Comorbid Axis I and Axis II Disorders in Early Adolescence
Outcomes 20 Years Later

Thomas N. Crawford, PhD; Patricia Cohen, PhD; Michael B. First, MD; Andrew E. Skodol, MD; Jeffrey G. Johnson, PhD; Stephanie Kasen, PhD

Context: Although Axis II personality disorders in adolescence have been linked to psychopathology and psychosocial impairment in early adulthood, little is known about their effects over longer periods.

Objectives: To evaluate and compare long-term prognoses of adolescent personality disorders and co-occurring Axis I disorders.


Setting: Upstate New York.

Participants: A community sample of 629 adolescents interviewed at a mean age of 13.8 years and again at a mean age of 33.2 years.

Main Outcome Measures: Clinically assessed psychiatric disorders and self-reported attainment and function.

Results: Axis I (mood, anxiety, disruptive behavior, and substance use disorders) and Axis II disorders in adolescence showed risks for negative prognoses lasting 20 years. Co-occurring Axis I and Axis II disorders consistently presented the highest risk, often approximating the sum of the axis-associated risk or even several times the risk of disorders in either axis alone.

Conclusions: Long-term prognoses of Axis I and Axis II disorders are of comparable magnitude and often additive when comorbid. These findings are highly relevant to the current debate over how personality disorders should be handled in DSM-V.

Arch Gen Psychiatry. 2008;65(6):641-648

In recent decades, it has become clear that many psychiatric disorders, perhaps even most, have onsets in adolescence or even earlier in childhood. Long-term risks associated with early anxiety, mood, disruptive behavior, and substance use disorders are now clearly recognized. However, longitudinal studies of childhood and adolescent psychopathology often focus on single disorders in severely impaired children from clinical samples. This limitation is compounded whenever research fails to consider co-occurring psychiatric disorders that are common in children and adults. When co-occurring disorders are not controlled, findings attributed to 1 disorder may be influenced by other disorders that were present but not considered.

When comorbid disorders are assessed, researchers often investigate Axis I disturbances like conduct disorder, major depression, and 1 or more of the anxiety disorders. However, Axis I disorders may not cover all of the syndromes that signal worse prognoses. Long-term dysfunction may also be linked to personality disorders (PDs), which are now increasingly recognized as clinically significant disturbances in adolescents. The DSM-IV-TR characterizes PDs as enduring patterns of inner experiences and behaviors that are inflexible and pervasive across personal and social situations that also deviate markedly from cultural expectations. Personality disorders may manifest in persistent disturbances in cognition, affect, interpersonal functioning, and impulse control. The DSM records PDs on Axis II to highlight the importance of assessing and treating these disorders. Although mental retardation is also recorded on Axis II, any mention of Axis II disorders herein will refer only to PDs. Just as many Axis I disorders have their first onsets in adolescence or childhood, there is evidence that clinically significant PDs emerge earlier in adolescence than previously thought. Adolescent PDs are associated with significant impairment and distress and high rates of ag-
Adolescent PDs frequently co-occur with Axis I disorders and identify young people at risk for psychiatric disorders and psychosocial impairment in early adulthood. Based on these and other findings, a research agenda prepared for DSM-IV emphasizes the need for a better understanding of the developmental origins of PDs. Although placement of PDs on Axis II was intended to encourage greater attention to their clinical significance, their separation from Axis I disorders may paradoxically cause them to be overlooked at times. Early epidemiological studies, including the Epidemiological Catchment Area Study and National Comorbidity Survey, largely ignored PDs, as have most longitudinal epidemiological studies that began in the participants’ childhood. Researchers conducting these studies may have ignored PDs based on common (but then untested) assumptions that PD symptoms were not stable before late adolescence or early adulthood. Partly for these reasons, diagnostic assessments by structured clinical interviews were developed for PDs well after comparable measures existed for Axis I disorders. Current instruments for assessing PDs in children or adolescents are limited in number and their coverage of Axis II pathology is often incomplete.

At present, the Children in the Community Study is the only general population-based longitudinal study that has assessed PDs before late adolescence. Data from this randomly selected community sample provide estimates of the prevalence and confounding effects of co-occurring disorders, which are not inflated by ascertainment bias that characterizes clinical samples. Comorbidity in clinical settings tends to be elevated because the presence of each separate disorder increases the likelihood of treatment seeking. The Children in the Community Study has shown that adolescent PDs increase risk for psychopathology on both axes in early adulthood. Moreover, PDs in early adulthood have been shown to increase risk for Axis I disorders 11 years later and to have a serious negative effect on subsequent quality of life. This stability across consecutive assessments led us to investigate the long-term prognosis of independent and comorbid adolescent personality and Axis I disorders.

**METHODS**

**SAMPLE AND PROCEDURE**

Data include those for 629 adolescents (53.7% female) from the Children in the Community Study, an ongoing investigation of a randomly selected sample of mothers and 1 randomly sampled child born between 1964 and 1974 who were drawn from eligible households in 2 upstate New York counties. This population was selected because it was reasonably representative of the United States in 1973 on socioeconomic factors and residence in urban, suburban, and rural settings. Using data supplied by both informants, researchers assessed psychiatric disorders and psychosocial functioning in 1983 for 749 youths (mean age, 13.8 years; SD, 2.6 years). The racial distribution (91% white, 8% African American), socioeconomic status (21% with a history of family income below the poverty line, 25% with upper middle-class educational and income background), and residential settings (about 25% living in rural or small-town settings) of the study population were representative of the sampled region.

The most recent follow-up data were supplied at a mean age of 33.2 years (SD, 2.9 years) by 629 participants, thus reflecting 84% retention of the young adults after 20 years. Although men were about 5% less likely than women to participate in each adult follow-up, there was no significant differential sample attrition associated with adolescent or adult psychiatric disorders. Sample attrition was also unrelated to age, race, and socioeconomic status. Study procedures were approved by the institutional review board of Columbia University College of Physicians and Surgeons and the New York State Psychiatric Institute. Written informed consent was obtained from participants aged 18 years or older, and those under that age gave assent. A National Institutes of Health Certificate of Confidentiality covers these data. Additional details about sample recruitment and study methods are available at the study’s Web site (http://www.nyspi.cpcn.columbia.edu/childcom/).

**ADOLESCENT PSYCHIATRIC DISORDERS**

When this sample was assessed in 1983, no instruments existed to measure adolescent PDs. Accordingly, PDs were measured with parent- and youth-reported items that corresponded with Axis II diagnostic criteria in the then-current DSM-III. Items were drawn from the Personality Diagnostic Questionnaire and other personality scales, which were adapted as necessary to make them age appropriate. Following publication of DSM-IV, PD scales were modified to maximize correspondence with updated symptom criteria. Acceptable Cronbach α coefficients for internal consistency were obtained for PD symptoms (for the 3 diagnostic clusters, median Cronbach α = .67; for overall PD symptoms, Cronbach α = .88). Diagnostic algorithms were updated to reflect new diagnostic thresholds. Prior research documents how adolescent PDs assessed with this procedure are associated with impairment and distress, show temporal stability similar to that observed in adults, and predict elevated risk of Axis I disorders and violent or suicidal behavior during early adulthood. Although we have required persistence of symptoms at a second adolescent assessment for PD diagnoses in prior articles, we did not apply this criterion in this investigation of the long-term prognosis of adolescent psychiatric disorders. Instead, we used data from a single assessment that roughly correspond to what clinicians encounter when they evaluate adolescents for diagnosis and make decisions about treatment.

Adolescent Axis I disorders were assessed using the Diagnostic Interview Schedule for Children, version 1, which was administered separately to the child and his or her mother. These interviews were conducted simultaneously in the home by 2 separate interviewers, each blind to information provided by the other respondent. Computer algorithms generated Axis I diagnoses in a 2-step process. In keeping with standard practice, symptoms were scored as present when endorsed by either respondent, and possible diagnoses were assigned when symptoms reached DSM-III-R thresholds. Symptoms and symptom-related severity and impairment were summed to create combined informant scales for each Axis I disorder. These standardized diagnostic-specific scales (Cronbach α = .6 to > .9) were used to discriminate between different levels of diagnostic certainty. Those children meeting diagnostic criteria and scoring at least 1 SD above the sample mean were designated as having probable disorders; those at least 2 SDs above the mean were considered to have definite disorders. Similar combinations of diagnostic criteria and impairment ratings have been employed in other epidemiological investigations of children and adolescents to control for excessively high rates of diagnoses attributable to multiple informants with typical levels of disagreement.
Table 1 summarizes measures at a mean age of 33.2 years that assessed educational attainment (0= no high school degree; 8=postgraduate university degree), occupational status (1=manual labor; 14=professional with doctorate), romantic partner commitment (0=none; 4=long-term commitment and living together), quality of relationship with romantic partner, social support, health, and life satisfaction.41 Multi-item quality of life scales used Likert scales typically ranging from 1 to 4 to assess partner relationship quality (shared activities and positive interactions), social support (stability and intensity of friend and family networks), health, and life satisfaction. Each of these scales show moderate to good internal consistency reliability.32

Clinician-rated Global Assessment of Functioning (GAF) scores were used to assess overall functioning (range, 1-100). Designed for use on Axis V in DSM’s multiaxial diagnoses, GAF scores range from lower to indicate satisfactory mental health and good overall functioning; scores from 51 to 70 signify mild or moderate impairment or distress; and scores below 51 indicate severe impairment. Global Assessment of Functioning scores were assigned by clinicians after administering the structured clinical interviews for psychiatric disorders. Clinicians were blind to the participants’ diagnoses and functioning at younger ages. Most participants in this community sample had adequate overall functioning (mean GAF score, 72.9; SD, 13.4).

Self-reported measures of antisocial behavior and psychotropic experiences were included as scaled measures of dysfunction. The antisocial PD scale used 14 self-report items (Cronbach = .77) adapted from the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II).43-44 Although the SCID-II normally assesses current antisocial PD symptoms in a structured interview, we preferred self-report items based on the expectation that participants in our longitudinal study would be more willing to acknowledge embarrassing or illegal behavior in a self-report questionnaire. Psychotropic experiences were measured with 10 items (Cronbach = .72) that assessed paranoia, delusions, and hallucinations.

Psychiatric disorders at follow-up were assessed with widely used clinical interviews. Trained research clinicians administered SCID-II interviews to diagnose PDs in our sample at a mean age of 33.2 years. In follow-up questions to the SCID-II screening instrument, clinicians determined whether positive responses to individual screen items (here adapted to include “maybe” and “yes” responses to increase sensitivity) actually indicated the presence of PD symptoms. As described, diagnostic criteria for antisocial PD were assessed using self-report items adapted from the SCID-II. To assess conduct disorder symptomology before age 15 years, which are required for a diagnosis of antisocial PD, we used conduct disorder diagnoses recorded in earlier prospective assessments of our sample. Axis I disorders were assessed with the nonpatient version of the Structured Clinical Interview for DSM-IV Axis I Disorders.48 Research has supported the reliability and validity of this interview.46 Because this interview does not fully assess schizotypal experiences, we created a dichotomous variable labeled psychosis to identify participants who endorsed 2 or more types of symptoms (paranoid, delusions, or hallucinations) that were subsequently confirmed by clinicians. Altogether, 9 participants (1.45%) met these criteria for psychosis.

### ADULT OUTCOME MEASURES

### Table 1. Descriptive Characteristics of Attainment Variables at a Mean Age of 33.2 Years in a Community Sample (N=629)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. of Items</th>
<th>Score, Mean (SD)</th>
<th>Rating Scale/Sample Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education attainment</td>
<td>1</td>
<td>4.87 (1.90)</td>
<td>0=Some high school, no general education degree</td>
</tr>
<tr>
<td>Occupational status</td>
<td>1</td>
<td>8.58 (4.39)</td>
<td>8=Graduate degree</td>
</tr>
<tr>
<td>Romantic commitment</td>
<td>1</td>
<td>2.87 (1.44)</td>
<td>0=No steady partner</td>
</tr>
<tr>
<td>Partner relationship quality</td>
<td>7</td>
<td>.88</td>
<td>4=Committed, living together</td>
</tr>
<tr>
<td>Social support</td>
<td>4</td>
<td>.70</td>
<td>0=No steady partner</td>
</tr>
<tr>
<td>Health index (standardized)</td>
<td>8</td>
<td>.71</td>
<td>4=Committed, living together</td>
</tr>
<tr>
<td>Overall life satisfaction</td>
<td>3</td>
<td>.69</td>
<td>0=No steady partner</td>
</tr>
</tbody>
</table>

**STATISTICAL ANALYSIS**

This study focused on 3 groups, summarized in Table 2. The Axis I–only group included adolescents with Axis I disorders but no PDs (n=60, 9.3% of the sample); the Axis II–only group included adolescents with PDs but no Axis I disorders (n=58, 9.2%); and the comorbid axes group included adolescents with co-occurring Axis I and Axis II disorders (n=57, 9.1%).

Axis I disorder subgroups included affective disorder (major depressive disorder, dysthymia, and bipolar disorder), anxiety disorder (overanxious, separation anxiety, and social phobia), disruptive disorder (attention deficit disorder, opposition/defiant disorder, and conduct disorder), and substance use disorder (alcohol dependence and illicit drug abuse). Co-occurring disorders within these subgroups are common and often may reflect a common underlying disturbance. Altogether, 117 adolescents had at least 1 Axis I disorder; 27 had diagnoses in 2 subgroups, and 6 had diagnoses in 3 subgroups. Although other Axis I disorders were assessed, there were no cases meeting full criteria for anorexia, psychiatric disorder, or panic disorder. Bulimia was not included because its criteria have substantially changed since the 1983 assessment.

Adolescent PDs were aggregated into cluster A (paranoid, schizoid, and schizotypal PDs), cluster B (borderline, histrionic, and narcissistic PDs), and cluster C (avoidant, dependent, and obsessive-compulsive PDs) disorders. Antisocial PD was not included because the DSM specifies it cannot be diagnosed before age 18 years. At least 1 PD was diagnosed in 115 adolescents. Within this group, 24 participants had disorders in 2 PD clusters and 3 participants had diagnoses in all 3.
Axis I–only, Axis II–only, and comorbid axes groups were used as independent predictors of adult attainment, well-being, global functioning, antisocial behavior, and psychotic experiences. Scaled outcome variables were standardized to facilitate interpretations of effect sizes and comparison of predictions across analyses. Next, logistic regression was used to determine the risks of categorically defined disorders at a mean age of 33.2 years. The 3 prediction groups each constituted approximately 9% of the sample. Using dummy codes (1=present, 0=absent), these groups were each compared with a reference group of 454 adolescents who did not meet criteria for any psychiatric disorders.

### RESULTS

Table 3 reports standardized mean difference scores that compare adolescents in the 3 diagnostic groups with those without any psychiatric disorders by indicators of attainment and function 20 years later.

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Axis I Only (n=60)</th>
<th>Axis II Only (n=58)</th>
<th>Comorbid Axes (n=57)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult attainment variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education attainment</td>
<td>−0.372&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.403&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.764&lt;sup&gt;c&lt;/sup&gt;</td>
<td>629</td>
</tr>
<tr>
<td>Occupation status</td>
<td>−0.249&lt;sup&gt;d&lt;/sup&gt;</td>
<td>−0.424&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.527&lt;sup&gt;c&lt;/sup&gt;</td>
<td>629</td>
</tr>
<tr>
<td>Romantic commitment</td>
<td>−0.221</td>
<td>−0.432&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.176</td>
<td>629</td>
</tr>
<tr>
<td>Partner quality&lt;sup&gt;e&lt;/sup&gt;</td>
<td>−0.362&lt;sup&gt;f&lt;/sup&gt;</td>
<td>−0.386&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.258</td>
<td>577</td>
</tr>
<tr>
<td>Social support&lt;sup&gt;e&lt;/sup&gt;</td>
<td>−0.241&lt;sup&gt;f&lt;/sup&gt;</td>
<td>−0.307&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.395&lt;sup&gt;b&lt;/sup&gt;</td>
<td>590</td>
</tr>
<tr>
<td>Health status&lt;sup&gt;e&lt;/sup&gt;</td>
<td>−0.181</td>
<td>−0.334&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.515&lt;sup&gt;c&lt;/sup&gt;</td>
<td>568</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>−0.243&lt;sup&gt;e&lt;/sup&gt;</td>
<td>−0.054</td>
<td>−0.364&lt;sup&gt;b&lt;/sup&gt;</td>
<td>625</td>
</tr>
<tr>
<td>Global Assessment of Functioning</td>
<td>−0.377&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.414&lt;sup&gt;b&lt;/sup&gt;</td>
<td>−0.710&lt;sup&gt;c&lt;/sup&gt;</td>
<td>623</td>
</tr>
<tr>
<td>Antisocial behavior</td>
<td>0.302&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0.091</td>
<td>0.701&lt;sup&gt;c&lt;/sup&gt;</td>
<td>624</td>
</tr>
<tr>
<td>Psychotic experiences</td>
<td>0.215</td>
<td>0.267&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0.878&lt;sup&gt;c&lt;/sup&gt;</td>
<td>625</td>
</tr>
</tbody>
</table>

<sup>a</sup> All outcome measures have been standardized to make comparisons between adolescents in diagnostic groups and those with no psychiatric disorder easier to interpret and compare across variables.

<sup>b</sup> P<.01.

<sup>c</sup> P<.001.

<sup>d</sup> P<.1.

<sup>e</sup> Assessed in all participants except a subsample who completed an abbreviated protocol.

<sup>f</sup> P<.05.

Axis I–only, Axis II–only, and comorbid axes groups were used as independent predictors of adult attainment, well-being, global functioning, antisocial behavior, and psychotic experiences. Scaled outcome variables were standardized to facilitate interpretations of effect sizes and comparison of predictions across analyses. Next, logistic regression was used to determine the risks of categorically defined disorders at a mean age of 33.2 years. The 3 prediction groups each constituted approximately 9% of the sample. Using dummy codes (1=present, 0=absent), these groups were each compared with a reference group of 454 adolescents who did not meet criteria for any psychiatric disorders.

Moreover, effect sizes associated with comorbidity were often roughly similar to the sum of the effects in the Axis I– and Axis II–only groups. For example, the effects of Axis I– and Axis II–only groups predicting educational attainment (b=−0.372 and −0.403, respectively) together approximate the effect of the comorbid axes group (b=−0.764). Outcomes associated with comorbidity thus reflected additive effects of Axis I and II disorders.

The same additive pattern is evident in findings for standardized mean differences in health status and GAF scores in Table 3. When unstandardized GAF scores (which are more familiar to clinicians) are used instead, inclusion in the diagnostic groups signaled clear reduction in functioning 20 years later compared with adolescents without diagnoses (mean difference, −5.1 for the Axis I–only group, −5.6 for the Axis II–only group, and −9.6 for the comorbid axes group). Post hoc analyses showed that lower global functioning was significantly
associated with adolescent disorders \( P < .05 \), even when adult Axis I and Axis II disorders at a mean age of 33.2 years were taken into account.

Other post hoc analyses showed that educational attainment mediated the association between adolescent psychiatric disorders and occupational attainment. In other words, adolescent psychopathology was no longer a significant predictor of subsequent occupational attainment once adult educational attainment was taken into account.

Self-reported antisocial behaviors and psychotic experiences in adulthood showed a particularly high level of risk for the comorbid axes group. Effect sizes associated with the comorbid axes group were much larger than those associated with the single axis groups. It should be noted that antisocial behavior in adolescence is recorded on Axis I instead of Axis II, thus explaining why the Axis I–only group predicted this adult outcome and the Axis II–only group did not. It is also worth noting that the comorbid axes group in Table 2 had a significantly higher percentage of disruptive behavior disorder than the Axis I–only group (58% vs 30%), perhaps explaining why the comorbid axes group predicted such a powerful effect.

**Table 4** reports the odds ratios and 95% confidence intervals for each group as predictors of adult psychiatric outcomes. Adolescents in the comorbid axes group had worse prognoses than those without any psychiatric disorders for all 9 outcome variables, including major depressive, bipolar, generalized anxiety, agoraphobia, and substance use disorders in adulthood. There was a 4-fold increase in the risk of schizophrenia spectrum disorders (paranoid, schizoid, and schizotypal PDs) and a much greater risk for psychosis (odds ratio, 36.9; 95% confidence interval, 6.9-197.0). In marked contrast, having only an Axis II disorder did not significantly increase risk for any of these disorders, nor did having only an Axis I disorder, except for schizophrenia spectrum disorders.

### Table 4. Adolescent Psychiatric Disorders and Long-term Risk for Psychiatric Disorders at a Mean Age of 33.2 Years

<table>
<thead>
<tr>
<th>Adult Disorder</th>
<th>Adult Prevalence, %</th>
<th>Axis I Only (n=60)</th>
<th>Axis II Only (n=58)</th>
<th>Comorbid Axes (n=57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major depressive disorder</td>
<td>12.4</td>
<td>1.7 (0.8-3.6)</td>
<td>0.9 (0.4-2.3)</td>
<td>3.5 (1.8-6.7)</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>1.45</td>
<td>NA</td>
<td>NA</td>
<td>13.1 (3.4-50.5)</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>2.73</td>
<td>2.4 (0.5-11.8)</td>
<td>2.1 (0.4-10.5)</td>
<td>7.2 (2.3-22.5)</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>4.33</td>
<td>1.0 (0.2-4.4)</td>
<td>1.1 (0.2-4.9)</td>
<td>4.5 (1.8-11.3)</td>
</tr>
<tr>
<td>Substance use disorder</td>
<td>4.17</td>
<td>1.6 (0.4-5.8)</td>
<td>1.1 (0.2-5.1)</td>
<td>4.4 (1.7-11.4)</td>
</tr>
<tr>
<td>Psychosis</td>
<td>1.45</td>
<td>NA</td>
<td>4.0 (0.3-45.6)</td>
<td>36.9 (6.9-197.0)</td>
</tr>
<tr>
<td>Schizophrenia spectrum personality disorder</td>
<td>5.94</td>
<td>4.1 (1.7-10.1)</td>
<td>1.8 (0.5-5.7)</td>
<td>4.4 (1.8-10.8)</td>
</tr>
<tr>
<td>Any Axis I disorder</td>
<td>18.3</td>
<td>1.4 (0.7-2.7)</td>
<td>1.2 (0.6-2.4)</td>
<td>2.9 (1.5-5.2)</td>
</tr>
<tr>
<td>Any Axis II disorder</td>
<td>15.1</td>
<td>1.7 (0.8-3.5)</td>
<td>1.5 (0.7-3.1)</td>
<td>2.5 (1.3-5.6)</td>
</tr>
</tbody>
</table>

Abbreviation: \( \text{NA} \), not applicable.

\( a \) \( P < .001 \).

\( b \) \( P < .01 \).

When compared with adolescents with no psychiatric disorder, those with co-occurring Axis I and Axis II disorders consistently had worse long-term prognoses for academic, occupational, interpersonal, and psychiatric functioning. Given effects that persisted even after 20 years, these findings call attention to the need for clinicians to evaluate and treat adolescent PDs, especially when they co-occur with Axis I disorders. The risk of long-term dysfunction is much too high to ignore.

Adolescents in the Axis I– and Axis II–only groups had poor outcomes on educational attainment and global functioning 20 years later, and dysfunction was even higher in the comorbid axes group. Associations between adolescent disorders and lower academic attainment were not attributable to sex, age, or adolescent IQ. Academic attainment was closely related to occupational attainment and even mediated the association between early psychopathology and subsequent occupational status in adulthood. When early psychiatric problems interfere with academic functioning, life-long effects may thus follow in other functional domains.

### COMORBID AXIS I AND AXIS II DISORDERS

The risk associated with Axis I and Axis II comorbidity was striking for mental health outcomes. When odds ratios in Table 4 are averaged, adolescents with disorders in both axes had an almost 9-fold increase in risk of subsequent psychiatric disorders. In comparison, the increase in risk for the Axis I– and Axis II–only groups was much lower (mean odds ratios, 2.0 and 1.7, respectively). As indexed by the number of disorders (aggregated into subgroups described previously), the comorbid axes group had more severe psychopathology (mean, 2.91 disorders; SD, 1.0 disorder) than the Axis I– or the Axis II–only groups (mean, 1.2 disorders; SD, 0.4 disorders). As psychiatric disorders increase in number, they may overwhelm a young person’s capacity to cope with increased distress, thus leading to worse functioning and more persistent disorders over time. However, simple aggregations of Axis I and Axis II disorders may not always provide an accurate estimate of severity, especially insofar as it is unclear whether comorbidity across diagnostic axes reflects truly separate forms of psychopathology that co-occur. Comorbidity between social phobia on Axis I and avoidant PD on Axis II, for instance, may
reflect differing degrees of severity of 1 disorder rather than 2 separate disorders.48

AXIS I–ONLY GROUP

Somewhat surprisingly, the Axis I–only group predicted subsequent cluster A PDs, which are often designated as schizophrenia spectrum disorders. When the Axis I–only group was divided into different types of Axis I disorders, disruptive behavior disorders alone predicted schizophrenia spectrum PDs 20 years later. A similar effect was observed in the comorbid axes group, which had more youths with disruptive behavior disorders than the Axis I–only group. It is useful to compare these findings with those from the Dunedin Longitudinal Study,1 which assessed adolescent Axis I disorders in a separate community sample but did not measure co-occurring PDs. Among adults with major psychiatric disorders diagnosed at age 26 years (schizophreniform disorder, major depression, mania, eating disorder, and substance use and antisocial PDs), approximately 20% to 60% had disruptive behavior disorders (conduct and oppositional-defiant disorders) in early adolescence. This robust link between disruptive behavior disorders and subsequent diagnoses parallels the similarly robust association between the comorbid axes group and psychiatric outcomes in the present study. If most adolescents with disruptive behavior disorders in the Dunedin Longitudinal Study also had a co-occurring PD (as they did in the Children in the Community Study), then unmeasured Axis II disorders may have contributed to or even accounted for some of the associations observed between childhood and adult psychiatric disorders.

It is noteworthy that the Axis I–only group did not predict Axis I disorders at follow-up. When Axis I disorders do not co-occur with PDs, they often may be episodic disturbances that alternate with periods of adequate functioning, thus reducing long-term consequences of the disorder. Judging from the adult outcomes, the interpersonal difficulties that are prominent in PDs were less salient in the Axis I–only group, thereby making it easier for adolescents to draw on social support that protects against long-term impairment. Also, some Axis I disturbances may be time limited, especially the disruptive behavior disturbances that increase in adolescence but decline by early adulthood.49,50 Adolescents with life-persistent conduct disorders that emerge earlier in development may be more likely to have co-occurring PDs.

AXIS II–ONLY GROUP

Adolescents in the Axis II–only group had no significant long-term risk for psychiatric disorders 20 years later. This outcome contrasts with earlier findings from our sample, which document how Axis II disorders in adolescence increased risk for PDs in early adulthood.18 Lasting effects of the Axis II–only group may dissipate over the longer interval investigated in the present study. This explanation is consistent with evidence that PDs decline in prevalence throughout adolescence and early adulthood,16,37 probably because of normal maturation and socialization processes.31,32 Nevertheless, the Axis II–only group had significantly worse scores on 8 of 10 measures of adult attainment and functioning 20 years later. These dimensional measures may be more sensitive to ongoing disturbances in adulthood than categorical measures of psychiatric disorders, which may fail to detect ongoing psychiatric symptoms that do not reach full diagnostic criteria at follow-up.

When Axis II disorders co-occurred with Axis I disorders, outcomes in adulthood were clearly worse for adult attainment, functioning, and mental illness. It could be that Axis I and Axis II comorbidity interfered with normal maturation and socialization processes in adolescence. Chronic dysfunctional traits would also limit an adolescent’s ability to make up for lost ground following acute Axis I disturbances. The poor prognosis associated with co-occurring Axis I and Axis II disorders is consistent with the growing literature on comorbidity in general and Axis I and Axis II comorbidity in particular. In a recent meta-analysis, patients with depression who had comorbid PDs had twice the risk of poor outcomes than those without PDs.53 Patients with depression who had co-occurring PDs have been linked to more social and emotional dysfunction49 and higher rates of completed suicides.55 Adolescents depression with comorbid PDs has been associated with a more insidious course over time.56,57

Although we focused here on long-term prognoses of Axis I and Axis II comorbidity, this is not the only form of comorbidity worth studying. For instance, one could distinguish people with PDs in a single diagnostic cluster from those with co-occurring PDs in 2 or more clusters, thus reflecting a more pervasive and severe manifestation of Axis II pathology. When Axis I disorders co-occur with PDs in 2 or more Axis II clusters, the long-term outcomes could be worse than when Axis I disorders co-occur with PDs in a single diagnostic cluster. Other combinations of Axis I and Axis II disorders linked to specific forms of adolescent psychopathology (eg, conduct disorder) may be even more powerful indicators of long-term prognosis. Although it is beyond the scope of this article to explore alternative ways to define comorbidity, additional research is clearly warranted to identify more specific patterns of comorbidity that signal long-term risk.

RELEVANCE TO DSM-V

The DSM-IV-TR currently allows diagnoses of PDs in early adolescence but advises that they should be made with caution. This caveat should be retained in the DSM-V, given evidence that PD symptoms in early adolescence usually decline over time.57 On the whole, however, the long-term prognosis for adolescent PDs is as severe as it is for the Axis I disorders included in this study. Moreover, instability of adolescent PDs is matched if not exceeded by instability in Axis I disorders.58 When adolescent PDs co-occur with Axis I disorders, the long-term prognosis tends to be much worse. Given these considerations, early intervention is indicated for adolescent PDs based on current distress and dysfunction but also by long-term negative prognoses.

A major consideration for DSM-V is whether scaled measures of PDs make more sense than diagnostic measures. It is likely that scaled measures of severity would
be useful for all or almost all disorders in both diagnostic axes. From one reasonable perspective, diagnostic cutoffs indicate a minimum level of severity for which treatment is justified. But treatment is justified when it is likely to ameliorate distressing or disabling symptoms even when they fail to meet full diagnostic criteria, not just in psychiatric disorders but also in physical disorders. Nevertheless, diagnostic cutoffs continue to have utility insofar as they facilitate scientific investigations of treatment, course, risks, public policy, and outcomes.

A second major issue is whether prognostic factors ought to be explicitly considered in the diagnostic system. It may be inappropriate to view PDs as prognostic factors for Axis I disorders when the long-term prognosis of PDs equals or exceeds that of Axis I disorders, that is, in the absence of Axis I and Axis II comorbidity. In other words, Axis II disorders should be recognized in their own right as risk factors for long-term dysfunction and distress. On the other hand, comorbidity may be the most critically important nonenvironmental influence on prognosis. Explicit attention to comorbidity, again including nonpsychiatric physical disorders, should be an important part of clinical training and diagnostic practice, even with adolescent patients.

A third issue is whether PDs should be reclassified as Axis I disorders. Our findings are relatively neutral on this issue. When disorders recorded on the 2 axes had additive effects (eg, for education attainment, life satisfaction, and GAF score), a simple sum of disorders could be scored on a single axis to produce an efficient predictor of distress and dysfunction. However, certain long-term outcomes (eg, antisocial behavior and psychotic experiences) were predicted much better by comorbid disorders on Axis I and Axis II than by disorders on either axis alone or by a simple sum of their additive effects. In this case, the predictive efficiency of cross-axis comorbidity would be lost if DSM-V drops the current distinction between Axis I and Axis II disorders.

**SIGNIFICANCE AND LIMITATIONS**

Using diagnoses based on parent and youth reports, this study provides estimates of the long-term effects of Axis I and Axis II disorders in a community sample of adolescents, which are not inflated by ascertainment bias. Negative effects associated with outcome variables measured 20 years later were assessed with self-reports, clinician ratings, and structured clinical interviews; as such, findings were not limited by single-informant data for both predictor and outcome variables. As in any community sample, there were relatively few cases meeting diagnostic criteria. It is unknown how well these findings will generalize to clinical samples, which tend to have higher rates of co-occurring disorders.

What are the implications for the diagnostic system? These findings provide developmental data on adolescent PDs, which are greatly needed for the DSM-V. Even though adolescent PDs often decline over time, these findings show that early PDs are significant disturbances with long-term consequences. Another clear-cut implication from this study is the prognostic importance of comorbidity. Findings here add to a growing awareness of the need to attend to co-occurring disorders throughout medicine, and comorbid mental disorders should be no exception. Finally, insofar as PDs are often ignored in clinical training and assessments, the DSM-V should emphasize the clinical significance of PDs, including those with adolescent onsets. Based on the findings presented, the DSM-V should also clearly indicate the role PDs play in long-term prognoses.

**Submitted for Publication:** February 8, 2007; final revision received July 17, 2007; accepted August 7, 2007. **Correspondence:** Thomas N. Crawford, PhD, Children in the Community Study, 100 Haven Ave, Ste 31F, New York, NY 10032 (crawfor@pi.cpmc.columbia.edu).

**Financial Disclosure:** None reported.

**Funding/Support:** This work was supported by grants MH36971 and MH60911 from the National Institute of Mental Health.

**REFERENCES**


15. Levy KN, Becker DF, Grilo CM, Mattanah JJF, Garnet KE, Quinlan DM, Edell WS. DSM-V should emphasize...


