# Anxiety and Mood Disorders in Adolescents With Childhood Attention-Deficit/Hyperactivity Disorder

CATHERINE L. BAGWELL, BROOKE S. G. MOLINA, TODD B. KASHDAN, WILLIAM E. PELHAM, JR., AND BETSY HOZA

In this study, the authors examined the association between childhood attention-deficit/hyperactivity disorder (ADHD) and anxiety and mood disorders in adolescence. They compared a group of 142 adolescents ages 13 to 18 years with a history of ADHD in childhood to group of 100 community-recruited adolescents without ADHD. The two groups did not differ in rates of anxiety and mood disorders in adolescence. Within the ADHD group, however, anxiety and mood disorders in adolescence were predicted by childhood externalizing disorder symptoms and social problems but not by childhood internalizing disorder symptoms. The current findings provided little evidence of an overall increased risk for anxiety and mood disorders in adolescents who had childhood ADHD. Children with ADHD who have more severe externalizing symptoms and social problems in childhood may be at elevated risk for certain internalizing disorders.

---

Although much attention has been paid to the comorbidity between attention-deficit/hyperactivity disorder (ADHD) and other disruptive behavior disorders such as oppositional defiant disorder (ODD) or conduct disorder (CD) in childhood, less attention has been given to the association between ADHD and anxiety and mood disorders (see Jensen, Martin, & Cantwell, 1997, for a review). In addition, conflicting evidence exists regarding the degree to which children with ADHD are at risk for developing anxiety and mood disorders after childhood. In the current follow-up study, we examined the risk for anxiety and mood disorders in midadolescence among clinic-referred children diagnosed with ADHD in comparison to a community group of adolescents without ADHD.

## RATES OF ANXIETY AND MOOD DISORDERS IN FOLLOW-UP STUDIES

Rates of anxiety and mood disorders reported in longitudinal studies of children with ADHD vary greatly, as do the ages of participants at follow-up. Most studies have examined these outcomes in late adolescence and early adulthood. A prospective study of two cohorts of children with hyperactivity found that in late adolescence ($M$ = 18.3 and 18.5 years), there were low rates of anxiety disorders (at most, 1% of probands and 2% of controls) and depressive disorders (at most, 3% of probands and 2% of controls) at that age and since the age of 13 (Gittelman, Mannuzza, Shenker, & Bonagura, 1985; Mannuzza, Klein, Bonagura, Malloy, Giampino, & Addalli, 1991). These findings were replicated in young adulthood when probands and controls were in their mid-20s (Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1993; Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1998). Likewise, Claude and Firestone (1995) found no difference in rates of current anxiety disorders (6% for the ADHD group vs. 15% for controls) and mood disorders (8% for the ADHD group vs. 4% for controls) between ADHD and control groups at a mean age of 19.7 years. In addition, no differences were found when rates of disorder since age 13 were considered (25% vs. 29% for mood disorders and 6% vs. 21% for anxiety disorders). In contrast, the most recent findings in this area by Fischer, Barkley, Smallish, and Fletcher (2002) indicated significantly higher lifetime rates of major depression for young adults ($M$ = 20.8 years) who had been diagnosed with ADHD in childhood (26%, vs. 12% for controls). Thus, most follow-up studies into late adolescence and early adulthood have indicated no group differences for these disorders, but some inconsistency in findings remains.

To date, only one follow-up study has examined rates of anxiety and mood disorders in mid-adolescence for youth with a history of ADHD in childhood. Biederman et al. (1996) found that children with ADHD had significantly more lifetime diagnoses of major depression and multiple anxiety disorders in midadolescence ($M$ = 14.4 years) than did the non-ADHD con-

trol group. The rate of lifetime depression was high (45% for probands vs. only 6% for controls), and 35% of probands versus 9% of controls had two or more anxiety disorders. This single set of findings for mid-adolescents, coupled with the inconsistent findings among late adolescents/young adults, suggests a need for continued evaluation of mood and anxiety disorders among children diagnosed with ADHD. It is still unknown whether the widely held notion that children with ADHD are at risk for anxiety and mood problems is accurate. Additional follow-up studies are needed, especially with mid-adolescent samples.

There are several potential explanations for the differences in the findings of the follow-up studies just described. In addition to different ages at follow-up, different eligibility and diagnostic criteria used at the childhood baseline assessment may have resulted in varying sample compositions. Gittelman et al. (1985) and Mannuzza et al. (1991) used criteria from the second edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-II*; American Psychiatric Association, 1968), whereas Biederman et al. (1996) used the ADHD diagnosis from the third edition, revised *DSM* (*DSM-III-R*, American Psychiatric Association, 1987). In addition, the degree to which the ADHD group had comorbid externalizing disorders in childhood likely differed among the samples. For example, Biederman et al. (1996) included children referred for reasons other than ADHD, and the ADHD group had substantial rates of comorbid CD and ODD. In contrast, Gittelman et al. (1985) and Mannuzza et al. (1991) selected their samples based on referrals for hyperactivity and excluded individuals with primarily aggressive behavior, resulting in samples of children with ADHD but almost no comorbid CD.

Variations in the adolescent assessment procedures, such as the particular diagnostic assessment used, may also have contributed to the different results regarding the risk for internalizing disorders. In addition, in the follow-up studies of children with ADHD into adolescence, rates of persistent ADHD varied (e.g., 40%–43% for Gittelman et al. and Mannuzza et al., 85% for Biederman et al.). To the extent that individuals who continue to meet the diagnostic criteria for ADHD in adolescence are expected to experience social, academic, and other challenges that may contribute to internalizing symptoms, these different rates of persistent ADHD may explain inconsistent findings of risk for mood and anxiety disorders.

## Associations Between ADHD and Anxiety and Mood Disorders

Why would ADHD be expected to place children at risk for anxiety and mood disorders? One possibility is that the developmental trajectory from ADHD to subsequent anxiety and mood disorders is a function of persistent impairment in salient life domains. For example, children with ADHD often have pervasive social skill difficulties and face peer rejection that continue into adolescence (e.g., Bagwell, Molina, Pelham, & Hoza, 2001; Hinshaw & Melnick, 1995; Hodgens, Cole, & Boldizar, 2000). In addition, academic difficulties and early school dropout are more frequent among adolescents with childhood ADHD (Barkley, 1998; Weiss & Hechtman, 1993). Failure to attain academic success in elementary school may erode self-efficacy in the domain of academic performance, and difficulties in social relationships may lead to negative affect, such as loneliness and depression (e.g., Boivin, Hymel, & Bukowski, 1995; Hoza, Bukowski, & Beery, 2000). Furthermore, conduct problems in childhood and persistent ADHD may exacerbate distress and impairment (see Tannock, 1994 for a review).

Recent evidence has indicated that the association between ADHD and (a) anxiety disorders or (b) mood disorders in particular may be mediated by ODD/CD (Angold, Costello, & Erkanli, 1999). For example, for boys with ADHD followed into young adulthood, childhood aggression predicted diagnoses of major depression (Paternite, Loney, Salisbury, & Whalen, 1999). In an adult follow-up study, an association between childhood conduct problems, severity of CD in adolescence, and adult antisocial personality disorder (APD) was found (Fischer et al., 2002). In turn, APD predicted an increase in rates of major depressive disorder, suggesting that the association between ADHD and conduct problems may be responsible for links between ADHD and depression and that ADHD *without* conduct problems may not increase the risk for depression. Furthermore, a number of studies have shown that comorbid externalizing disorders (especially CD) predict worse outcomes for children with ADHD, including delinquency, school dropout, and more persistent impairment (e.g., Pfiffner et al., 1999; Satterfield & Schell, 1997).

Thus, children with ADHD who also have serious behavior problems as adolescents may be more likely than individuals without adolescent conduct problems to suffer psychologically due to the negative repercussions of their behavior. If so, the incremental impairment associated with CD and ODD and the comorbidity between externalizing disorders and anxiety and mood disorders in adolescence (e.g., Angold et al., 1999; Youngstrom, Findling, & Calabrese, 2003) suggest a greater likelihood of co-occurring anxiety and depression in children with ADHD who also have additional diagnoses of CD or ODD in adolescence.

In the study on which we report here, we tested whether concurrent ODD or CD in adolescence was associated with the presence of anxiety and mood disorders in the youth with ADHD. Likewise, we hypothesized that adolescents who continued to meet the diagnostic criteria for ADHD in adolescence would have higher rates of anxiety and mood disorders due, at least in part, to associated social, academic, and other impairments of ADHD in adolescence.

In addition to examining adolescent characteristics expected to increase the risk for anxiety and depression (i.e., persistent ADHD and CD or ODD), we considered whether childhood symptoms of internalizing disorders, externalizing disorders (i.e., ODD and CD), or problems with social functioning predicted anxiety and depressive disorders in adoles-

cence for the ADHD group. As discussed previously, aggression and conduct problems in childhood are associated with depression among youth with ADHD. Given the link between childhood peer problems and adolescent internalizing distress (e.g., Burks, Dodge, & Price, 1995; Coie, Terry, Lenox, Lochman, & Hyman, 1995), we expected that social problems in childhood would be an important nonclinical marker of risk for internalizing disorders in the ADHD group.

As a result, the current follow-up study examined three primary questions:

1. Do clinic-referred children diagnosed with ADHD have higher rates of anxiety and mood disorders in adolescence in comparison to a community-recruited group of adolescents without ADHD?
2. Are the subgroups of adolescents with a history of childhood ADHD who have ODD or CD in adolescence or whose ADHD persists into adolescence at an increased risk for anxiety and mood disorders?
3. Do comorbid problems in childhood (i.e., internalizing symptoms, externalizing symptoms, and social functioning problems) predict depression and anxiety in adolescence among youth with ADHD in childhood?

## Method

### Participants

Participants in the current study consisted of 142 adolescents with ADHD in childhood (probands) and a comparison group of 100 community-recruited adolescents without ADHD. We selected the sample size for the comparison group based on power analyses for a two-group comparison. We recruited the ADHD group from the group of children who received services from 1987 to 1995 at the ADD Clinic at Western Psychiatric Institute and Clinic. The probands ranged in age from 5 years to 17 years when they received services. Most of these children (88.7%) were between 5 years old and 12 years old when they were first assessed. We recontacted the eligible children and their parents to participate in the follow-up study during their adolescence (ages 13–18 years). This contact occurred an average of 5.26 years after the initial assessment. Of the eligible children who were contacted to participate in the follow-up study, 56.5% participated. Although this rate of participation was modest, comparisons between nonparticipants and 111 of the probands for whom childhood data were available indicated no statistically significant differences in the childhood variables of ADHD, ODD, or CD symptoms; teacher and parent reports of internalizing symptoms; Full Scale IQ scores; or reading and math achievement test scores.

Eligibility criteria required that the probands be in school or otherwise eligible for school placement (e.g., should be in school but dropped out) and met the diagnostic criteria for ADHD in childhood as defined in either the *DSM-III-R* or the *DSM-IV* (American Psychiatric Association, 1994). Specifically, the standard clinic assessment when the probands were children consisted of the following intake measures: the *Disruptive Behavior Disorders Scale* (DBD; Pelham, Gnagy, Greenslade, & Milich, 1992), *IOWA/Abbreviated Conners Rating Scale* (Goyette, Conners, & Ulrich, 1978; Loney & Milich, 1982), and the *Swanson, Nolan, and Pelham Rating Scale* (SNAP; Atkins, Pelham, & Licht, 1985; Swanson, 1992). These are norm-referenced behavior-rating scales of *DSM-III-R* and *DSM-IV* ADHD symptoms and additional externalizing and social behaviors. All have acceptable psychometric properties. Parents and teachers of the students completed these instruments. In addition, as part of a broader clinical interview, PhD clinicians conducted semistructured interviews to confirm ADHD symptoms and diagnoses and rule out alternative diagnoses. For a subgroup of children, a second clinician verified the diagnosis with an independent file review. The combined parent and teacher DBD data indicated that all probands met the *DSM-III-R* diagnostic criteria for ADHD.

We recruited the 100 adolescents in the non-ADHD comparison group at the time of the follow-up study through newspaper advertisements, flyers in the probands' schools, and announcements on the hospital voicemail system. We used a telephone screening to administer a checklist of *DSM-III-R* ADHD symptoms, including asking the parents whether the child had ever been diagnosed with ADHD, and the checklist also included questions about the child's lifetime history of ADHD symptoms. Adolescents recruited for the community comparison sample were eligible for participation if they did not have a past history or current diagnosis of ADHD based on data collected at the telephone screening or interview.

We used additional criteria to exclude potential participants in both the ADHD and community comparison groups from the adolescent follow-up sample. These exclusion criteria were a verbal IQ less than 80; seizures or other neurological problems; or a history of pervasive developmental disorder, psychotic disorder, sexual disorder, or organic mental disorder.

We matched the non-ADHD comparison adolescents as a group to be similar to the probands as a group on each of five demographic variables: age, gender, ethnicity, one- versus two-parent household, and parental education; thus, there were no significant differences among the groups on these variables. All of the participants were 13 to 18 years of age at the time of the adolescent assessment (ADHD: $M$ = 15.18 years, $SD$ = 1.44; control: $M$ = 15.18, $SD$ = 1.42), and most were boys (ADHD: 6.3% girls; control: 5.0% girls). In the ADHD group, the ethnic/racial distribution of the sample was 86.6% White, 9.5% African American, and 3.7% Other. In the non-ADHD group, 87% of the participants were White, 8.0% were African American, and 5.0% had other ethnic/racial backgrounds. Parents' educational levels ranged from less than high school to graduate degrees (median for both groups = college graduate), and family yearly income levels ranged from less than $10,000 to $300,000 (ADHD: median = $46,000, control: median = $50,000). Additional details regarding the characteristics and

recruitment of the samples may be found in Molina and Pelham (2003).

## Procedure

All probands and comparison adolescents and at least one of their parents completed a one-time office-based interview that assessed adolescent adjustment in multiple domains. Adolescents and parents were interviewed separately. The interviewer read all questions aloud to the adolescents, who followed along on their own copy of the measures. They were assured that responses were confidential unless child abuse or neglect or impending danger to self or others was suspected. We obtained a Certificate of Confidentiality from the Department of Health and Human Services as an additional means of ensuring confidentiality of responses for research purposes. Parents provided informed consent for their participation and their child's participation, and the youth provided informed assent to participate. We paid parents $40 and adolescents $60 each for their participation.

## Measures

***Diagnoses in Adolescence.*** At the time of the adolescent interview, we made *DSM-III-R* diagnoses of anxiety and depressive disorders by using the *NIMH Diagnostic Interview Schedule for Children–Version 2.3* (DISC 2.3; Shaffer et al., 1996), which we administered separately to adolescents and parents. The DISC 2.3 considers symptoms that have occurred in the past 6 months. Of interest in the current study were the three anxiety disorder diagnoses (generalized anxiety disorder [GAD], avoidant disorder, and social anxiety disorder) and the two depressive disorder diagnoses (dysthymia and major depressive disorder). Although the DISC uses the term *social phobia*, we refer to this disorder as *social anxiety disorder* to reflect current nomenclature and to capture the distress associated with the disorder. In addition, avoidant disorder is not included in *DSM-IV*; however, we elected to retain this diagnosis, given that the DISC 2.3 and our analyses are based on *DSM-III-R* diagnoses.

A degree of functional impairment is required before symptoms found by the DISC are counted toward diagnosis (e.g., "Does being afraid of [feared event] keep you from doing things you would like to do or should do?"). Three additional impairment questions in the DISC ask whether endorsed symptoms cause problems at home, at school, or with peers. We considered these items, which were not included in the DISC diagnostic algorithm, in our coding of disorder to minimize concerns about overdiagnosis, especially for anxiety disorders (Shaffer et al., 1996). We asked about the three impairment items separately for each of the three anxiety diagnoses and once for the two depressive disorders. We considered the impairment criterion to be met if the informant endorsed one of the three impairment items. Our rationale was that if the symptoms are severe enough to cause a problem in at least one salient domain of adolescent life, they are likely to be diagnostically significant. A positive diagnosis was assigned if the adolescent met the full diagnostic criteria through either the adolescent report or the parent report (e.g., Gittelman et al., 1985; Mannuzza et al., 1991). This procedure is consistent with clinical practice (Youngstrom et al., 2003). The DISC 2.3 has adequate to good test–retest reliability when using this combination of parent and adolescent report (Schwab-Stone et al., 1996; Shaffer et al., 1996). With a population-based sample, test–retest intraclass correlations ranged from .46 for generalized anxiety disorder to .66 for dysthymia/major depression symptom counts (Shaffer et al., 1996). With clinician interviews as the criterion—and using combined parent/adolescent reports, as in the current study—Schwab-Stone et al. (1996) found that concurrent validity for the DISC was moderate ($\kappa$ = .48 for depressive disorders, $\kappa$ = .46 for anxiety disorders).

We based diagnoses of ADHD and ODD/CD in adolescence on *DSM-III-R* criteria, using the DBD (parent and teacher reports) and DISC 2.3 (parent report) for ADHD and the DBD (parent and teacher reports) and DISC 2.3 or DISC 3.0 (parent and adolescent reports) for ODD/CD. Using the DBD, we considered the diagnostic criteria to be met if a sufficient number of symptoms were reported between the parent and teachers. For the DISC, we considered a diagnosis based on either reporter to be sufficient.

***Clinical Symptoms and Social Functioning in Childhood.*** At the time of initial diagnosis in childhood, the probands had been assessed for internalizing and externalizing symptoms and social problems through use of the parent and teacher versions of the *Child Behavior Checklist* (CBCL; Achenbach, 1991). Respondents indicated whether each behavior described was *not true* (0), *somewhat or sometimes true* (1), or *very true or often true* (2) for the child. In our analyses, we used the maximum score across parent and teacher ratings of the composite externalizing and internalizing dimensions, as well as the specific eight-item Social Problems subscale (e.g., doesn't get along with other kids, not liked by other kids; $\alpha$ = .73 for parent report, $\alpha$ = .70 for teacher report). Achenbach (1991) reported 1-week test–retest correlations of .87 to .93 and 2-year stability correlations of .70 to .86 for the three scales included in the current study. In addition, construct validity was established by significant correlations between these scales and other measures of internalizing and externalizing behavior problems, such as the *Quay-Peterson Revised Behavior Problem Checklist* (Quay & Peterson, 1983).

# Results

## Rates of Anxiety and Mood Disorders in Adolescence

We dropped five adolescents in the ADHD group from all analyses because they were missing parent-report data on the diagnostic instruments. The rates of anxiety and mood disorders for

adolescents with and without a childhood history of ADHD are given in Table 1. Although rates of disorder were consistently highest for the proband group, there were no statistically significant differences in rates of anxiety and mood disorders for the ADHD and non-ADHD comparison groups. Table 2 shows that rates of anxiety and mood disorders in adolescence were not associated with persistence of ADHD into adolescence when comparing three groups—adolescents with a history of ADHD in childhood who continued to meet diagnostic criteria for ADHD in adolescence (ADHD persisters), adolescents who were diagnosed with ADHD in childhood only (ADHD desisters), and the non-ADHD comparison group.

Table 3 shows rates of anxiety and mood disorders in adolescence according to whether probands had an ODD or CD diagnosis in adolescence. We excluded the 11 adolescents in the non-ADHD group who had a diagnosis of ODD or CD from these analyses. As shown, there were no statistically significant differences among the three groups for anxiety or depressive disorders. Direct comparisons of the probands with ODD/CD and the non-ADHD comparison groups, however, revealed a significant difference for social anxiety disorder, $\chi^2(1, N = 171) = 5.03$, $p < .05$. Probands with ODD or CD in adolescence had more than 2.5 times the rate of social anxiety disorder for the non-ADHD comparison group. Although no other comparisons reached statistical significance at the $p < .05$ level, rates of mood disorders for probands with ODD/CD were also more than double the rates for the comparison group.

TABLE 1
Rates of DISC Internalizing Disorders

| | Non-ADHD | | ADHD | | |
|---|---|---|---|---|---|
| **Diagnosis** | ***n*** | **%** | ***n*** | **%** | $\chi^2$ |
| | | **Anxiety** | | | |
| Any anxiety disorder | 17 | 17.2 | 28 | 20.6 | 0.44 |
| Social anxiety | 8 | 8.0 | 20 | 14.8 | 2.64 |
| Avoidant disorder | 6 | 6.1 | 11 | 8.1 | 0.36 |
| Generalized anxiety | 6 | 6.0 | 13 | 9.5 | 0.98 |
| | | **Depression** | | | |
| Any depressive disorder | 5 | 5.0 | 12 | 8.8 | 1.31 |
| Dysthymia | 3 | 3.0 | 8 | 5.8 | 1.10 |
| Major depression | 6 | 6.0 | 14 | 10.2 | 1.38 |

*Note.* DISC = *NIMH Diagnostic Interview Schedule for Children Version 2.3* (Shaffer et al., 1996); ADHD = attention-deficit/hyperactivity disorder; ADHD group: *n* range = 135–137 and non-ADHD group: *n* range = 99–100 because of missing data.

## Prediction of Adolescent Anxiety and Mood Disorders

We used logistic regressions to predict anxiety and mood disorders in adolescence from childhood internalizing, externalizing, and social problems scores for the probands. The three predictors were entered as *z* scores; thus, odds ratios are interpreted in terms of standard deviation units of the predictors. The chi-square results for the overall model examined the prediction of each adolescent outcome when all three childhood predictors (i.e., internalizing symptoms, externalizing symptoms, and social problems) were included in the model. As shown in

TABLE 2
Rates of DISC Internalizing Disorders as a Function of ADHD in Childhood and Adolescence

| | Non-ADHD | | ADHD desisters | | ADHD persisters | | |
|---|---|---|---|---|---|---|---|
| **Diagnosis** | ***n*** | **%** | ***n*** | **%** | ***n*** | **%** | $\chi^2$ |
| | | | **Anxiety** | | | | |
| Any anxiety disorder | 17 | 17.2 | 7 | 17.9 | 21 | 21.6 | .67 |
| Social anxiety disorder | 8 | 8.0 | 7 | 17.9 | 13 | 13.5 | 3.06 |
| Avoidant disorder | 6 | 6.1 | 3 | 7.7 | 8 | 8.2 | .37 |
| Generalized anxiety disorder | 6 | 6.0 | 2 | 5.1 | 11 | 11.2 | 2.33 |
| | | | **Depression** | | | | |
| Any depressive disorder | 5 | 5.0 | 4 | 10.3 | 8 | 8.2 | 1.44 |
| Dysthymia | 3 | 3.0 | 2 | 5.1 | 6 | 6.1 | 1.16 |
| Major depression | 6 | 6.0 | 5 | 12.8 | 9 | 9.2 | 1.77 |

*Note.* DISC = *NIMH Diagnostic Interview Schedule for Children Version 2.3* (Shaffer et al., 1996); ADHD = attention-deficit/hyperactivity disorder; non-ADHD group: *n* range = 99–100 and ADHD persisters group: *n* range = 96–98 because of missing data; ADHD desisters group: *n* = 39.

TABLE 3
Rates of DISC Internalizing Disorders as a Function of ADHD in Childhood and ODD/CD in Adolescence

| Diagnosis | Non-ADHD w/o ODD/CD | | ADHD w/o ODD/CD | | ADHD w/ ODD/CD | | Overall model $\chi^2$ |
|---|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | *n* | % | |
| **Anxiety** | | | | | | | |
| Any anxiety disorder | 14 | 15.9 | 9 | 15.8 | 19 | 24.1 | 2.19 |
| Social anxiety disorder | 6 | 6.7$_a$ | 6 | 10.5 | 14 | 17.9$_b$ | 5.12 |
| Avoidant disorder | 4 | 4.5 | 3 | 5.3 | 8 | 10.1 | 2.23 |
| Generalized anxiety disorder | 4 | 4.5 | 5 | 8.8 | 8 | 10.0 | 2.12 |
| **Depression** | | | | | | | |
| Any depressive disorder | 4 | 4.5 | 2 | 3.6 | 10 | 12.5 | 5.25 |
| Dysthymia | 2 | 2.2 | 1 | 1.8 | 7 | 8.8 | 5.23 |
| Major depression | 5 | 5.6 | 3 | 5.3 | 11 | 13.8 | 4.37 |

*Notes.* DISC = *NIMH Diagnostic Interview Schedule for Children Version 2.3* (Shaffer et al., 1996); ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder; CD = conduct disorder; non-ADHD group: *n* range = 88–89, ADHD without ODD/OC group: *n* range = 56–57, and ADHD with ODD/OC group: *n* range = 79–80, all because of missing data. Rates in the same row that do not share subscripts differ at $p < .05$ in direct comparisons of the probands with ODD/CD and the non-ADHD group. Group differences with $.05 < p < .10$ are not reported. For social anxiety disorder, the non-ADHD group and the ADHD with ODD/CD group differ significantly at $p < .05$. The different subscripts (i.e., a and b) identify this difference.

Table 4, only childhood social problems and externalizing disorder symptoms predicted adolescent anxiety and mood disorders; internalizing symptoms in childhood did not. The overall models for GAD and dysthymia were significant. Examination of the individual predictor variables reveals that a 1 *SD* unit increase in childhood externalizing disorder symptoms decreased the odds of GAD in adolescence. In contrast, a 1 *SD* unit increase in childhood externalizing disorder symptoms increased the odds of dysthymia in adolescence almost fourfold. Although the overall models including all three childhood predictors were not significant, the results indicated that increases in social problems in childhood significantly increased the odds of any anxiety disorder and particularly social anxiety disorder in adolescence.

## DISCUSSION

This study examined the prevalence and comorbidities of anxiety and mood disorders among adolescents with childhood ADHD. Our findings suggest that as a group, children diagnosed with ADHD are not at significantly (or meaningfully) higher risk for anxiety and depression in adolescence than a non-ADHD community comparison group. With one exception, there was evidence, however, that the children with ADHD who had more externalizing behaviors or social problems in childhood were more likely to have anxiety and depressive disorders in adolescence. A subgroup of children with ADHD therefore appears to be at risk for the development of specific disorders by adolescence.

The Biederman et al. (1996) study is the only other longitudinal follow-up of children with ADHD that reported anxiety and mood disorders in mid-adolescence. Comparing rates of these disorders across the two studies shows that the rates of anxiety and depressive disorders in our probands (20.6% for anxiety, 8.8% for depression) were considerably lower than the rates reported by Biederman and colleagues (35% for anxiety disorders and 45% for depression). For the control groups, however, rates of anxiety disorders were somewhat higher in our study (17.2% vs. 9%), and rates of depression were consistent across the two studies (5% vs. 6%). We therefore believe that our assessment method (DISC) was not responsible for generating lower rates of anxiety and mood disorder diagnoses in general. Instead, differences in the populations served at each clinic may be responsible. Clearly, the field needs additional studies of anxiety and mood disorders among adolescents with childhood ADHD to obtain a more narrow-band estimate of the likelihood of these disorders. Other ongoing longitudinal studies of children with ADHD, such as the Multimodal Treatment Study of ADHD (MTA Cooperative Group, 1999), a longitudinal study of ADHD in preschool children (Lahey et al., 1998), and a study of ADHD in girls (Hinshaw, 2002), should be helpful in this regard.

In contrast, at least four follow-up studies reported anxiety and mood disorders or symptoms in late adolescence and adulthood (Claude & Firestone, 1995; Fischer et al., 2002; Mannuzza et al., 1993; Mannuzza et al., 1998). Fischer et al. reported higher rates of depression among probands, and the possibility remains that children with ADHD are at risk for depressive dis-

TABLE 4
Logistic Regressions Predicting Adolescent Internalizing Disorders from Childhood Symptomatology

| Diagnosis | Internalizing symptoms | | Externalizing symptoms | | Social problems | | Overall model | |
|---|---|---|---|---|---|---|---|---|
| | $\chi^2$ | OR | $\chi^2$ | OR | $\chi^2$ | OR | $\chi^2$ | $R^2$ |
| **Anxiety** | | | | | | | | |
| Any anxiety disorder | .94 | 1.31 | .04 | .95 | 4.10* | 1.90 | 7.69 | .12 |
| Social anxiety disorder | .46 | 1.23 | .23 | .86 | 4.80* | 2.20 | 7.59 | .13 |
| Avoidant disorder | .07 | .90 | .71 | .71 | 2.96 | 2.09 | 3.87 | .09 |
| Generalized anxiety disorder | .40 | 1.31 | 5.04* | .33 | 3.56 | 2.33 | 10.36* | .23 |
| **Depression** | | | | | | | | |
| Any depressive disorder | .01 | .97 | 1.83 | 1.71 | .18 | .84 | 2.02 | .04 |
| Dysthymia | .09 | 1.15 | 5.12* | 3.75 | .55 | 1.46 | 9.00* | .21 |
| Major depression | .25 | 1.18 | .63 | 1.33 | 1.59 | 1.63 | 4.10 | .08 |

*Notes.* OR = odds ratio. *ns* range = 103–105 because of missing data. The odds ratios indicate the increase or decrease in the odds of the diagnosis in adolescence being associated with a 1 *SD* unit increase in the specific childhood predictor variable, controlling for the other predictors in the model.
*$p < .05$.

orders by adulthood. Because impairment among adults with childhood ADHD can be substantial (Barkley, Fischer, Smallish, & Fletcher, 2002; Mannuzza et al., 1993) and includes long-term consequences (e.g., loss of employment, lack of financial independence, adult arrest record), depression may be more likely at this time. The rates of depression in the current study may therefore be an underestimate of long-term risk. Whether the rates of depression will increase substantially within the ADHD group but not the control group is an empirical question to be answered in future assessments with this same sample, most of whom are also participating in the ongoing Pittsburgh ADHD Longitudinal Study, a larger study with repeated assessments into adulthood.

In the adult follow-up studies that have suggested some risk for anxiety and mood disorders, externalizing symptoms were found to be significant predictors of later depressive disorders (Fischer et al., 2002; Paternite et al., 1999). The current study identified this association for adolescents with childhood ADHD. Among probands, childhood externalizing disorder symptoms as rated by parents and teachers increased the odds of later dysthymia by a factor of 3.75. This finding is important for demonstrating the unique contribution of early externalizing symptoms to later internalizing disorders, because the association emerged when controlling for childhood internalizing disorder symptoms and social problems. In addition, although the group differences did not meet conventional $p < .05$ cutoffs for statistical significance, there was a strong pattern in the data such that the subgroup of children with ADHD who developed ODD or CD by adolescence had the highest rates of all for internalizing disorders. Taken together, these findings suggest the importance of externalizing problems in accounting for links between ADHD and later depressive disorders.

These findings are consistent with the epiphenomenal explanation for the link between ADHD and depression described by Angold et al. (1999). Specifically, they explained the co-occurrence of ADHD and depression by the association of both disorders with ODD and CD; when ODD/CD was absent, the comorbidity between ADHD and depression was significantly decreased (Angold et al., 1999). One hypothesis is that youth with ADHD who have symptoms of ODD/CD receive frequent negative feedback from parents, teachers, and peers due to their aggressive and disruptive behaviors. This negative feedback, coupled with a limited amount of positive feedback, may eventually lead to internalizing symptoms for some probands. For example, Harrington, Rutter, and Fombonne (1996) found that conduct problems in childhood were associated with symptoms of minor depression in young adulthood after controlling for childhood emotional problems. We should note that social problems and antisocial personality characteristics were at least in part responsible for this connection. In addition, boys with ADHD who are also aggressive were found to be the most highly rejected by peers (compared to nonaggressive boys with ADHD; Hinshaw & Melnick, 1995), and several studies have shown that boys who are rejected and aggressive in elementary school experience a trajectory of increasing internalizing problems across adolescence (see Coie & Bagwell, 1999, for a review). Thus, a precedent exists in the literature for the importance of disrupted interpersonal functioning that includes authority figures and peers (e.g., ODD and CD symptoms) to the later development of internalizing disorders.

Our findings that problems with peer relations in childhood predicted anxiety disorders in adolescence suggest that the peer problems common to children with ADHD may be an important nonclinical marker for anxiety in adolescence. The measures of anxiety that we selected were purposefully focused on socially mediated disorders because of the well-known social deficits among children with ADHD (e.g., Pelham & Bender, 1982; Wheeler & Carlson, 1994) and the hypothesis that anxiety might develop around social interactions. In our sample, then, we replicated the associations among peer problems, externalizing disorder symptoms, and internalizing distress generally, but we more specifically highlighted the potential importance of impairment in interpersonal functioning for the development of internalizing disorders among children with ADHD.

Surprisingly, childhood externalizing disorder symptoms predicted a lower risk for GAD in adolescence, once we accounted for childhood internalizing symptoms and social problems. The same association between externalizing disorders and depression in the ADHD group (as discussed previously) thus does not seem to hold for externalizing symptoms and anxiety disorders, particularly GAD. Despite the nonspecific negative affect that underlies anxiety and depressive disorders, a primary component of social anxiety disorder and GAD is behavioral restriction. For social anxiety disorder, this includes the avoidance of situations that produce social distress (e.g., Rapee & Heimberg, 1997); for GAD, this involves experiential avoidance during behavioral activities (e.g., worrying about possible catastrophes with the belief that this prepares them for aversive events; Borkovec, 1994). Despite the need for replication and further research, we can speculate that approach-oriented externalizing symptoms, even if they are pathological, may reduce the fundamental avoidance patterns of anxiety disorders.

## Limitations

There are several limitations to the current study. First, reliance on diagnoses using DISC interviews meant that we had only categorical indicators of anxiety and mood disorders rather than dimensional symptom assessments. Although this strategy allowed us to consider clinically significant diagnoses, some adolescents with a history of ADHD might have been suffering from levels of anxiety and mood symptoms below the diagnostic threshold that still caused impairment in their daily functioning. Further studies that use dimensional assessments to assess both clinical diagnoses and subthreshold symptoms will allow for a consideration of the range of distress that adolescents may suffer.

Second, it is important to note potential limitations in the generalizability of these findings. The sample is not representative of the U.S. population in terms of race/ethnicity, level of parent education, or family income. In addition, the adolescents in the ADHD group were clinic-referred, and most participated in some form of psychosocial or medication treatment following their assessment. Given that children who are referred for treatment sometimes have higher rates of comorbidity than children who are diagnosed but not referred (Bird, Gould, & Staghezza, 1993), this referral bias may result in elevated risk for internalizing disorders. Children with ADHD who receive mental health services do not demonstrate higher rates of comorbid disorders than those who do not receive services, however (Szatmari, Offord, & Boyle, 1989). In addition, more than 70% of our probands continued to meet the diagnostic criteria for ADHD at follow-up. Our participation rate was modest, and it is possible that children with ADHD who were eligible for the follow-up study but declined to participate differed from the participants in important ways, but there were no significant differences in many critical variables (e.g., ADHD, CD, and ODD symptoms; internalizing symptoms; IQ), providing some confidence that our participants were a representative sample of adolescents who were eligible for the follow-up study.

Our ADHD group included few girls. Boys are approximately three to six times more likely than girls to be diagnosed with ADHD. As in the current sample, this ratio is often much higher in clinic-referred samples (Barkley, 2003). Consequently, we were unable to test whether our findings interacted with gender. Greater attention to the potential risk for anxiety and mood disorders in adolescent girls with a history of ADHD is an important research direction, especially because rates of depression in adolescence are significantly higher for girls than for boys (Nolen-Hoeksema & Girgus, 1994). Likewise, it will be important for future studies investigating associations between childhood ADHD and adolescent anxiety and mood disorders to model rates of disorders in probands' parents, given the association between ADHD and affective disorders among first-degree relatives (Biederman et al., 1987).

Finally, because we recruited the community comparison group when they were already adolescents, we were not able to follow this group of participants prospectively from childhood and could not predict rates of anxiety and mood disorders from childhood symptomatology. In a related vein, although our exclusion of ADHD participants from the control group was based on comprehensive multiple-measure multiple-reporter assessments, these reports were nevertheless retrospective. Recall bias may have resulted in the inadvertent inclusion of children with prior ADHD.

## Implications

The current findings have several clinical implications, most notably for treatment. First, they highlight the importance of considering whether adolescents with a history of ADHD have comorbid externalizing disorders. This comorbidity is expected to result in more serious impairment and appears to increase the risk for internalizing disorders as well. Second, problems with peer relationships, which are known to be associated with ADHD in childhood, also predict internalizing distress in adolescence. Peer problems are often resistant to typical psy-

chosocial and pharmacological treatments for ADHD (Pelham & Bender, 1982), yet the current findings suggest that they are not only problematic for social functioning in childhood but also an important marker of later internalizing disorders. Further work to develop interventions that may improve the social functioning of children and adolescents with ADHD appears warranted.

## About the Authors

**CATHERINE L. BAGWELL,** PhD is an associate professor of psychology at the University of Richmond. Her research examines the developmental significance of peer and friendship relations and social functioning among children with ADHD and aggression. **BROOKE S. G. MOLINA,** PhD, is an associate professor of psychology and psychiatry at the University of Pittsburgh. Her current research interests are the longitudinal course and treatment of ADHD and substance use disorders. **TODD B. KASHDAN,** PhD is an assistant professor of psychology at George Mason University. His research largely focuses on social anxiety and other anxiety-related conditions, the role of self-regulation and positive psychological processes in understanding and treating psychopathology, and the cultivation of various dimensions of positive health. **WILLIAM E. PELHAM, JR.,** PhD is Distinguished Professor of Psychology and a professor of pediatrics and psychiatry at the State University of New York at Buffalo. His research focuses on multiple aspects of ADHD, including psychosocial, pharmacological, and combined treatments for ADHD and cognition and motivation in ADHD. **BETSY HOZA,** PhD is a professor of psychology at the University of Vermont. Her research is geared toward better understanding the social, academic, and self-system functioning of children with ADHD from a developmental psychopathology perspective. Address: Catherine L. Bagwell, Department of Psychology, University of Richmond, Richmond, VA 23173; e-mail: cbagwell@richmond.edu

## Authors' Note

This study was supported by grants from the National Institute of Alcohol Abuse and Alcoholism (NIAAA; AA00202, AA11873, AA08746). Our research was also supported in part by grants from the National Institute on Drug Abuse (DA12414, DA05605), NIAAA (AA12342, AA0626), the National Institute on Mental Health (MH12010, MH4815, MH47390, MH45576, MH50467, MH53554), and the National Institute of Environmental Health Sciences (ES0515-08).

## References

Achenbach, T. M. (1991). *Manual for the Teacher's Report Form and 1991 profile*. Burlington: University of Vermont, Department of Psychiatry.

American Psychiatric Association. (1968). *Diagnostic and statistical manual of mental disorders* (2nd ed.). Washington, DC: Author.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Angold, A., Costello, E. J., & Erkanli, A. (1999). Comorbidity. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 40*, 57–87.

Atkins, M. S., Pelham, E. E., Jr., & Licht, M. (1985). A comparison of objective classroom measures and teacher ratings of attention deficit disorder. *Journal of Abnormal Child Psychology, 13*, 155–167.

Bagwell, C. L., Molina, B. S. G., Pelham, W. E., & Hoza, B. (2001). Attention-deficit hyperactivity disorder and problems in peer relations: Predictions from childhood to adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1285–1292.

Barkley, R. A. (1998). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (2nd ed.). New York: Guilford Press.

Barkley, R. A. (2003). Attention-deficit/hyperactivity disorder. In E. J. Mash & R. A. Barkley (Eds.), *Child psychopathology* (2nd ed., pp. 75–143). New York: Guilford Press.

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. E. (2002). The persistence of attention-deficit/hyperactivity disorder into young adulthood as a function of reporting source and definition of disorder. *Journal of Abnormal Psychology, 111*, 279–289.

Biederman, J., Faraone, S., Milberger, S., Guite, J., Mick, E., Chen, L., et al. (1996). A prospective 4-year follow-up study of attention-deficit hyperactivity and related disorders. *Archives of General Psychiatry, 53*, 437–446.

Biederman, J., Munir, K., Knee, D., Armentano, M., Autor, S., Waternaux, C., et al. (1987). High rate of affective disorders in probands with attention deficit disorder and in their relatives: A controlled family study. *The American Journal of Psychiatry, 144*, 330–333.

Bird, H. R., Gould, M. S., & Staghezza, B. M. (1993). Patterns of diagnostic comorbidity in a community sample of children aged 9 through 16 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 32*, 361–368.

Boivin, M., Hymel, S., & Bukowski, W. M. (1995). The roles of social withdrawal, peer rejection, and victimization by peers in predicting loneliness and depressed mood in childhood. *Development and Psychopathology, 7*, 765–785.

Borkovec, T. D. (1994). The nature, functions, and origins of worry. In G. C. L. Davey & F. Tallis (Eds.), *Worrying: Perspectives on theory, assessment, and treatment* (pp. 5–33). New York: Wiley.

Burks, V. S., Dodge, K. A., & Price, J. M. (1995). Models of internalizing outcomes of early rejection. *Development and Psychopathology, 7*, 683–696.

Claude, D., & Firestone, P. (1995). The development of ADHD boys: A 12-year follow-up. *Canadian Journal of Behavioural Science, 27*, 226–249.

Coie, J. D., & Bagwell, C. L. (1999). School-based social predictors of serious adolescent psychopathology and dysfunction: Implications for prevention. In D. Cicchetti & S. L. Toth (Eds.), *Rochester symposium on developmental psychopathology: Vol. 10. Developmental approaches to prevention and intervention* (pp. 25–55). Rochester, NY: University of Rochester Press.

Coie, J., Terry, R., Lenox, K., Lochman, J., & Hyman, C. (1995). Childhood peer rejection and aggression as predictors of stable patterns of adolescent disorder. *Development and Psychopathology, 7*, 697–713.

Fischer, M., Barkley, R. A., Smallish, L., & Fletcher, K. (2002). Young adult follow-up of hyperactive children: Self-reported psychiatric disorders, comorbidity, and the role of childhood conduct problems and teen CD. *Journal of Abnormal Child Psychology, 30*, 463–475.

Gittelman, R., Mannuzza, S., Shenker, R., & Bonagura, N. (1985). Hyperactive boys almost grown up: I. Psychiatric status. *Archives of General Psychiatry, 42*, 937–947.

Goyette, C. H., Conners, C. K., & Ulrich, R. F. (1978). Normative data on revised Conners Parent and Teacher Rating Scales. *Journal of Abnormal Child Psychology, 6*, 221–236.

Harrington, R., Rutter, M., & Fombonne, E. (1996). Developmental pathways in depression: Multiple meanings, antecedents, and endpoints. *Development and Psychopathology, 8*, 601–616.

Hinshaw, S. P. (2002). Preadolescent girls with attention-deficit/hyperactivity disorder: I. Background characteristics, comorbidity, cognitive and social functioning, and parenting practices. *Journal of Consulting and Clinical Psychology, 70*, 1086–1098.

Hinshaw, S., & Melnick, S. M. (1995). Peer relationships in boys with attention-deficit hyperactivity disorder with and without comorbid aggression. *Development and Psychopathology, 7*, 627–647.

Hodgens, J. B., Cole, J., & Boldizar, J. (2000). Peer-based differences among boys with ADHD. *Journal of Clinical Child Psychology, 29*, 443–452.

Hoza, B., Bukowski, W. M., & Beery, S. (2000). Assessing peer network and dyadic loneliness. *Journal of Clinical Child Psychology, 29*, 119–128.

Jensen, P. S., Martin, B. A., & Cantwell, D. P. (1997). Comorbidity in ADHD: Implications for research, practice, and *DSM-V*. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*, 1065–1079.

Lahey, B. B., Pelham, W. E., Stein, M. A., Loney, J., Trapani, C., Nugen, K., et al. (1998). Validity of *DSM-IV* attention-deficit/hyperactivity disorder for younger children. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 695–702.

Loney, J., & Milich, R. (1982). Hyperactivity, inattention, and aggression in clinical practice. In M. Wolraich & D. K. Routh (Eds.), *Advances in developmental and behavioral pediatrics* (Vol. 3, pp. 113–147). Greenwich, CT: JAI Press.

Mannuzza, S., Klein, R. G., Bessler, A., Malloy, P., & LaPadula, M. (1993). Adult outcome of hyperactive boys: Educational achievement, occupational rank, and psychiatric status. *Archives of General Psychiatry, 50*, 565–576.

Mannuzza, S., Klein, R. G., Bessler, A., Malloy, P., & LaPadula, M. (1998). Adult psychiatric status of hyperactive boys grown up. *The American Journal of Psychiatry, 155*, 493–498.

Mannuzza, S., Klein, R. G., Bonagura, N., Malloy, P., Giampino, T. L., & Addalli, K. (1991). Hyperactive boys almost grown up: V. Replication of psychiatric status. *Archives of General Psychiatry, 48*, 77–83.

Molina, B. S. G., & Pelham, W. E. (2003). Childhood predictors of adolescent substance use in a longitudinal study of children with ADHD. *Journal of Abnormal Psychology, 112*, 497–507.

MTA Cooperative Group. (1999). Moderators and mediators of treatment response for children with attention-deficit/hyperactivity disorder. *Archives of General Psychiatry, 56*, 1088–1096.

Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin, 115*, 424–443.

Paternite, C. E., Loney, J., Salisbury, H., & Whalen, M. A. (1999). Childhood inattention–overactivity, aggression, and stimulant medication history as predictors of young adult outcomes. *Journal of Child and Adolescent Psychopharmacology, 9*, 169–184.

Pelham, W. E., & Bender, M. E. (1982). Peer relationships in hyperactive children: Description and treatment. In K. D. Gadow & I. Bialer (Eds.), *Advances in learning and behavioral disabilities* (Vol. 1, pp. 365–436). Greenwich, CT: JAI Press.

Pelham, W. E., Gnagy, E. M., Greenslade, K. E., & Milich, R. (1992). Teacher ratings of *DSM-III-R* symptoms for the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 210–218.

Pfiffner, L. J., McBurnett, K., Lahey, B. B., Loeber, R., Green, S., Frick, P. J., et al. (1999). Association of parental psychopathology to the comorbid disorders of boys with attention deficit-hyperactivity disorder. *Journal of Consulting and Clinical Psychology, 67*, 881–893.

Quay, H. C., & Peterson, D. R. (1983). *Interim manual for the Revised Behavior Problem Checklist*. Coral Gables, FL: University of Miami, Applied Social Sciences.

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive–behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*, 741–756.

Satterfield, J. H., & Schell, J. H. (1997). A prospective study of hyperactive boys with conduct problems and normal boys: Adolescent and adult criminality. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*, 1726–1735.

Schwab-Stone, M. E., Shaffer, D., Dulcan, M. K., Jensen, P. S., Fisher, P., Bird, H. R., et al. (1996). Criterion validity of the NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3). *Journal of the American Academy of Child and Adolescent Psychiatry, 35*, 878–888.

Shaffer, D., Fisher, P., Dulcan, M. K., Davies, M., Piacentini, J., Schwab-Stone, M. E., et al. (1996). The NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3): Description, acceptability, prevalence rates, and performance in the MECA study. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*, 865–877.

Swanson, J. M. (1992). *School-based assessments and interventions for ADD students*. Irvine, CA: K. C. Publications.

Szatmari, P., Offord, D. R., & Boyle, M. H. (1989). Correlates, associated impairments and patterns of service utilization of children with attention deficit disorder: Findings from the Ontario Child Health Study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 30*, 205–217.

Tannock, R. (1994). Attention-deficit hyperactivity disorder with anxiety disorders. In T. E. Brown (Ed.), *Attention-deficit disorders and comorbidities in children, adolescents, and adults* (pp. 125–170). Washington, DC: American Psychiatric Press.

Weiss, G., & Hechtman, L. (1993). *Hyperactive children grown up* (2nd ed.). New York: Guilford Press.

Wheeler, J., & Carlson, C. L. (1994). The social functioning of children with ADD with hyperactivity and ADD without hyperactivity: A comparison of their peer relations and social deficits. *Journal of Emotional and Behavioral Disorders, 2*, 2–12.

Youngstrom, E. A., Findling, R. L., & Calabrese, J. R. (2003). Who are the comorbid adolescents? Agreement between psychiatric diagnosis, youth, parent, and teacher report. *Journal of Abnormal Child Psychology, 31*, 231–245.