

This series of 10-year updates in child and adolescent psychiatry began in July 1996. Topics are selected in consultation with the AACAP Committee on Recertification, both for the importance of new research and its clinical or developmental significance. The authors have been asked to place an asterisk before the 5 or 6 most seminal references.

M.K.D.

Oppositional Defiant and Conduct Disorder: A Review of the Past 10 Years, Part I

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ABSTRACT

Objective: To review empirical findings on oppositional defiant disorder (ODD) and conduct disorder (CD). **Method:** Selected summaries of the literature over the past decade are presented. **Results:** Evidence supports a distinction between the symptoms of ODD and many symptoms of CD, but there is controversy about whether aggressive symptoms should be considered to be part of ODD or CD. CD is clearly heterogenous, but further research is needed regarding the most useful subtypes. Some progress has been made in documenting sex differences. Symptoms that are more serious, more atypical for the child's sex, or more age-atypical appear to be prognostic of serious dysfunction. Progress has been made in the methods for assessment of ODD and CD, but some critical issues, such as combined information from different informants, remains to be addressed. A proportion of children with ODD later develop CD, and a proportion of those with CD later meet criteria for antisocial personality disorder. ODD and CD frequently co-occur with other psychiatric conditions. **Conclusions:** Although major advances in the study of the prevalence and course of ODD and CD have occurred in the past decade, some key issues remain unanswered. *J. Am. Acad. Child Adolesc. Psychiatry*, 2000, 39(12):1468–1484. **Key Words:** oppositional defiant disorder, conduct disorder, sex differences, review.

Oppositional defiant disorder (ODD) and conduct disorder (CD) continue to be the predominant juvenile disorders seen in mental health and community clinics (Frick, 1998; Kazdin, 1995) and are of great concern because of their high degree of impairment (Lahey et al., 1997) and poor diagnosis (see below).

In this review, we first briefly discuss descriptive features of ODD and CD, particularly empirical support

for a distinction between ODD and CD, their stability, prognostic subtypes, and alternative classifications. Second, we consider issues in the assessment of the disorders. Third, we consider epidemiological aspects of the disorders. Fourth, we discuss comorbidity, including sequences in the onset of comorbid disorders. Part II will examine biological processes, child risk factors, psychosocial risk and protective factors, developmental models, interventions, and research recommendations.

The review summarizes a large body of empirical findings from the past 10 years and, in addition, selectively draws from major reviews and books published during the period. Among the general reviews, mention should be made of the work by Hinshaw (1994), Kolko (1994), Lahey et al. (1999a), Loeber (1990), and Tolan and Loeber (1993). Readers are also referred to monographs by Kazdin (1995), Frick (1998), Loeber et al. (1998a), and Patterson et al. (1992); edited collections of papers on disruptive behaviors (Maughan and Hill, in press; Pepler and Rubin, 1991; Routh, 1994; Rutter

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et al., 1998; Sholevar, 1995; Stoff et al., 1997); and a special issue in *Development and Psychopathology* (Cicchetti and Nurcombe, 1993). In addition, in the past 10 years increasing attention has been drawn to disruptive behavior disorders (DBD) in girls, with reviews by Goodman and Kohlsdorf (1994), Keenan et al. (unpublished, 1998), Loeber et al. (1991), Loeber and Keenan (1994), Silverthorn and Frick (1999), and Zoccolillo (1993). The present review also selectively draws on delinquency studies because many forms of delinquent acts are also symptoms of CD (e.g., Farrington, 1999; Loeber and Farrington, 1998; Reiss and Roth, 1994; Rutter et al., 1998). For example, Fergusson and Horwood (1995) found that 90% of children with 3 or more CD symptoms at age 15 were self-reported frequent offenders a year later, compared with 17% of children with no CD symptoms.

FEATURES OF ODD AND CD

The essential features of ODD are a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior toward authority figures, which leads to impairment, and the essential features of CD are a repetitive and persistent pattern of behavior in which the basic rights of others and major age-appropriate societal norms or rules are violated (American Psychiatric Association, 1994). See Table 1 for *DSM-IV* symptoms of ODD and CD. Regarding the recent development of diagnostic criteria, limited field trials were undertaken for *DSM-III-R* (Spitzer et al., 1990), but more extensive field trials (Frick et al., 1994; Lahey et al., 1994, 1998) and secondary data analyses (Loeber et al., 1993a, 1998b; Russo et al., 1994) preceded *DSM-IV*. Readers are referred to Volkmar and Schwab-Stone's (1996) summary of how *DSM-III-R* criteria were transformed into *DSM-IV* criteria for ODD and CD (see also Quay, 1999; Robins, 1999).

Considerable dialogue has taken place regarding the degree to which ODD and CD relate to, and should be distinguished from, one another. The majority of empirical evidence supports a distinction between ODD and CD (Cohen and Flory, 1998; Fergusson et al., 1994; Frick et al., 1993), as well as distinctions between attention-deficit/hyperactivity disorder (ADHD) and both ODD (Waldman and Lilienfeld, 1991) and CD (Hinshaw, 1994).

In contrast to the *DSM* distinction between ODD and CD, another body of evidence appears to support a distinction between one syndrome that includes ODD behaviors and aggressive CD behaviors and another that

TABLE 1

DSM-IV Diagnostic Criteria for Oppositional Defiant Disorder and Conduct Disorder

<i>DSM-IV</i> Criteria for Oppositional Defiant Disorder
A. A pattern of negativistic, hostile and defiant behavior lasting at least 6 months, during which four (or more) of the following are present: <ol style="list-style-type: none"> 1. Often loses temper 2. Often argues with adults 3. Often actively defies or refuses to comply with adults' requests or rules 4. Often deliberately annoys people 5. Often blames others for his or her mistakes or misbehavior 6. Is often touchy or easily annoyed by others 7. Is often angry and resentful 8. Is often spiteful or vindictive
<i>DSM-IV</i> Criteria for Conduct Disorder
<ol style="list-style-type: none"> 1. Often bullies, threatens or intimidates others 2. Often initiates physical fights 3. Has used a weapon 4. Has been physically cruel to people 5. Has been physically cruel to animals 6. Has stolen while confronting a victim 7. Has forced someone into sexual activity 8. Has deliberately engaged in fire setting 9. Has deliberately destroyed others' property 10. Has broken into someone else's house, building or car 11. Often lies to con others 12. Has stolen items of nontrivial value without confronting the victim 13. Often out late without permission, starting before age 13 14. Has run away from home overnight at least twice 15. Often truant from school, starting before age 13

includes nonaggressive CD behaviors (Achenbach, 1991). Aggression in a proportion of boys emerges early in life and is usually accompanied by ODD symptoms (Loeber et al., 2000). There is no controversy about the distinction between covert CD behaviors and ODD (Achenbach, 1991; Frick et al., 1993), but some researchers have suggested that it may also be useful to distinguish ODD from aggressive CD (Frick et al., 1993) and to distinguish between 2 types of covert CD behaviors: property crimes and status offenses (Frick et al., 1993; Lahey et al., in press-a).

Sex differences in the demonstration of CD symptoms deserve further investigation. Zoccolillo et al. (1996) raised the possibility that *DSM-III-R* diagnoses of ODD and CD did not accurately identify preadolescent girls with early-onset (kindergarten) persistent and pervasive antisocial behavior. However, the low prevalence of CD in the study may have affected the conclu-

sion. Rather than physical aggression, females tend to use indirect, verbal and relational aggression, including alienation, ostracism, and character defamation directed at the relational bonds between "friends" (Björkqvist et al., 1992; Crick, 1995; Crick and Grotpeter, 1995). As these problem behaviors are not represented among the CD symptoms, it may be clinically useful to modify the diagnostic criteria for girls.

Stability

An element of the validity of diagnostic constructs is their reliability over time. Extensive reviews regarding issues of the stability of DBD and its symptoms, including aggression, have been conducted by Caspi and Moffitt (1995), Loeber (1991), and Maughan and Rutter (1998).

Starting with Robins (1966), persistence of diagnosis has been reported at 50% of children continuing to qualify for the disorder (or serious behavior problems) (Campbell, 1991; Lahey et al., 1995). In the Ontario Child Health Study (Offord et al., 1992), 44% of children initially assessed with CD persisted with CD at follow-up 4 years later. Lahey et al. (1995) found higher persistence in a clinic-referred sample of boys, with 88% of the CD boys meeting criteria again at least once in the next 3 years. Cumulative stability of CD is much higher and clinically more relevant than year-to-year stability.

The severity of symptoms influences the stability of the disorder. Cohen et al. (1993a) found high stability from late childhood to adolescence for severe ODD and CD (odds ratio [OR] = 8.3 and 13.9, respectively), and lower stability for mild or moderate ODD or CD (OR = 3.2 and 6.0 for ODD, respectively; 3.1 and 7.8 for CD, respectively). Although less well examined, the stability of disruptive behaviors tends to be as high or higher for females than males. Tremblay et al. (1992) showed that aggression and later delinquency were equally highly correlated in boys and girls (product moment correlations 0.76 and 0.79, respectively). The temporal stability of an aggression factor (Verhulst and van der Ende, 1991) was consistently higher for girls than boys in 4 measurements between ages 4–5 and 10–12 years. Thus, despite a lower prevalence of disruptive behavior in girls than boys, once such behavior becomes apparent in girls it remains at least as stable as in boys.

The Search for Prognostic Subtypes

The subtyping of CD has been a matter of great concern because of the need to differentiate among those

youths who are likely to persist in disruptive behavior, those who will escalate to serious levels of such behavior, and those who are likely to outgrow or to desist from the behavior. The *DSM-IV* (American Psychiatric Association, 1994) discusses subtyping of CD based on age of onset and refers to use of the number and intensity of symptoms as clinical indicators of severity. Evidence supporting the prognostic utility of other factors, such as overt versus covert symptoms, comorbid ADHD, and the presence of early symptoms of antisocial personality disorder (APD), has accrued over the past decade.

Early Versus Late Onset

DSM subtypes of CD were changed between 1987 and 1994. *DSM-III-R* advocated the distinction between socialized and nonsocialized forms of aggression. This was replaced in *DSM-IV* by subtypes based on the age of onset (age 10 or younger versus 11 or older) of first CD symptoms. The new subtypes were supported by a consensus of research findings for boys (Moffitt, 1993; Robins et al., 1991; Tolan and Thomas, 1995), and their validity has been confirmed by Lahey and colleagues (1998) in 2 large studies.

However, it is important not to oversimplify an early age of onset of CD as a marker of psychopathology. Age of onset has been criticized because it is based on a single measurement (the presence or absence of a symptom before a certain age (Loeber and Stouthamer-Loeber, 1998), because of the unreliability of recall of age of onset (Angold et al., 1996), and because it lacks empirical, prognostic support for girls.

Evidence that the average onset of CD is earlier for boys than for girls is not uniform across studies (Lahey et al., 1998). Retrospective studies including females indicate the presence of 2 groups: an early-onset group and a group with late onset, emerging during adolescence (Zoccolillo, 1993), but other reviewers conclude that late-onset CD is the only type of CD for girls (Silverthorn and Frick, 1999). It remains to be tested, however, whether the early/late onset distinction is important for prognosis in girls (Moffitt, 1993; Moffitt, personal communication, January 1996).

There are several important findings concerning other factors that influence the age of onset of CD symptoms. The onset of CD is particularly early in boys with ADHD. For example, in 92% of referred ADHD boys who developed CD, the onset of CD occurred prior to age 12 (Biederman et al., 1996; Hinshaw et al., 1993).

Early onset of CD problems is often preceded and predicted by persistent ODD symptoms. For example, Campbell (1991) demonstrated that, of children with behavior problems that continued from preschool, 67% qualified for a diagnosis of ADHD, ODD, or CD by age 9. Age of onset of CD is significantly related to the number of aggressive behaviors (Lahey et al., 1998); males who meet criteria for CD with an age of onset of less than 10 years are 8.7 times more likely to show at least one aggressive symptom than are youths who qualify for CD at a later age (Lahey et al., 1998).

Severity Levels of Symptoms

DSM-IV makes a distinction among different severity levels of symptoms of ODD and CD, but such distinctions are not often referred to in the psychiatric literature (but see Lahey and Loeber, 1994; Loeber et al., 1998b). In contrast, delinquency studies have demonstrated the high predictive utility of severity scaling of various forms of delinquent acts (e.g., Farrington et al., 1996; Loeber et al., 1998a). Regarding individual symptoms, Cohen and Flory (1998) found that the singular symptoms of cruelty to people and weapon use best predicted subsequent diagnosis of CD.

The age- and gender-atypicality of symptoms are prognostic of later outcome. Using cross-sectional analyses, Frick et al. (1994) found that in younger children (below age 13) the symptoms of cruelty, running away, and breaking into a building were most predictive of CD. In addition, they found that for girls, fighting and cruel behavior were atypical symptoms and were most predictive of CD. Unfortunately, there are not yet age-normative and gender-specific tables to judge the relative deviance of particular disruptive behaviors.

Overt Versus Covert Disruptive Behavior

There is substantial evidence for a subtyping of CD according to the distinction between overt (confrontational, such as fighting) and covert (concealing, such as theft) disruptive behaviors (Fergusson et al., 1994; Frick et al., 1993). Several reviews have attested to the importance of aggression and physical fighting in the development of DBD (Coie and Dodge, 1998; Loeber and Farrington, 1998; Loeber and Stouthamer-Loeber, 1998; Vitiello and Stoff, 1997). In a prospective study by Loeber and colleagues (1998b), of all possible symptoms of CD, only physical fighting, together with the diagnosis of ODD, were the best predictors of the *onset* of CD.

Although physical fighting by preschool-age boys is common (Loeber and Hay, 1994, 1997), some boys stand out by their *persistent* fighting. Even those who desist in fighting may be at risk for later delinquency (Haapasalo and Tremblay, 1994), but it is the group of stable fighters that appears at highest risk for other disruptive behaviors (Loeber et al., 1989; Tremblay et al., 1991).

Not all physical fighting, however, appears relevant for the development of CD. Proactive aggression, compared with reactive fighting, appears particularly important for later maladjustment (Dodge, 1991). Proactive, but not reactive, aggression in boys predicts CD symptoms, but it predicts ODD symptoms only marginally (Vitaro et al., 1998).

Other subclassifications of aggression have been proposed, such as impulsive versus nonimpulsive, predatory versus affective, hostile versus instrumental, and, for clinical groups, impulsive-hostile-affective aggression versus predominantly controlled-instrumental-predatory aggression (Vitiello and Stoff, 1997). The utility of these different dimensions for the subclassification of CD remains to be illuminated. The emotional component of aggression is important because a high degree of anger is associated with rumination, the maintenance of grudges, and desire for revenge. For example, Pelham et al. (in press) found that children with comorbid ADHD and ODD/CD held a grudge longer than other children.

CD With and Without ADHD

CD boys with ADHD have a worse outcome than CD boys without ADHD (Hinshaw, 1994; Satterfield and Schell, 1997). Indeed, several authors have concluded that there are at least 2 important subtypes of ADHD children: those with and without CD (Jensen et al., 1997; Satterfield and Schell, 1997). The distinction may be important, because longitudinal research indicates that the presence of ADHD is predictive of an early onset of CD in clinic-referred boys (Loeber et al., 1995). The most consistent finding across studies is that youths with ADHD and comorbid CD (or antisocial behavior defined in other ways) have an earlier age of onset of DBD symptoms than youths with CD alone (Moffitt, 1990).

There has been very little investigation of ODD comorbid with ADHD (but see Campbell, 1991). However, it seems plausible that the presence of ADHD among children with ODD is a marker for the early onset of CD symptoms.

Early APD Symptoms

The most serious outcomes of DBD are APD and psychopathy. Psychopathy includes one dimension of the personality traits egocentricity, callousness, and manipulateness. The second dimension is more similar to APD, encompassing impulsivity, irresponsibility, and antisocial behavior (Hare et al., 1991). Under *DSM-IV* rules, APD cannot be diagnosed until age 18 (American Psychiatric Association, 1994), but some symptoms of APD may be present in a subgroup of DBD youths at a younger age. The early presence of such symptoms may identify those youths with CD who eventually qualify for APD (Frick, 1998). Christian et al. (1997) found that referred CD children who showed callous and unemotional symptoms and conduct problems, compared with those with conduct problems only, displayed a higher variety of conduct problems and more police contacts. Loeber et al. (in press) scored boys on psychopathic characteristics and found that between ages 7 and 12, 69.1% of boys with CD already displayed 3 or more "APD" symptoms, compared with 38.5% of the boys without CD. Lynam (1997) reported that childhood psychopathy predicted serious, stable antisocial behavior in adolescence over and above other known predictors. Although a subclassification of boys with CD on the basis of APD symptoms appears plausible, it remains to be seen how such classification relates to others mentioned previously (although it is likely that they overlap with early-onset CD cases) and what its predictive utility is.

In summary, aside from onset and severity as mentioned in *DSM-IV*, factors of age- and gender-atypicality, overt versus covert disruptive behavior, the nature of any aggression, and the presence of early APD or psychopathy-related symptoms all appear to be of prognostic importance and, therefore, of relevance for practitioners and researchers.

ASSESSMENT

Knowledge about the prevalence and course of DBD is only as good as the available methods of assessment. Readers are referred to reviews of the assessment of DBD in juveniles by Frick and O'Brien (1995), Dishion and colleagues (1995), and Hinshaw and Zupan (1997), and to a special section of the *Journal of the American Academy of Child and Adolescent Psychiatry* (McClellan and Werry, 2000).

Issues Regarding Diagnostic Criteria

The assessment of DBD has been complicated by shifts in criteria across different versions of *DSM*. Lahey and colleagues (1997) demonstrated that impairment is greater for CD compared with ODD in terms of school suspensions and police contacts. Angold and Costello (1996a) proposed that the criteria for ODD should be only 2 or 3 symptoms plus impairment. They showed that the 6-month duration criterion made no difference at all, because symptoms tended to be longstanding.

Subsequent to critiques such as that of Wakefield (1992) regarding the dangers of confusing disorders with nondysfunctional reactions to environmental conditions, *DSM-IV* prescribes that the diagnosis of CD should not be made when behaviors are in reaction to their immediate social context, such as living in a high-crime area. Yet the difficulty of discriminating between internal dysfunction and reaction to social context remains; thus research in this area is badly needed.

Methods of Assessment

Advances have taken place in the development of standardized diagnostic interviews, including the NIMH Diagnostic Interview Schedule for Children Version IV (Shaffer et al., 1996), the Child and Adolescent Psychiatric Assessment (Angold and Costello, 2000), the Schedule for Affective Disorders and Schizophrenia for School-Age Children (Ambrosini, 2000), and the Diagnostic Interview for Children and Adolescents (Reich, 2000), but comparative studies remain to be done. Furthermore, procedures have been developed to obtain diagnostic information from teachers (Lahey et al., 1995). Since interviews are time-consuming and costly, several studies have examined rating scales as alternatives to psychiatric interviews in order to assess ODD and CD (see e.g., Grayson and Carlson, 1991; Verhulst and van der Ende, 1991).

The initial data on the psychometric properties of instruments for the assessment of children using pictorial items, such as the Pictorial Instrument for Children and Adolescents-III-R (Ernst et al., 2000) and the Dominic-R (Valla et al., 2000) are generally good. Additional investigation of these measures is needed to validate fully their reliability and validity.

Some advance has been made to expand assessment of DBD for preschool children (National Center for Clinical Infant Programs, 1994). However, assessments

in that age period require more distinction between age-normative and age-atypical disruptive behavior than can be empirically supported at present. Prognostic studies of such assessments for this age period are much needed.

Informants

The correlation between different informants on DBD is low, but different informants contribute different strengths. Loeber and colleagues found that, on average, parents and teachers, compared with boys, reported a higher prevalence of ODD (Angold and Costello, 1996a; Loeber et al., 1989). However, Angold and Costello (1996a) found that child information was very useful, particularly to establish impairment criteria, and was better for predicting CD a year later.

Children are essential informants regarding CD because their covert acts are not always noticed by adults. It is not clear how best to combine information from different informants, such as the child, parent, and teacher (Bird et al., 1992; Piacentini et al., 1992). Farrington et al. (1996) found that parent and teacher reports of delinquent activity added to the predictive utility of boys' self-reports of such behavior. Hart et al. (1994) reported that teachers alone, and in combination with reports from parents and children, showed the strongest association with impairment criteria for ODD.

Age of Onset

The subclassification of CD in *DSM-IV* according to age of onset of symptoms requires a retrospective assessment of how early symptoms first appeared. Angold et al. (1996) has raised concerns about the relatively low precision of parent and child reports of age of onset of disruptive behavior problems; prospective studies are needed to properly address this issue. However, it is noteworthy that the correlation between different informants' recall of the relative ordering of symptoms was generally high (Angold et al., 1996; Loeber et al., 1993b).

EPIDEMIOLOGY

During the past 10 years, efforts to understand variations in the prevalence of ODD and CD according to age, gender, socioeconomic status, neighborhood, and degree of urbanicity have begun (Lahey et al., 1999a). Knowledge of these variations is important both for understanding the nature of these disorders and for the planning and administration of mental and public health services. Table 2 summarizes prevalence data

from several population-based studies (excluding studies based on teacher ratings alone). Prevalence is influenced by whether *DSM-III-R* or *DSM-IV* criteria were used, the measurement instrument, the time window considered, the location of the study sample, the number of informants, and whether impairment was part of the diagnostic algorithm (Lahey et al., 1999a). Even minor changes in diagnostic criteria can produce large differences in prevalence. A comparison of *DSM-III* and *DSM-III-R* diagnoses on the same sample showed that between *DSM-III* and *DSM-III-R* ODD became 25% less prevalent and CD became 44% less prevalent (Boyle et al., 1996; Lahey et al., 1990). Furthermore, Costello and Angold (unpublished data, 1998) showed that the prevalence of *DSM-IV* CD was slightly lower than that of *DSM-III-R* CD. This was not true of ODD (Costello and Angold, unpublished data, 1998).

Prevalence by Age

Table 2 shows that no firm conclusion can be reached regarding the prevalence of ODD or CD as a function of age. Some studies suggest that the prevalence of CD tends to increase from middle childhood to adolescence (Lahey et al., in press-b; Loeber et al., 1998a), but other studies found either no age differences or age-related decreases in the prevalence of CD (Cohen et al., 1993b; Lewinsohn et al., 1993). This lack of consistent findings regarding age and CD reflects methodological limitations, but it may also be a result of the heterogeneity of CD behaviors. Since several CD symptoms are also delinquent symptoms (Farrington, 1999), juvenile delinquency studies are an additional source for age effects. There is a consensus among delinquency studies of both official and self-report data, showing an increase from childhood through adolescence in the prevalence of nonaggressive CD behaviors (Achenbach et al., 1991; Stanger et al., 1997), including acts such as serious theft, breaking-and-entering, and fraud (e.g., Loeber and Farrington, 1998; Loeber et al., 1998a). Other studies show that the prevalence of covert conduct problems increases from childhood through adolescence (Loeber and Stouthamer-Loeber, 1998). In contrast, the prevalence of certain forms of aggression (such as physical fighting) has been shown to decrease during the same period (Lahey et al., 1998; Loeber and Hay, 1997; Loeber et al., 1991). However, the prevalence of serious forms of aggression, such as robbery, rape, and attempted or completed homicide, tends to increase during adolescence

TABLE 2
Prevalence of ODD and CD in Community Studies

Key Reference and Setting	Population Base	Informant (Time Window)	Diagnostic Instrument	DSM (Impairment, I)	Age (yr)	Prevalence			
						Boys		Girls	
						ODD	CD	ODD	CD
Cohen et al. (1993b); upper New York State	975	C, P	DISC	III-R (I)	10-13	14.2	16.0	10.4	3.8
					14-16	15.4	15.8	15.6	9.2
					17-21	12.2	9.5	12.5	7.1
Loeber et al. (1998a); Pittsburgh	1,517	C, P	DISC	III-R	7	2.2	5.6		
					11	4.8	5.4		
					13	5.0	8.3		
Kashani et al. (1987); Columbia, MO	150	C, P	DICA	III-R (I)	14-16		9.3		8.0
Feehan et al. (1994); Dunedin, New Zealand	930	C	DISC	III III-R (I)	11	3.6	2.6	2.1	0.8
					18			8.8 ^a	2.1 ^a
Offord et al. (1987); Ontario, Canada	2,674	C (aged 12-16), P	Ratings	III	4-11		6.5		1.8
					12-16		10.4		4.1
Costello and Angold (unpublished, 1998); Smoky Mountains, NC	4,500	C, P	CAPA	III-R IV	9-15	2.1	4.8 ^b	1.5	1.2 ^b
						4.5	3.9	2.5	1.3
Fergusson et al. (1993); Christchurch, New Zealand	965	P C	Ratings	III-R	15		1.8		3.3
							5.1		1.8

Note: ODD = oppositional defiant disorder; CD = conduct disorder; C = child; P = parent; DISC = Diagnostic Interview Schedule for Children; DICA = Diagnostic Interview for Children and Adolescents; CAPA = Child and Adolescent Psychiatric Assessment.

^a Prevalence estimated from paper.

^b Three-month prevalence over 4 waves of data.

(Loeber and Farrington, 1998). Knowledge of these apparently complex developmental trends is important to gauge age-atypical manifestations, such as boys who do not outgrow physical fighting or who start serious covert acts at a precocious age, but much remains to be learned.

Prevalence by Gender

It seems clear that boys, compared with girls, are more likely to meet criteria for *DSM* definitions of CD and to exhibit a higher frequency of CD symptoms (Lahey et al., 1999a). Several studies have found odds of CD that were 3 to 4 times as high for boys as girls across different ages (Costello and Angold, unpublished data, 1998; Lahey et al., in press-b).

Table 2 shows that, contrary to popular notions, ODD and CD are relatively common mental health diagnoses in girls, especially in clinical settings (Zoccolillo, 1993). CD in girls is associated with several serious and undesirable outcomes (Bardone et al., 1996), such as APD (Robins

et al., 1991) and early pregnancy (Kovacs et al., 1994; Zoccolillo and Rogers, 1991). Girls with CD are likely to find antisocial partners (Krueger et al., 1998; Robins et al., 1991), which may increase the risk for DBD among the offspring of girls with CD. Although adult criminal records indicate that women have lower rates of delinquency than men (Wikström, 1990) and are less frequently arrested for violent crime, women are frequently arrested for nonaggressive, covert forms of delinquency, such as shoplifting and fraud (Ogle et al., 1995).

There is emerging evidence that sex differences in disruptive behavior do not emerge until after age 6, when more boys than girls show overt forms of disruptive behavior (Keenan and Shaw, 1997; Loeber and Hay, 1997; Webster-Stratton, 1996). As shown in Table 2, data on gender differences in the prevalence of ODD during middle childhood and adolescence are inconsistent, but most suggest either slightly higher rates in boys or no sex difference. Because understanding whether sex differences change across age is essential to understanding

the development of CD in both boys and girls, more research is needed on this fundamental issue. One study suggested that the magnitude of the sex ratio increases with age (Lahey et al., in press-b), but other studies suggest that the sex difference is smaller during adolescence than childhood (Cohen et al., 1993b). In particular, good data on the prevalence rates of ODD in general populations during the preschool period are not available.

Prevalence by Socioeconomic Status

Both ODD and CD are more prevalent among youths from families of low socioeconomic status (Lahey et al., 1999a). CD and delinquency are more common in neighborhoods characterized by high crime rates and social disorganization (Lahey et al., 1999a; Loeber and Farrington, 1998; Sampson et al., 1997).

Not shown in Table 2 are studies on special populations that may be underserved. A survey of children from low-income families shows that 8% had *DSM-III-R* ODD and 4.6% had CD (this includes impairment criteria) (Keenan et al., 1997). Prevalence rates of CD are probably highest in the worst of inner-city neighborhoods. Loeber and colleagues (1998a) argue that delinquency (and, thus, conduct problems) is especially concentrated in the worst neighborhoods. However, prevalence rates of DBD in the disadvantaged neighborhoods compared with advantaged inner-city neighborhoods have not been sufficiently documented, and current evidence on possible differences in the prevalence of ODD and CD in rural and urban environments is decidedly mixed (Lahey et al., 1999a). Early-onset CD, often associated with a poor prognosis, may be concentrated in urban areas, however (see below).

Prevalence Over Time

Is the prevalence of DBD higher now than in the past? Robins (1986) reported a higher prevalence of retrospectively reported child and adolescent CD in younger compared with older adult generations. Because older adults must recall their child and adolescent misbehavior over a longer span of time than younger adults, such differences in prevalence may reflect systematically biased recall rather than true generational differences. Other sources further support the hypothesis of generational increases in externalizing behavior (Loeber and Farrington, 1998; Rutter and Smith, 1995). Although they may be on the decline again, official arrest records show a substantial increase in rates of arrests of juveniles for violent crimes

from 1984 to 1994, with no increase in arrests for property crimes (Snyder and Sickmund, 1995). Because arrest rate statistics can reflect changes in how violent juveniles are treated by law enforcement, these statistics are not unequivocal in meaning. In addition, a national monitoring study of high school students found inconsistent evidence regarding generational changes in violence over time (Maguire and Pastore, 1996). There is some indication that sex differences in delinquency have narrowed in recent years, with an increase in the prevalence of girls' delinquency (Farrington, 1987; Fréchette and Le Blanc, 1987; Robins, 1986) and an emergence of girl gangs (Bjerregaard and Smith, 1993).

COMORBIDITY AND DEVELOPMENTAL CHANGES IN COMORBIDITY

The importance of studying target disorders in the context of comorbid disorders has been highlighted in several reviews (Angold et al., 1999; Caron and Rutter, 1991; Loeber and Keenan, 1994; Nettleman and Jensen, 1995). The emergence of comorbid conditions may indicate different levels of seriousness of disorder, with some comorbid conditions resulting in higher degrees of impairment than single conditions (e.g., Paternite et al., 1995). Risk assessment is still in an embryonic state regarding the identification of those disruptive youths most prone to develop impairing comorbid conditions.

The intent of this section is to address *DSM* diagnoses that are commonly found to be comorbid with ODD and CD. In addition, we will review several serious conditions that do not formally meet criteria for any *DSM* diagnosis, yet frequently co-occur with ODD or CD. Examples are substance use and mood problems in childhood or adolescence, periods of development during which relatively fewer children qualify for the diagnosis of substance abuse or dependence or mood disorder.

Perhaps because of the tendency for other disorders to appear later in development, or perhaps because many studies have combined ODD and CD (Angold et al., 1999), few studies provide evidence of comorbid disorders associated with ODD. One exception is that of Angold and Costello (1996b), which reported relatively low levels of comorbid conditions in ODD cases from a community sample, such as 14% ADHD, 14% anxiety disorder, and 9% depressive disorder.

Ample evidence indicates that CD, however, is associated with increased risk for other disorders during childhood and adolescence. At 4-year follow-up, children in

the Ontario Child Health Study (Offord et al., 1992) with CD at time 1 had increased rates of other psychiatric disorders at follow-up compared with children with no disorder: 46% versus 13%, respectively, had one or more disorders. Specifically, 35% with CD at time 1 had hyperactivity at follow-up versus 3% of those with no disorder, and 29% versus 8%, respectively, had an emotional disorder. Data from the Dunedin study show that at age 18 the probability of another disorder given CD was higher than the probability of CD given another disorder (deduced from Feehan et al., 1994). Several disorders have been suggested to be associated with CD, including APD, substance abuse, mania, schizophrenia, and obsessive-compulsive disorder (Robins et al., 1991). ADHD is a common comorbid condition of CD in boys, a combination that is associated with increased risk for anxiety and depression (Anderson et al., 1989; Loeber et al., 1998a).

Childhood ADHD

The role played by childhood ADHD in the development of CD is a controversial topic that needs further study, complicated by the multidimensional nature of the symptoms that constitute ADHD. Several comprehensive reviews on the topic exist, such as those by Hinshaw (1994), Jensen et al. (1997), Loeber and Keenan (1994), and Lahey et al. (in press-a). Longitudinal studies agree that children with ADHD exhibit increased levels of antisocial behavior during adolescence and adulthood (af Klinteberg, 1997). However, in these studies, it is not possible to determine whether ADHD is a precursor to later antisocial behavior, as no attempt was made to exclude children with comorbid ADHD *and* CD during childhood.

Two prospective studies of the role of ADHD in the development of CD which did attempt to exclude boys with CD at the initial assessment were conducted by Gittelman and colleagues (Gittelman et al., 1985; Mannuzza et al., 1991). In these separate studies, children with ADHD were significantly more likely to meet criteria for either CD or APD after age 16 than children without ADHD (27% versus 8%, respectively, in the first study; 32% versus 8% in the second). In a follow-up of the first study, at an average of 26 years of age, boys were significantly more likely to meet criteria for APD if they had childhood ADHD than if they did not (18% versus 2%) (Mannuzza et al., 1993). While these findings suggest that ADHD alone may be a precursor

to CD and to APD, unfortunately ODD during childhood was not measured in these studies. Therefore, the authors could not evaluate the alternative hypothesis that ODD rather than ADHD was associated with boys' onset of CD, and eventually APD. An additional complication is that these studies were initiated prior to *DSM-III* and used a definition of ADHD that differed considerably from current definitions.

In contrast, a number of prospective studies have found that youths with ADHD alone had no higher rates of antisocial behavior in adulthood than children with neither ADHD nor CD (Farrington et al., 1990; Lahey et al., in press-a; Magnusson and Bergman, 1990). Biederman et al. (1996) found that ADHD was a very weak predictor of new onset of CD, in the absence of ODD (initial assessment and follow-up 4 years later). The findings of Satterfield and Schell (1997) suggest that the association between childhood hyperactivity and adult criminality is almost always mediated by the presence of childhood conduct problems. Loeber and colleagues (1995) reported that the presence of ADHD did not distinguish between boys with and without CD over a subsequent 5-year period. They did find, however, that ADHD was associated with an earlier onset of CD in those boys who did develop CD.

A model describing one theory of the relationships between ADHD, ODD, and CD has been developed by Lahey and Loeber (Lahey and Loeber, 1994; Lahey et al., 1997, 1999b). This model hypothesizes that only children with ADHD who also exhibited comorbid ODD will develop CD in childhood, with a subset of the children with CD later developing APD. Thus, there is a heterotypic developmental continuity (changing manifestations of the same disorder) in ODD, CD, and APD, with ADHD influencing the developmental progression from less serious to more serious manifestations of CD.

On this latter point, the literature is generally consistent: ADHD is found to influence the development, course, and severity of CD. Youths with CD (or conduct problems defined in other ways) and comorbid ADHD have a much earlier age of onset of disruptive behavior than youths with CD alone (Moffitt, 1990).

In addition, a number of studies suggest that CD is more severe and persistent when children also exhibit ADHD (Abikoff and Klein, 1992; Cantwell and Baker, 1992; Farrington et al., 1990; Magnusson, 1988; Magnusson and Bergman, 1990). Satterfield and Schell (1997) found that, in hyperactive boys, only one conduct prob-

lem was necessary to predict serious antisocial behavior in adolescence and adulthood. Unfortunately, none of these studies used definitions of CD and ADHD that were similar to *DSM-III-R* or *DSM-IV* definitions. In their review, Jensen and colleagues (1997) concluded that the evidence regarding the severity and persistence of CD and ADHD is supportive of a synergistic, interactive relationship between the disorders. Hinshaw et al. (1993), in reviewing the literature, concluded that, compared with other children with CD, children with CD and comorbid ADHD (1) have an earlier age of onset of CD and (2) exhibit more physical aggression and more persistent CD.

Other investigators have considered the impact of the individual dimensions of ADHD (hyperactivity, impulsivity, and inattention) on the relationship between CD and comorbid ADHD. Babinski et al. (1999), using *DSM-IV* criteria, found that hyperactivity-impulsivity, but not inattention, contributed to the risk for criminal involvement over and above the risk associated with early conduct problems. Magnusson (1988) found that the combination of aggressiveness and motor restlessness at age 13 was a stronger antecedent of adult criminality than aggressiveness only or motor restlessness only.

Anxiety

There is a growing body of literature that suggests that the interplay of CD and anxiety disorders is important and complex. On the one hand, early epidemiological studies indicate that prepubertal children with anxiety disorders who do not have CD are at a *reduced* risk for later conduct problems in adolescence. On the other hand, a substantial body of evidence suggests that CD and anxiety disorders are comorbid at *substantially higher than chance rates* during childhood and adolescence (Loeber and Keenan, 1994; Zoccolillo, 1992). Paradoxically, then, childhood anxiety disorders seem to protect against future antisocial behavior when they occur alone, but youths who do develop CD are at increased risk for comorbid anxiety disorder.

It is important to distinguish between behavioral inhibition (such as anxiety and shyness) and social withdrawal with regard to delinquency. Kerr et al. (1997), in a longitudinal study of a sample of 10- to 12-year-olds followed up at ages 13 and 15, showed that inhibition, but not withdrawal, served as a protective factor negatively predicting delinquency (OR = 0.16). In contrast, withdrawal was a risk factor positively predicting delinquency. Boys who were both disruptive and withdrawn had a 3-

fold risk of becoming delinquent and depressed. Boys who were disruptive but not withdrawn had 2½ times risk of becoming delinquent. While anxiety-generated shyness and social withdrawal appear behaviorally similar, their implications for later conduct problems may be dramatically different. Sensitivity to the distinctions between the two in the assessment and treatment of children is warranted, and much more research is needed on this topic.

Mood Disorders

CD and depressive symptoms often co-occur; studies of their temporal relationship, however, have produced inconsistent results (Capaldi, 1992). It is possible that CD is a precursor to depression in some children (Capaldi, 1992), but it may prove to be more of a concomitant disorder than a precursor. Lewinsohn et al. (1994), in a community study, found that the odds of DBD in those with a history of depression was 2.9, but that DBD did not predict depression. In addition, a review by Angold and Costello (1993) indicates that a much higher proportion of depressed youths also have ODD/CD compared with those youths with ODD/CD who also qualify for depression.

Second, the course of both CD and depression may be different when they co-occur; indeed, a diagnostic category of "depressive conduct disorder" has been proposed (Puig-Antich et al., 1989). It has also been suggested that some proportion of late-onset nonaggressive CD is actually secondary to depression and distinct from other CD (Masten, 1988). Zoccolillo (1992), in his review of literature on the topic, highlights some of the benefits of maintaining separate diagnoses of CD and comorbid mood or anxiety disorders, which include making use of the different predictive value of CD regardless of other coexisting disorders and the utility of providing treatment specific to emotional disorders, even in the context of comorbid conditions such as CD.

The high rate of comorbidity of depression with CD is of special concern because the joint presence of these disorders appears to increase the risk for serious outcomes such as substance abuse (Buydens-Branchey et al., 1989) and suicide (Shaffer, 1974; Shaffi et al., 1985). Therefore, understanding the relation between CD and depression will be an important step toward the prevention of serious and life-threatening psychiatric conditions.

Some investigators have examined the relationship between CD and bipolar disorder (Carlson and Kashani, 1988; Kutcher et al., 1989). One critical question is the

extent to which adolescents with CD may experience cycles of elated, expansive, and depressed moods. It is possible that especially during elated, expansive moods, the commission of delinquent acts and the escalation of crime severity is more likely. This would accord with reports that symptoms of bipolar disorder co-occur with ADHD and CD (e.g., Kovacs and Pollock, 1995; Lewinsohn et al., 1995). Carlson (1995), however, has advocated being cautious in interpreting mood changes in adolescents as symptoms of bipolar disorder.

In summary, many adolescents qualify for a diagnosis of CD and mood disorder. The developmental sequence between the two disorders is unclear, however, and on a subthreshold symptom level their comorbidity may already start in preadolescence. Finally, further investigation needs to be conducted regarding the role of elated or manic mood in the etiology of multiproblem disruptive adolescents and in the risk for serious negative outcome.

Somatoform Disorder

There is limited information about the relationship between somatoform disorders and CD, even though the *DSM-IV* (American Psychiatric Association, 1994) identifies CD as a risk for later somatoform disorder. Moreover, the diagnostic criteria for somatoform disorders have changed dramatically over time. Thus more recent data on the relationship between these disorders and CD are needed.

The link between somatization and CD has been primarily shown in studies of APD (Lilienfeld, 1992) and family-genetic studies with adult populations. Only a few studies have been conducted on the association between CD and somatoform disorders in children and adolescents. Achenbach and colleagues (1995) found that a high somatization score in adolescence predicted a high delinquency score in females but not in males.

Substance Use

Several studies have documented a strong association between CD and substance use (Whitmore et al., 1997; Windle, 1990). In the Ontario Child Health Study, CD was the psychiatric disorder most strongly associated with substance use (Boyle and Offord, 1991). Regarding possible directions of influence, much of the literature indicates that the onset of CD precedes or coincides with the onset of substance use disorder (Huizinga et al., 1989; Mannuzza et al., 1991). On the other hand, past studies have shown that an early onset of substance use

predicts later criminality. Thus, it is likely that the relationship between CD and substance use is reciprocal, with each exacerbating the expression of the other (see also Hovens et al., 1994).

Gender and Comorbidity

The effect of gender in the comorbidity between CD and other disorders is significant, and more comprehensive reviews of the topic were conducted by Loeber and Keenan (1994) and Zoccolillo (1992). Robins (1986) concluded from her research that "an increased rate of almost every disorder was found in women with a history of conduct problems" (p. 399), including ADHD, anxiety disorders, mood disorders, and substance use (see also Zoccolillo, 1993).

In our literature review of the comorbidity of CD (Loeber and Keenan, 1994), two themes emerged. One is that comorbid conditions in girls with CD are relatively predictable. For example, given that adolescent girls, compared with boys, are more at risk for anxiety and depression, we can expect an increased risk for such disorders in girls with CD. This agrees with the findings of Robins (1986), who reported that internalizing disorders were common in women who had CD (64%–73%) and occurred twice as frequently as they did in women without CD (see also review by Zoccolillo, 1992). The second is that there appears to be a gender paradox for comorbid conditions, in that the gender with the lowest prevalence of a disorder appears more at risk to develop another, relatively rare comorbid condition than the gender with the higher prevalence of a disorder. Thus, we believe that gender and age are crucial parameters in the development of comorbid conditions with CD. We will now briefly review comorbid disorders of CD in girls.

ADHD is known as a correlate of CD in boys (Loeber et al., 1995), but much less is known about ADHD as a predictor of CD in girls (Hinshaw, 1994; Lahey et al., in press-b). Our review of comorbid disorders in each gender (Loeber and Keenan, 1994) showed a paradoxical effect for girls. Several studies, when comparing observed and expected comorbid conditions, showed that girls with a diagnosis of ADHD have a *higher* likelihood than boys to qualify for a diagnosis of CD, even though the prevalence of both disorders is much lower in girls than in boys (Bird et al., 1993). Other studies, however, have not reported a high rate of co-occurrence between ADHD and CD in girls (Faraone et al., 1991). One way that ADHD

may be associated with CD in girls is that ADHD is a sign of general developmental delays and impairments that also include cognitive deficits and emotional/behavioral regulation problems. Such delays may place these girls at risk for the continued development of disruptive behavior. Another hypothesis is that impulsivity may be one of the more important dimensions in the relation between ADHD and CD. The work of Moffitt and colleagues on impulsivity in boys has clearly shown that impulsivity is a correlate of conduct problems (Caspi et al., 1994; White et al., 1994). Research on impulsivity in girls, however, has not been conducted.

There appears to be a disparity in the risk and outcomes of comorbid CD and depression between the genders. While preadolescent girls have been found to show a similar or slightly lower rate of both dysthymia and major depression than preadolescent boys (Links et al., 1989; Nolen-Hoeksema and Girgus, 1994), there is ample evidence that the discrepancy in prevalence between the sexes increases during adolescence, with higher rates for females (Cohen et al., 1993b; Connelly et al., 1993; Ge et al., 1994; Goodyer and Cooper, 1993; Lewinsohn et al., 1994; McGee et al., 1992; Nottelman and Jensen, 1995).

Given comorbid CD and depression, girls may be more at risk for serious outcomes than boys. Joffe et al. (1988) reported that the relative odds of suicidal behavior (including ideation) for girls with CD was 8.6 compared with 5.6 for boys with CD. Also, Cairns et al. (1988) found that highly aggressive females (aged 14–15 years) had 3 times the observed rate of attempted suicide of males.

Whitmore and colleagues (1997), using a clinic sample, reported that the developmental association between comorbid CD and substance use is different in boys and girls, implying a need for more sensitive assessment and treatment techniques. They observed that CD severity was related to the severity of substance use disorder for boys, but not for girls. Girls with fewer symptoms of CD were still at risk for substance use disorder. In a clinic study, Mezzich et al. (1994) found that experimentation with nonprescription diet pills and nicotine dependence was more common in adolescent girls with CD than in adolescent boys with CD. Also, Fergusson et al. (1994) found marked gender differences with regard to comorbid disorders among adolescents with problem behaviors. While the predominant problems for boys were those relating to antisocial behaviors, girls mostly experienced

problems related to early sexual activity, alcohol abuse, and marijuana use.

The relation between CD and substance use often is aggravated by co-occurring depression. Lewis and Bucholz (1991) found that this trend is particularly true of females with CD. Henry et al. (1993) reported that both conduct problems and depressive symptoms were associated with “self medication” among adolescent females. Along that line, in a large epidemiological study, Windle (1994) reported that a higher percentage of alcohol-abusing females were both depressed and scored high on delinquency compared with alcohol-abusing males (17.8% versus 11.8%), this despite the fact that the prevalence of alcohol abuse in females was about half that in males (8.4% versus 17.3%).

Developmental Sequences Among DBD and Comorbid Conditions

While ODD and CD appear to place children and adolescents at risk for a large number of disorders, there appears to be a modal sequence in the onset of conditions comorbid with DBD. Figure 1 provides a visual depiction of a hypothesized sequence of the development of DBD in males and comorbid conditions that may apply to many youths. ODD may often be a precursor to CD, which is thought to be a precursor to APD. In clinical samples, ADHD is a commonly comorbid condition with ODD and CD, but it is hypothesized not to affect the course of CD without prior ODD (Lahey et al., in press-a). Its onset more typically co-occurs early, before the age of 7. Anxiety and depression are less likely in childhood and tend to emerge concurrently and interactively with CD, with anxiety often preceding depression in onset. Substance abuse tends to develop concurrently and recursively with CD (see review by Le Blanc and Loeber, 1998). It is likely that the manifestation of APD, particularly the expression of violence, is aggravated by the proximal consumption of substances such as alcohol. These developmental trends may differ between the genders, given findings of differing risk of depression, for example, between girls and boys.

CONCLUSION

Limited space cannot do justice to the complexity of DBD symptoms and syndromes, their course, and outcomes. Although the past 10 years have seen major development in this area, we identified several important issues to be addressed. While it is clear that oppositional

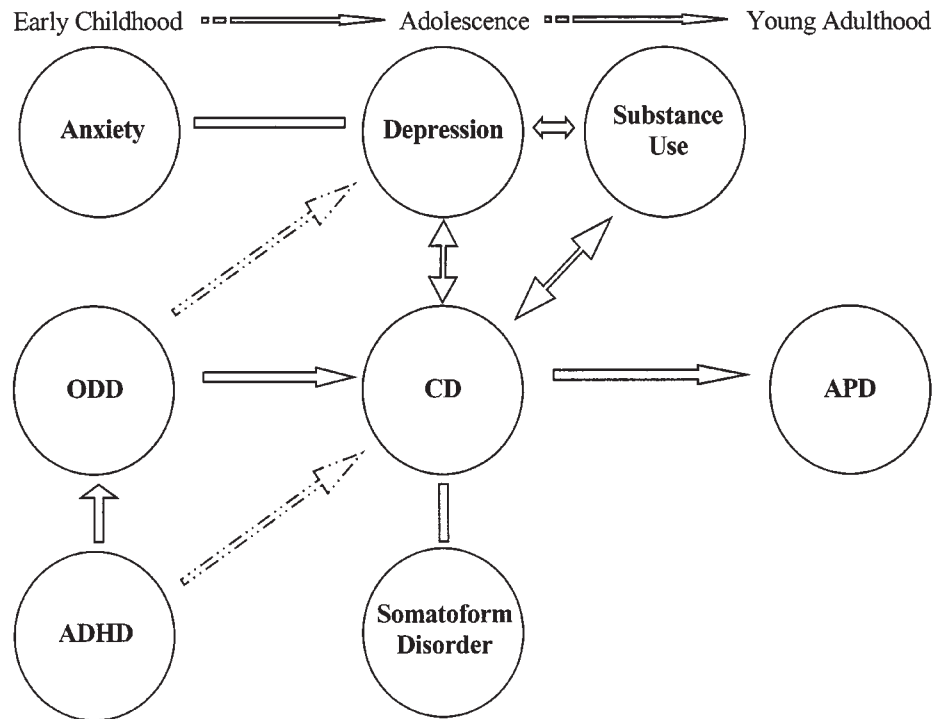


Fig. 1 Developmental sequences between disruptive behavior disorders and comorbid conditions. The dotted arrow indicates a relationship in which attention-deficit/hyperactivity disorder (ADHD) serves to hasten the onset and worsen the severity of conduct disorder (CD), but only in the presence of oppositional defiant disorder (ODD). Lines without arrowheads indicate relationships in which the direction is not clear. Antisocial personality disorder (APD) in young adulthood is a primary likely outcome of the disruptive behavior disorders pathway but was not expressly reviewed here.

behavior and covert delinquent behavior are distinct syndromes, it is not yet clear whether aggression should be considered to be (1) part of ODD, (2) part of CD (aggressive and covert CD behaviors), or (3) distinct from both ODD and covert CD. Modifications to the diagnostic criteria have altered the assessment and prevalence rates of DBD but have improved the utility of the diagnoses as well. Several factors distinguish subgroups with differing prognoses, including age of onset, gender, and aggression. Gender differences are also evident in the expression and implication of symptoms but have been the subject of too little empirical investigation. The prevalence of DBD may vary across age, generation, gender, urbanicity, and socioeconomic levels, but surprisingly we still have much to learn about these fundamental points. ODD, CD, and later APD may be hierarchically and developmentally related. Broad pathways between the disorders as well as more specific symptomatic and conceptual pathways have been tentatively identified and appear to have demonstrated utility. Several other psychi-

atric diagnoses have been found to co-occur with ODD and CD. However, further investigation to better elucidate the clinical and prognostic implications of these comorbid conditions remains to be conducted. Part II of this review will examine child risk factors, biological processes, psychosocial risks and protective factors, interventions, and research recommendations.

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