of two or three people, usually) rather than alone. Large gangs are comparatively unusual. In the Cambridge Study, the probability of committing offenses with others decreased steadily with age (Reiss & Farrington, 1991). Whereas the average crime before age 17 was committed with others, the average crime after age 17 was committed alone. Boys tended to commit their crimes with other boys similar in age and living close by.

The major problem of interpretation is whether young people are more likely to commit offenses while they are in groups than while they are alone, or whether the high prevalence of co-offending merely reflects the fact that, whenever young people go out, they tend to go out in groups. Do peers tend to encourage and facilitate offending, or is it just that most kinds of activities outside the home (both delinquent and nondelinquent) tend to be committed in groups? Another possibility is that the commission of offenses encourages association with other delinquents, perhaps because “birds of a feather flock together” or because of the stigmatizing and isolating effects of court appearances and institutionalization. Thornberry, Lizotte, Krohn, Farnworth, & Jang (1994) in the Rochester Youth Development Study and Elliott and

Menard (1996) in the National Youth Survey concluded that there were reciprocal effects, with delinquent peer bonding causing delinquency and delinquency causing association with delinquent peers.

In the Pittsburgh Youth Study, risk factors for delinquency were compared both between individuals and within individuals (Farrington, Loeber, Yin, & Anderson, 2002). Peer delinquency was the strongest correlate of delinquency in between-individual correlations but did not predict delinquency within individuals. In contrast, poor parental supervision, low parental reinforcement, and low involvement of the boy in family activities predicted delinquency both between and within individuals. It was concluded that these three family variables were the most likely to be causes, whereas having delinquent peers was most likely to be a correlate of the boy's offending.

It is clear that young people increase their offending after joining a gang. In the Seattle Social Development Project, Battin, Hill, Abbott, Catalano, and Hawkins (1998) found this, and also showed that gang membership predicted delinquency above and beyond having delinquent friends. In the Pittsburgh Youth Study, Gordon et al. (2004) reported not only a substantial increase in drug selling, drug use, violence, and property crime after a boy joined a gang, but also that the frequency of offending decreased to pre-gang levels after a boy left a gang. Thornberry, Krohn, Lizotte, Smith, & Tobin (2003) in the Rochester Youth Development Study and Gatti, Tremblay, Vitaro, and McDuff (2005) in the Montreal longitudinal experimental study also found that young people offended more after joining a gang. Several of these studies contrasted the "selection" and "facilitation" hypotheses and concluded that future gang members were more delinquent to start with but became even more delinquent after joining a gang. Gang membership in adolescence is a risk factor for later violence (Herrenkohl et al., 2000), but this may be because both are measuring the same underlying construct.

There is no doubt that highly aggressive children tend to be rejected by most of their peers (Coie, Dodge, & Kupersmidt, 1990; Dodge et al., 2003). In the Oregon Youth Study, Nelson and Dishion (2004) found that peer rejection at age 9–10 significantly predicted adult antisocial behavior. However, it is unclear to what extent peer rejection causes later aggression. Low popularity was only a marginal predictor of adolescent aggression and teenage violence in the Cambridge Study (Farrington, 1989a). Coie and Miller-Johnson (2001) found that it was the boys who were both aggressive and rejected by their classmates who became the self-reported and official delinquents. However, while aggressive children are rejected by conventional peers, they can be popular with other aggressive children (Cairns, Cairns, Neckerman, Gest, & Gariepy, 1988).

### School Influences

It is also well established that delinquents disproportionately attend high delinquency rate schools, which have high levels of distrust between teachers and students, low commitment to the school by students, and unclear and inconsistently enforced rules (Graham, 1988). In the Cambridge Study, attending a high-delinquency-rate school at age 11 significantly predicted a boy's own delinquency (Farrington, 1992c). However, what is less clear is to what extent the schools themselves influence antisocial behavior, by their organization, climate and practices, or to what extent the concentration of offenders in certain schools is mainly a function of their intakes. In the Cambridge Study, most of the variation between schools in their delinquency rates could be explained by differences in their intakes of troublesome boys at age 11 (Farrington, 1972). However, reviews of American research show that schools with clear, fair, and consistently enforced rules tend to have low rates of student misbehavior (Gottfredson, 2001; Herrenkohl, Hawkins, Chung, Hill, & Battin-Pearson, 2001).

In the New York State Longitudinal Study, Kasen, Johnson, and Cohen (1990) investigated

the effects of different dimensions of school climate on changes in children's conduct problems over time. They found that high school conflict (between students and teachers, or between students and other students) predicted increases in conduct problems. In contrast, a high academic focus in schools (e.g., emphasizing homework, academic classes, and task orientation) predicted decreases in conduct problems and hence might be regarded as a protective factor.

### Community Influences

Many studies show that boys living in urban areas are more violent than those living in rural ones. In the U.S. National Youth Survey, the prevalence of self-reported assault and robbery was considerably higher among urban youth (Elliott, Huizinga, & Menard, 1989). Within urban areas, boys living in high-crime neighborhoods are more violent than those living in low-crime neighborhoods. In the Rochester Youth Development Study, living in a high-crime neighborhood significantly predicted self-reported violence (Thornberry, Huizinga, & Loeber, 1995). Similarly, in the Pittsburgh Youth Study, living in a bad neighborhood (either as rated by the mother or based on census measures of poverty, unemployment, and female-headed households) significantly predicted official and reported violence (Farrington, 1998).

Sampson, Raudenbush, and Earls (1997) studied community influences on violence in the Project on Human Development in Chicago Neighborhoods. The most important community predictors were concentrated economic disadvantage (as indexed by poverty, the proportion of female-headed families, and the proportion of African Americans), immigrant concentration (the proportions of Latinos or foreign-born persons), residential instability, and low levels of informal social control and social cohesion. They suggested that the "collective efficacy" of a neighborhood, or the willingness of residents to intervene to prevent antisocial behavior, might act as a protective factor against crime. In the same

project, Sampson, Morenoff, and Raudenbush (2005) concluded that most of the difference between African Americans and Caucasians in violence could be explained by racial differences in exposure to risk factors, especially living in bad neighborhoods. Similar conclusions were drawn by Farrington, Loeber, and Stouthamer-Loeber (2003b) in the Pittsburgh Youth Study.

It is clear that offenders disproportionately live in inner-city areas characterized by physical deterioration, neighborhood disorganization, and high residential mobility (Shaw & McKay, 1969). However, again, it is difficult to determine to what extent the areas themselves influence antisocial behavior and to what extent it is merely the case that antisocial people tend to live in deprived areas (e.g., because of their poverty or public housing allocation policies). Interestingly, both neighborhood researchers such as Gottfredson, McNeil, and Gottfredson (1991) and developmental researchers such as Rutter (1981) have argued that neighborhoods have only indirect effects on antisocial behavior through their effects on individuals and families. In the Chicago Youth Development Study, Tolan, Gorman-Smith, and Henry (2003) concluded that the relationship between community structural characteristics (concentrated poverty, racial heterogeneity, economic resources, violent crime rate) and individual violence was mediated by parenting practices, gang membership, and peer violence.

In the Pittsburgh Youth Study, Wikström and Loeber (2000) found an interesting interaction between types of people and types of areas. Six individual, family, peer, and school variables were trichotomized into risk, middle, or protective scores and added up. Boys with the highest risk scores tended to be delinquent irrespective of the type of area in which they were living. However, boys with high protective scores or balanced risk and protective scores were more likely to be delinquent if they were living in disadvantaged public housing areas. Hence, the area risk was most important when other risks were not high. In the same study,

Lynam et al. (2000) reported that impulsivity predicted delinquency most strongly in poor neighborhoods.

Clearly, there is an interaction between individuals and the communities in which they live. Some aspect of an inner-city neighborhood may be conducive to offending, perhaps because the inner city leads to a breakdown of community ties or neighborhood patterns of mutual support, or perhaps because the high population density produces tension, frustration, or anonymity. There may be many inter-related factors. As Reiss (1986) argued, high-crime-rate areas often have a high concentration of single-parent female-headed households with low incomes, living in low-cost, poor housing. The weakened parental control in these families—partly caused by the fact that the mother had to work and left her children largely unsupervised—meant that the children tended to congregate on the streets. In consequence, they were influenced by a peer subculture that often encouraged and reinforced offending. This interaction of individual, family, peer, and neighborhood factors may be the rule rather than the exception.

### SUCCESSFUL INTERVENTIONS

As mentioned earlier, I will focus here especially on results obtained in randomized experiments with reasonably large samples, since the effect of any intervention on antisocial behavior can be demonstrated most convincingly in such experiments (Farrington, 1983; Farrington & Welsh, 2005). For more extensive reviews of the effects of interventions, see Wasserman and Miller (1998), Catalano, Arthur, Hawkins, Berglund, and Olson (1998), and Farrington and Welsh (2007). Most interventions target risk factors and aim to prevent antisocial behavior. However, it is equally important to strengthen protective factors and promote healthy adolescent development (Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002).

A meta-analysis by Farrington and Welsh (2003) concluded that two main types of family-based programs—general parent education

(in the context of home visiting and parent education plus daycare services) and parent management training—were effective in preventing delinquency. Both types of programs also produce a wide range of other important benefits for families—improved school readiness and school performance on the part of children, greater employment and educational opportunities for parents, and greater family stability in general. There is some evidence that home visiting programs can pay back program costs and produce substantial monetary benefits for the government and taxpayers. Little is known about the economic efficiency of day care and parent management training programs.

### Early Home Visiting

In New York State, Olds, Henderson, Chamberlain, and Tatelbaum (1986) randomly allocated 400 mothers either to receive home visits from nurses during pregnancy, or to receive visits both during pregnancy and during the first 2 years of life, or to a control group who received no visits. The home visitors gave advice about prenatal and postnatal care of the child, about infant development, and about the importance of proper nutrition and avoiding smoking and drinking during pregnancy.

The results of this experiment showed that the postnatal home visits caused a decrease in recorded child physical abuse and neglect during the first 2 years of life, especially by poor unmarried teenage mothers; 4% of visited versus 19% of nonvisited mothers of this type were guilty of child abuse or neglect. This last result is important because (as mentioned above) children who are physically abused or neglected tend to become violent offenders later in life. In a 15-year follow-up, the main focus was on lower class unmarried mothers. Among these high-risk mothers, those who received prenatal and postnatal home visits had fewer arrests than those who received prenatal visits or no visits (Olds et al., 1997). Also, children of these mothers who received prenatal and/or postnatal home visits had less than half as many arrests as

children of mothers who received no visits (Olds et al., 1998). According to Aos, Phipps, Barnoski, and Lieb (2001a), the benefit-to-cost ratio for high risk mothers was 3.1, based on savings to crime victims and criminal justice. (For a recent review of home visiting programs, see Olds, Sadler, & Kitzman, 2007.)

### Preschool Programs

One of the most successful early prevention programs has been the Perry preschool project carried out in Michigan by Schweinhart and Weikart (1980). This was essentially a "Head Start" program targeted on disadvantaged African American children. The experimental children attended a daily preschool program, backed up by weekly home visits, usually lasting two years (covering ages 3-4). The aim of the "plan-do-review" program was to provide intellectual stimulation, to increase thinking and reasoning abilities, and to increase later school achievement.

As demonstrated in several other Head Start projects, the experimental group showed gains in intelligence that were rather short-lived. However, the experimental children were significantly better in elementary school motivation, school achievement at age 14, teacher ratings of classroom behavior at ages 6-9, self-reports of classroom behavior at age 15, and self-reports of offending at age 15. A later follow-up of the Perry sample (Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984) showed that, at age 19, the experimental group was more likely to be employed, more likely to have graduated from high school, more likely to have received college or vocational training, and less likely to have been arrested. By age 27, the experimental group had accumulated only half as many arrests on average as the controls (Schweinhart et al., 1993). Also, they had significantly higher earnings and were more likely to be homeowners. Hence, this preschool intellectual enrichment program led to decreases in school failure, to decreases in delinquency, and to decreases in other undesirable outcomes.

The most recent follow-up of this program at age 40 found that it continued to make an important difference in the lives of the participants (Schweinhart et al., 2005). Compared to the control group, those who received the program had significantly fewer lifetime arrests for violent crimes (32% vs. 48%), property crimes (36% vs. 56%), and drug crimes (14% vs. 34%), and they were significantly less likely to be arrested five or more times (36% vs. 55%). Improvements were also recorded in many other important life-course outcomes. For example, significantly higher levels of schooling (77% vs. 60% graduating from high school), better records of employment (76% vs. 62%), and higher annual incomes were reported by the program group compared to the controls.

Several economic analyses show that the financial benefits of this program outweighed its costs. The Perry project's own calculation (Barnett, 1993) included crime and noncrime benefits, intangible costs to victims, and even included projected benefits beyond age 27. This generated the famous benefit-to-cost ratio of 7 to 1. Most of the benefits (65%) were derived from savings to crime victims. The most recent cost-benefit analysis at age 40 found that the program produced \$17 in benefits per \$1 of cost.

Like the Perry project, the Child Parent Center (CPC) in Chicago provided disadvantaged children with a high-quality, active learning preschool supplemented with family support (Reynolds, Temple, Robertson, & Mann, 2001). However, unlike Perry, CPC continued to provide the children with the educational enrichment component into elementary school, up to age 9. Focussing on the effect of the preschool intervention, it was found that, compared to a control group, those who received the program were less likely to be arrested for both nonviolent and violent offenses by the time they were 18. The CPC program also produced other benefits for those in the experimental compared to the control group, such as a higher rate of high school completion.

### Parent Training

Parent training is also an effective method of preventing delinquency (Piquero, Farrington, Welsh, Tremblay, & Jennings, 2008). Many different types of parent training have been used (Kazdin, 1997), but the behavioral parent management training developed by Patterson (1982) in Oregon is one of the most effective approaches. His careful observations of parent-child interaction showed that parents of antisocial children were deficient in their methods of child rearing. These parents failed to tell their children how they were expected to behave, failed to monitor their behavior to ensure that it was desirable, and failed to enforce rules promptly and unambiguously with appropriate rewards and penalties. The parents of antisocial children used more punishment (such as scolding, shouting, or threatening), but failed to make it contingent on the child's behavior.

Patterson's method involved linking antecedents, behaviors, and consequences. He attempted to train parents in effective child-rearing methods, namely noticing what a child is doing, monitoring behavior over long periods, clearly stating house rules, making rewards and punishments contingent on behavior, and negotiating disagreements so that conflicts and crises did not escalate. His treatment was shown to be effective in reducing child stealing and antisocial behavior over short periods in small-scale studies (Dishion, Patterson, & Kavanagh, 1992; Patterson, Chamberlain, & Reid, 1982; Patterson, Reid, & Dishion, 1992). However, the treatment worked best with children aged 3-10 and less well with adolescents. Also, there were problems of achieving cooperation from the families experiencing the worst problems. In particular, single mothers on welfare were experiencing so many different stresses that they found it difficult to use consistent and contingent child-rearing methods.

One of the most famous parent training programs was developed by Webster-Stratton (1998) in Seattle. She evaluated its success

by randomly allocating 426 children aged 4 (most with single mothers on welfare) either to an experimental group that received parent training or to a control group that did not. The experimental mothers met in groups every week for 8 or 9 weeks, watched videotapes demonstrating parenting skills, and then took part in focused group discussions. The topics included how to play with your child, helping your child learn, using praise and encouragement to bring out the best in your child, effective setting of limits, handling misbehavior, how to teach your child to solve problems, and how to give and get support. The program was successful. Observations in the home showed that the experimental children behaved better than the control children (see also Webster-Stratton, 2000).

Sanders, Markie-Dadds, Tully, and Bor (2000), in Brisbane, Australia, developed the Triple-P Parenting program. This can either be delivered to the whole community in primary prevention using the mass media or can it be used in secondary prevention with high-risk or clinic samples. The success of Triple-P was evaluated with high-risk children aged 3 by randomly assigning them either to receive Triple-P or to a control group. The Triple-P program involves teaching parents 17 child management strategies, including talking with children, giving physical affection, praising, giving attention, setting a good example, setting rules, giving clear instructions, and using appropriate penalties for misbehavior ("time-out," or sending the child to his or her room). The evaluation showed that the Triple-P program was successful in reducing children's antisocial behavior.

Another parenting intervention, Functional Family Therapy, was evaluated in Utah by Alexander and Parsons (1973). This aimed to modify patterns of family interaction by modeling, prompting, and reinforcement; to encourage clear communication of requests and solutions between family members; and to minimize conflict. Essentially, all family members were trained to negotiate effectively,

to set clear rules about privileges and responsibilities, and to use techniques of reciprocal reinforcement with each other. This technique halved the recidivism rate of minor delinquents in comparison with other approaches (client-centered or psychodynamic therapy). Its effectiveness with more serious delinquents was confirmed in a replication study using matched groups (Gordon, 1995; see also Sexton & Alexander, 2000).

The multidimensional treatment foster care (MTFC) program, evaluated in Oregon by Chamberlain and Reid (1998), also produced desirable results. In treatment foster care, families in the community were recruited and trained to provide a placement for delinquent youths. The MTFC youths were closely supervised at home, in the community, and in the school, and their contacts with delinquent peers were minimized. The foster parents provided a structured daily living environment, with clear rules and limits, consistent discipline for rule violations and one-to-one monitoring. The youths were encouraged to develop academic skills and desirable work habits. In the evaluation, 79 chronic male delinquents were randomly assigned to treatment foster care or to regular group homes where they lived with other delinquents. A 1-year follow-up showed that the MTFC boys had fewer criminal referrals and lower self-reported delinquency. Hence, this program seemed to be an effective treatment for delinquency.

### Skills Training

The set of techniques variously termed *cognitive behavioral interpersonal social skills training* have proved to be successful (Lipsey & Wilson, 1998). For example, the "Reasoning and Rehabilitation" program developed by Ross and Ross (1995) in Ottawa, Canada, aimed to modify the impulsive, egocentric thinking of delinquents, to teach them to stop and think before acting, to consider the consequences of their behavior, to conceptualize alternative ways of solving interpersonal problems, and to consider the impact of their

behavior on other people, especially their victims. It included social skills training, lateral thinking (to teach creative problem solving), critical thinking (to teach logical reasoning), values education (to teach values and concern for others), assertiveness training (to teach nonaggressive, socially appropriate ways to obtain desired outcomes), negotiation skills training, interpersonal cognitive problem solving (to teach thinking skills for solving interpersonal problems), social perspective training (to teach how to recognize and understand other people's feelings), role playing and modeling (demonstration and practice of effective and acceptable interpersonal behavior). This program led to a large decrease in reoffending by a small sample of delinquents.

Tong and Farrington (2008) completed a systematic review of the effectiveness of "Reasoning and Rehabilitation" in reducing offending. They located 32 comparisons of experimental and control groups in four countries. Their meta-analysis showed that, overall, there was a significant 14% decrease in offending for program participants compared with controls.

Jones and Offord (1989) implemented a skills training program in an experimental public housing complex in Ottawa and compared it with a control complex. The program centered on nonschool skills, both athletic (e.g., swimming and hockey) and non-athletic (e.g., guitar and ballet). The aim of developing skills was to increase self-esteem, to encourage children to use time constructively and to provide desirable role models. Participation rates were high; about three-quarters of age-eligible children in the experimental complex took at least one course in the first year. The program was successful: delinquency rates decreased significantly in the experimental complex compared to the control complex. The benefit-to-cost ratio, based on savings to taxpayers, was 2.5.

Lösel and Beelman (2006) completed a systematic review of the effectiveness of skills training with children and adolescents. They

located 89 comparisons of experimental and control groups. Their meta-analysis showed that, overall, there was a significant 10% decrease in delinquency in follow-up studies for children who received skills training compared with controls. The greatest effect was for cognitive-behavioral skills training, where there was an average 25% decrease in delinquency in seven follow-up studies. The most effective programs targeted children aged 13 or older and high-risk groups who were already exhibiting behavior problems.

### Peer Programs

There are few outstanding examples of effective intervention programs for antisocial behavior targeted on peer risk factors. The most hopeful programs involve using high-status conventional peers to teach children ways of resisting peer pressure; this is effective in reducing drug use (Tobler, Lessard, Marshall, Ochshorn, & Roona, 1999). Also, in a randomized experiment in St. Louis, Feldman, Caplinger, and Wodarski (1983) showed that placing antisocial adolescents in activity groups dominated by prosocial adolescents led to a reduction in their antisocial behavior (compared with antisocial adolescents placed in antisocial groups). This suggests that the influence of prosocial peers can be harnessed to reduce antisocial behavior. However, putting antisocial peers together can have harmful effects (Dishion, McCord, & Poulin, 1999).

The most important intervention program whose success seems to be based mainly on reducing peer risk factors is the Children at Risk program (Harrell, Cavanagh, Harmon, Koper, & Sridharan, 1997), which targeted high-risk adolescents (average age 12) in poor neighborhoods of five cities across the United States. Eligible youths were identified in schools, and randomly assigned to experimental or control groups. The program was a comprehensive community-based prevention strategy targeting risk factors for delinquency, including case management and family counseling, family skills training,

tutoring, mentoring, after-school activities and community policing. The program was different in each neighborhood.

The initial results of the program were disappointing, but a one-year follow-up showed that (according to self-reports) experimental youths were less likely to have committed violent crimes and used or sold drugs (Harrell, Cavanagh, & Sridharan, 1999). The process evaluation showed that the greatest change was in peer risk factors. Experimental youths associated less often with delinquent peers, felt less peer pressure to engage in delinquency, and had more positive peer support. In contrast, there were few changes in individual, family or community risk factors, possibly linked to the low participation of parents in parent training and of youths in mentoring and tutoring (Harrell et al., 1997, p. 87). In other words, there were problems of implementation of the program, linked to the serious and multiple needs and problems of the families.

Community-based mentoring programs usually involve nonprofessional adult volunteers spending time with young people at risk for delinquency, dropping out of school, school failure, or other social problems. Mentors behave in a "supportive, nonjudgmental manner while acting as role models" (Howell, 1995, p. 90). Welsh and Hoshi (2006) identified seven community-based mentoring programs (of which six were of high quality) that evaluated the impact on delinquency. Since most programs found desirable effects, Welsh and Hoshi concluded that community-based mentoring was a promising approach in preventing delinquency. Similarly, a meta-analysis by Jolliffe and Farrington (2008) concluded that mentoring was often effective in reducing reoffending.

### School Programs

An important school-based prevention experiment was carried out in Seattle by Hawkins, von Cleve, and Catalano (1991). This combined parent training, teacher training, and skills training. About 500 first-grade children

(aged 6) were randomly assigned to be in experimental or control classes. The children in the experimental classes received special treatment at home and school, which was designed to increase their attachment to their parents and their bonding to the school, on the assumption that delinquency was inhibited by the strength of social bonds. Their parents were trained to notice and reinforce socially desirable behavior in a program called "Catch Them Being Good." Their teachers were trained in classroom management, for example, to provide clear instructions and expectations to children, to reward children for participation in desired behavior, and to teach children prosocial (socially desirable) methods of solving problems.

In an evaluation of this program 18 months later, when the children were in different classes, Hawkins et al. (1991) found that the boys who received the experimental program were significantly less aggressive than the control boys, according to teacher ratings. This difference was particularly marked for Caucasian boys rather than African American boys. The experimental girls were not significantly less aggressive, but they were less self-destructive, anxious, and depressed. In a later follow-up, Hawkins, Catalano, Kosterman, Abbott, and Hill (1999) found that, at age 18, the full intervention group (those receiving the intervention from grades 1 to 6) admitted less violence, less alcohol abuse and fewer sexual partners than the late intervention group (grades 5–6 only) or the controls. The benefit-to-cost ratio of this program according to Aos et al. (2001a) was 4.3. Other school-based programs have also been successful in reducing antisocial behavior (Catalano et al., 1998).

In Baltimore, Petras et al. (2008) evaluated the "Good Behavior Game" (GBG), which aimed to reduce aggressive and disruptive child behavior through contingent reinforcement of interdependent team behavior. First-grade classrooms and teachers were randomly assigned either to the GBG condition ( $N = 238$ ) or to a control condition ( $N = 165$ ), and

the GBG was played repeatedly over 2 years. In trajectory analyses, the researchers found that the GBG decreased aggressive/disruptive behavior (according to teacher reports) up to grade 7 among the most aggressive boys, and also caused a decrease in APD at ages 19–21. However, effects on girls and on a second cohort of children were less marked.

There have been a number of comprehensive, evidence-based reviews of the effectiveness of school-based programs (Gottfredson, Wilson, & Najaka, 2006; Wilson, Gottfredson, & Najaka, 2001; Wilson & Lipsey, 2007). Meta-analyses identified four types of school-based programs that were effective in preventing delinquency: school and discipline management, classroom or instructional management, reorganization of grades or classes, and increasing self-control or social competency using cognitive behavioral instruction methods. Reorganization of grades or classes had the largest average effect size ( $d = 0.34$ ), corresponding to a significant 17% reduction in delinquency.

After-school programs (e.g., recreation-based, drop-in clubs, dance groups, and tutoring services) are based on the belief that providing prosocial opportunities for young people in the after-school hours can reduce their involvement in delinquent behavior in the community. After-school programs target a range of risk factors for delinquency, including association with delinquent peers. Welsh and Hoshi (2006) identified three high-quality after-school programs with an evaluated impact on delinquency. Each had desirable effects on delinquency, and one program also reported lower rates of drug use for participants compared to controls.

### Anti-Bullying Programs

Several school-based programs have been designed to decrease bullying. The most famous of these was implemented by Olweus (1994) in Norway. It aimed to increase awareness and knowledge of teachers, parents, and children about bullying and to dispel myths about it. A 30-page booklet was distributed

to all schools in Norway describing what was known about bullying and recommending what steps schools and teachers could take to reduce it. Also, a 25-minute video about bullying was made available to schools. Simultaneously, the schools distributed to all parents a four-page folder containing information and advice about bullying. In addition, anonymous self-report questionnaires about bullying were completed by all children.

The program was evaluated in Bergen. Each of the 42 participating schools received feedback information from the questionnaire, about the prevalence of bullies and victims, in a specially arranged school conference day. Also, teachers were encouraged to develop explicit rules about bullying (e.g., do not bully, tell someone when bullying happens, bullying will not be tolerated, try to help victims, try to include children who are being left out) and to discuss bullying in class, using the video and role-playing exercises. Also, teachers were encouraged to improve monitoring and supervision of children, especially on the playground. The program was successful in reducing the prevalence of bullying by half.

A similar program was implemented in England in 23 Sheffield schools by Smith and Sharp (1994). The core program involved establishing a "whole-school" anti-bullying policy, raising awareness of bullying and clearly defining roles and responsibilities of teachers and students, so that everyone knew what bullying was and what they should do about it. In addition, there were optional interventions tailored to particular schools: curriculum work (e.g., reading books, watching videos), direct work with students (e.g., assertiveness training for those who were bullied), and playground work (e.g., training lunchtime supervisors). This program was successful in reducing bullying (by 15%) in primary schools, but had relatively small effects (a 5% reduction) in secondary schools.

Baldry and Farrington (2007) reviewed 16 major evaluations of programs to prevent school bullying, conducted in 11 different

countries. Of these, eight yielded clearly desirable results and only two yielded undesirable negative effects on bullying. They concluded that the findings of existing evaluations were generally optimistic. Similarly optimistic conclusions were drawn in systematic reviews by Vreeman and Carroll (2007) and Ttofi, Farrington, and Baldry (2008).

### **Multimodal Programs**

Multimodal programs including both skills training and parent training are more effective than either alone (Wasserman & Miller, 1998). An important multimodal program was implemented by Tremblay, Pagani-Kurtz, Vitaro, Masse, and Pihl (1995) in Montreal, Canada. They identified about 250 disruptive (aggressive/hyperactive) boys at age 6 for a prevention experiment. Between ages 7 and 9, the experimental group received training to foster social skills and self-control. Coaching, peer modeling, role playing, and reinforcement contingencies were used in small group sessions on such topics as "how to help," "what to do when you are angry," and "how to react to teasing." Also, their parents were trained using the parent management training techniques developed by Patterson (1982).

This prevention program was successful. By age 12, the experimental boys committed less burglary and theft, were less likely to get drunk, and were less likely to be involved in fights than the controls. Also, the experimental boys had higher school achievement. At every age from 10 to 15, the experimental boys had lower self-reported delinquency scores than the control boys. Interestingly, the differences in antisocial behavior between experimental and control boys increased as the follow-up progressed. A later follow-up showed that fewer experimental boys had a criminal record by age 24 (Boisjoli, Vitaro, Lacourse, Barker, & Tremblay, 2007).

Intervention programs that tackle several of the major risk factors for CD and delinquency are likely to be particularly effective. Henggeler, Melton, Smith, Schoenwald, and

Hanley (1993) in South Carolina evaluated multisystemic therapy (MST) for juvenile offenders, tackling family, peer, and school risk factors simultaneously in individualized treatment plans tailored to the needs of each family. MST was compared with the usual Department of Youth Services treatment, involving out-of-home placement in the majority of cases. In a randomized experiment with delinquents, MST was followed by fewer arrests, lower self-reported delinquency, and less peer-oriented aggression. Borduin et al. (1995) also showed that MST was more effective in decreasing arrests and antisocial behavior than was individual therapy. According to Aos, Phipps, Barnoski, and Lieb (2001b), MST had one of the highest benefit-to-cost ratios of any program. For every \$1 spent on it, \$13 was saved in victim and criminal justice costs.

MST was the most effective intervention in the review by Farrington and Welsh (2003). However, since that review two later meta-analyses have reached dramatically opposite conclusions about the effectiveness of MST; Curtis, Ronan, and Borduin (2004) concluded that it was effective, but Littell (2005) concluded that it was not. Therefore, we cannot be confident about the effectiveness of MST until this controversy is resolved by more evaluations.

## CONCLUSIONS

A great deal is known about adolescent antisocial behavior from high-quality longitudinal and experimental studies. First, males are more antisocial than females. Second, all types (including CD, aggression, and delinquency) tend to coexist and are intercorrelated. Third, the most antisocial adolescents at one age tend also to be the most antisocial at a later age. Fourth, an early onset of antisocial behavior predicts a long and serious antisocial career. However, both the prevalence and the age of onset of antisocial behavior can vary dramatically according to its definition and how it is measured. Research is needed on a wider range of features of antisocial careers; not just prevalence and

onset but also frequency, seriousness, duration, escalation, deescalation, desistance, remission, motivation and situational influences. More studies are needed with multiple informants and frequent measurements.

How the prevalence and incidence of antisocial behavior varies between ages 10 and 17 is less well understood. The existing evidence suggests that the incidence of physical aggression decreases during adolescence but that the prevalence of CD and delinquency increase. More research is needed on the age distribution of different types of antisocial behavior, in order to explain these findings. Also, more research is needed on different types of developmental pathways and trajectories during this age range.

A great deal is known about the key risk factors for adolescent antisocial behavior, which include impulsiveness, low empathy, low IQ and low school achievement, poor parental supervision, child physical abuse, punitive or erratic parental discipline, cold parental attitude, parental conflict, disrupted families, antisocial parents, large family size, low family income, antisocial peers, high-delinquency-rate schools, and high-crime neighborhoods. However, the causal mechanisms linking these risk factors with antisocial outcomes are less well established. Larger developmental theories that explain broader patterns of results need to be formulated and tested (Lahey, Moffitt, & Caspi, 2003; Farrington, 2005). More research is needed on risk factors for persistence or escalation of antisocial behavior. To what extent risk factors are the same for males and females, for different ethnic groups, or at different ages needs to be investigated. More cross-national comparisons of risk factors, and more studies of promotive and protective factors, are needed.

The comorbidity and versatility of antisocial behavior poses a major challenge to scientific understanding. It is important to investigate to what extent research findings are driven by a minority of multiple-problem adolescents or chronic delinquents. Often, multiple risk factors lead to multiple-problem boys (Farrington,

2002; Loeber et al., 2001). To what extent any given risk factor generally predicts a variety of different outcomes (as opposed to specifically predicting one or two outcomes) and to what extent each outcome is generally predicted by a variety of different risk factors (as opposed to being specifically predicted by only one or two risk factors) is unclear. An increasing number of risk factors leads to an increasing probability of antisocial outcomes, almost irrespective of the particular risk factors included in the prediction measure, but more research is needed on this. There was insufficient space in this chapter to review theories explaining the links between risk factors and antisocial outcomes, but these have to be based on knowledge about the additive, independent, interactive, and sequential effects of risk factors.

There are many examples of successful intervention programs, including general parent education in home visiting programs, preschool intellectual enrichment programs, parent management training, cognitive behavioral skills training, anti-bullying and other school programs, mentoring and after-school programs, and multimodal programs including individual and family interventions. The meta-analysis by Farrington and Welsh (2003) concluded that the average effect size of family-based programs on delinquency was  $d = 0.32$ , corresponding to a decrease in the percentage convicted from 50% to 34%. However, many experiments are based on small samples and short follow-up periods. The challenge to researchers is to transport carefully monitored small-scale programs implemented by high-quality university personnel into routine large-scale use, without losing their effectiveness. Often, multimodal programs are the most successful, making it difficult to identify the active ingredient. Successful multimodal programs should be followed by more specific experiments targeting single risk factors, which could be very helpful in establishing which risk factors have causal effects.

More efforts are needed to tailor types of interventions to types of adolescents. Ideally, an intervention should be preceded by a

screening or needs assessment to determine which problems need to be rectified and which adolescents are most likely to be amenable to treatment. It is important to establish to what extent interventions are successful with the most antisocial adolescents, in order to identify where the benefits will be greatest in practice. Also, more cost-benefit analyses are needed, to show how much money is saved by successful programs. Saving money is a powerful argument to convince policy makers and practitioners to implement intervention programs.

A great deal has been learned about adolescent antisocial behavior in the past 25 years, especially from longitudinal and experimental studies. More investment in these kinds of studies is needed in the next 25 years in order to advance knowledge about and decrease these troubling social problems.

### Acknowledgments

I am very grateful to Rowell Huesmann, Ben Lahey, Rolf Loeber, Barbara Maughan, Terrie Moffitt, and Richard Tremblay for providing helpful comments and materials.

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