Journal of Clinical Child and Adolescent Psychology
2006, Vol. 35, No. 3, 356–368

Predictors of Adolescent Functioning in Girls With Attention Deficit Hyperactivity Disorder (ADHD): The Role of Childhood ADHD, Conduct Problems, and Peer Status

Steve S. Lee
University of Chicago

Stephen P. Hinshaw
University of California, Berkeley

Predictors of adolescent functioning were studied in an ethnically diverse sample of girls with attention deficit hyperactivity disorder (ADHD; n = 140) and age- and ethnicity-matched comparison girls (n = 88) who participated in naturalistic summer programs during childhood. Over a 5-year follow-up (sample retention = 92%; age range = 11.3–18.2 years), conduct problems were predicted by hyperactivity–impulsivity (HI) symptoms and noncompliance (NC). Academic achievement was predicted only by inattention symptoms, whereas school suspensions and expulsions were predicted by inattention symptoms (ADHD sample only), NC, and negative peer status. Substance use was predicted by NC and HI symptoms. Internalizing problems were predicted by HI symptoms, NC, and covert antisocial behavior. Finally, initial peer status was the only significant predictor of later negative social preference.

There is overwhelming evidence that children with attention deficit hyperactivity disorder (ADHD) experience more maladjustment than typically developing youth. Evidence for concurrent and prospective impairment includes substandard academic achievement, poor peer relationships, family disruption, accidental injuries, and high comorbidity with other psychiatric disorders (Barkley, Fischer, Smallish, & Fletcher, 2002; Hinshaw, 2002; Lahey et al., 2004). Although the literature is marked by an absence of research on female samples, a recent prospective study of girls with and without ADHD revealed that early ADHD was linked consistently and strongly to elevated symptomatology and impairment in adolescence, largely independent of demographics, IQ, or comorbidities (Hinshaw, Owens, Sami, & Fargeon, 2006). Our objective here is to extend this work using the same sample of girls by examining conceptually relevant and, in many instances, objectively measured predictor variables during childhood (e.g., overt and covert aggression; peer relationships) in terms of their independent predictions to adolescent functioning. Indeed, based on parallel work with boys diagnosed with ADHD (Lee & Hinshaw, 2004), it may well be the case that childhood ADHD is associated with adolescent problems largely through its association with comorbidities and associated impairments.

As just indicated, the paucity of data on girls' follow-up status means that the male literature provides examples of relevant predictors. In addition, although limited data exist on girls with ADHD, there are several follow-up studies of girls with externalizing behaviors. The review of Pajer (1998) revealed that outcomes of girls with conduct problems were more diverse than those of boys and included internalizing disorders, marital problems, and suicidality. Therefore, longitudinal studies of outcomes for girls with ADHD must include multiple domains because of the potential for multifinal developmental trajectories in girls (Cicchetti & Rogosch, 1996).

What are the most important outcome domains, and which predictors may be relevant for each? First, conduct problems and antisocial behavior comprise an essential outcome. In boys with ADHD, the presence of conduct problems predicts persistent antisocial behavior (ASB; Hinshaw, Lahey, & Hart, 1993; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). Further, noncompliance (NC) and covert ASB outweighed early ADHD in predicting later delinquency in boys (Lee & Hinshaw, 2004). Peer rejection also predicts negative outcomes in boys. Some studies have shown that peer status, independent of aggres-

Work on this project was supported by National Institute of Mental Health Grants 45064 and 64226.

We are indebted to the girls and their families who have participated in our ongoing study as well as graduate students and research assistants who have generously contributed their time and effort to making this project a reality.

Correspondence should be addressed to Steve S. Lee, Department of Psychiatry (MC 3077), University of Chicago, 5841 South Maryland Avenue, Chicago, IL 60637. E-mail: stevelee@yoda.bsd.uchicago.edu

sion, predicts antisocial outcomes (Coie, Lochman, Terry, & Hyman, 1992; Nelson & Dishion, 2004). However, other studies have reported that negative peer regard in childhood is a marker for other behaviors that are the primary, independent predictors (Lee & Hinshaw, 2004; Woodward & Fergusson, 1999).

In addition to antisocial outcomes, academic problems are a frequent consequence of ADHD (Fischer, Barkley, Edelbrock, & Smallish, 1990; Lahey et al., 2004). The association between aggression and underachievement in childhood is largely accounted for by the overlap of ADHD with conduct problems (Hinshaw, 1992), suggesting that links between ADHD and low academic achievement are highly specific. Still, the majority of the literature pertains to boys and needs to be tested in girls. It is also unclear which underlying dimension of ADHD is most strongly related to academic problems: inattention–disorganization or hyperactivity–impulsivity (HI; American Psychiatric Association, 2000).

A third important outcome to consider in girls with ADHD is substance use. Although some experimentation with substances may be normative during adolescence, nonnormative use may presage serious delinquency (Loeber et al., 1998). Recently, Molina and Pelham (2003) reported that ADHD was independently associated with later substance use (controlling for aggression); but replication is needed, particularly in a female sample. Furthermore, whereas temperamental factors associated with ADHD (e.g., deficits in response inhibition or harm avoidance) may influence substance abuse (Willis & Dishion, 2004), conduct problems may be the primary predictor of such substance use, with ADHD and peer status influencing substance use indirectly through their overlap with aggression (Armstrong & Costello, 2002).

A fourth important outcome is the development of internalizing symptoms. In boys with ADHD, higher rates of later internalizing symptoms than in comparison samples have not been consistently reported (Fischer, Barkley, Smallish, & Fletcher, 2002; Hinshaw, 2002; Mannuzza et al., 1991). However, given the large increase in anxiety and depression in adolescence for girls in general (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993), it may be that girls with ADHD show particularly high risk for their emergence, due in part to the negative peer status and conduct problems associated with ADHD (see, e.g., Pajer, 1998).

Finally, ADHD is associated with negative peer status (Hinshaw & Melnick, 1995), but the vast majority of the longitudinal literature pertains to boys. Peer rejection shows significant continuity (Coie & Dodge, 1983); therefore, problems in the later social relationships of children with ADHD may reflect problems associated with peer rejection in childhood.

In all, the absence of a large literature on the prospective follow-up of girls with ADHD means that hypotheses for this sample must be based to a large extent on (a) follow-up investigations of boys with ADHD (Mannuzza & Klein, 1999) and (b) current thinking about the multifinal outcomes that emerge for girls with conduct problems (Pajer, 1998; see review in Hinshaw & Blachman, 2005). We therefore hypothesized, in this large and well-characterized female sample, ascertained during the elementary-school years and followed prospectively 5 years later, that childhood ADHD (and inattention in particular) would predict low academic achievement but that early aggression would provide the strongest predictions to diverse measures of adolescent functioning (e.g., externalizing and internalizing symptoms, substance use, and school behavior problems). We also expected that initial peer status would independently predict only later social preference, given that its associations with negative outcomes in prior reports were largely a product of its overlap with ADHD and aggression. Note that for all outcomes (except ADHD symptom dimensions), we tested interactions between predictors and childhood ADHD diagnostic status to ascertain whether predictions were stronger in the ADHD or control group. That is, because the covariation of ADHD and aggression is almost entirely explained by shared genetic influences (Nadder, Rutter, Silberg, Maes, & Eaves, 2002), negative outcomes associated with early aggression should be stronger in children with ADHD, given their common etiology. Furthermore, previous research showed that authoritative parenting predicted peer status more strongly in boys with ADHD than in comparison boys (Hinshaw, Zupan, Simmel, Nigg, & Melnick, 1997), whereas covert ASB predicted adolescent delinquency severity more strongly in comparison boys than in boys with ADHD (Lee & Hinshaw, 2004).

Method

Participants

The sample of 140 girls with ADHD was recruited through referrals from mental health centers, physician offices, and local schools. Presentations were given at meetings of local self-help groups and advertisements were placed in local newspapers. Probands were not required to have a previous diagnosis of ADHD. Comparison girls ($n = 88$) were recruited from fliers sent to local libraries, community centers, and listings in specific sections of newspapers that advertised summer programs for children.

The initial screening procedure for childhood ascertainment was multigated. The first phase consisted of a telephone screening. At the second phase, involving the mailed rating scales to adult informants, inclusion crite-

ria for probands required above-threshold scores on two empirically established measures and cutoff scores: (a) the Swanson, Nolan, and Pelham Parent Inattention and Teacher Inattention Questionnaire (Swanson, 1992) with at least five of the nine inattention symptoms endorsing impairment—items were rated at the level of 2 (*pretty much*) or 3 (*very much*) on a 0 to 3 metric—and (b) the Child Behavior Checklist and Teacher Report Form Attention problems narrowband scores (Achenbach, 1991a, 1991b) that surpass the empirically established cutoff of $T = 60$ (Chen, Faraone, Biederman, & Tsuang, 1994). Parents of children with a prior diagnosis of ADHD and who were actively treated with medication provided ratings based on unmedicated behaviors (as did the majority of teachers). As in the Multimodal Treatment Study of Children with ADHD (Hinshaw, March, et al., 1997), parents and teachers received an instruction sheet asking them to rate the girl's behavior during periods of time in which she was not receiving medication for ADHD. For structured interviews regarding symptomatology, interviewers similarly asked parents to select times during which the girl was not actively medicated.

Exclusion criteria included (a) borderline cognitive ability (Full Scale IQ < 70), (b) neurological disorders or psychosis, (c) autism or other pervasive developmental disorders, and (d) other medical or physical conditions that prevented participation in all summer camp activities. This sample reflects the ethnic and socioeconomic diversity of the San Francisco Bay area. Of the 228 female participants, 53% were Caucasian, 27% were African American, 11% were Latina, and 9% were Asian American (see Table 1 for diagnostic group comparisons).

Procedures

Families were invited to campus for a rigorous assessment, which included child IQ testing and a structured diagnostic interview using the Diagnostic Interview Schedule for Children, Parent Version (4th ed. [DISC–IV]; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). Inclusion criteria required a diagnosis of ADHD Combined or Predominantly Inattentive type, based on unmedicated behavior with an onset prior to age 7. Comparison girls could not have an ADHD diagnosis.

Because of the limited data on girls with ADHD, it is difficult to compare patterns of comorbidity gathered from the DISC–IV in this sample with any previous standard. Among the girls with the combined type of ADHD ($n = 93$), 71% ($n = 66$) and 26% ($n = 24$) met criteria for oppositional defiant disorder (ODD) and conduct disorder (CD), respectively. Comorbidity was also high for girls with the inattentive type of ADHD ($n = 47$); 47% ($n = 22$) and 11% ($n = 5$) were comorbid for ODD and CD, respectively.

Each girl participated in one of three summer research programs (see Hinshaw, 2002, for details). Each program was 5 weeks long and conducted at a nearby school. Prior to each camp, and following mailed questionnaires to parents and teachers, all families came to campus for informed consent and assent procedures and extensive assessments of child and family functioning. The summer programs were designed to blend structure and naturalism. Girls were grouped into three classrooms based on their age, with each class composed of 25 to 26 girls. All classes and interactions were monitored daily, thus yielding objective measures of externalizing (physical and verbal aggression, NC) and internalizing (social isolation, withdrawal) behavior. A laboratory measure of covert ASB (property destruction and theft) was administered to all children during the last week of each program. Peer sociometrics were gathered at the end of the first, third, and fifth week. Note that ADHD and comparison families

Table 1. *Descriptive Statistics for Attention Deficit Hyperactivity Disorder and Comparison Groups at Baseline*

	Combined[a]		Inattentive[b]		Comparison[c]		
Variable	***M***	***SD***	***M***	***SD***	***M***	***SD***	***p*[d]**
Demographic							
Age (in Months)	114.4	20.20	118.0	20.20	113.2	19.80	*ns*
Income[e]	6.1	2.60	6.3	2.80	6.7	2.50	*ns*
Maternal Education	4.7	0.96	4.7	0.95	4.9	0.99	*ns*
Cognitive							
WISC Verbal IQ	99.8_a	13.50	101.1_a	15.40	113.1_b	12.60	< .01
WIAT Reading[f]	102.1_a	14.60	101.1_a	14.20	112.0_b	12.60	< .01
Behavioral (Maternal Ratings)							
SNAP Inattention (0–27)	20.8_a	5.00	21.6_a	4.20	3.8_b	3.40	< .01
SNAP Hyperactivity/Impulsivity (0–27)	18.9_a	5.30	10.0_b	5.10	2.3_c	2.60	< .01
CBCL Internalizing	60.8_a	10.30	60.2_a	10.20	47.4_b	11.20	< .01
CBCL Externalizing	68.7_a	8.20	58.6_b	11.00	45.9_c	8.20	< .01

Note: WISC = Wechsler Intelligence Scale for Children; WIAT = Wechsler Individual Achievement Test; SNAP = Swanson, Nolan, and Pelham rating scale; CBCL = Child Behavior Checklist.
[a]$n = 93$. [b]$n = 47$. [c]$n = 88$. [d]Group differences were tested via one-way analysis of variance. Means with different subscripts in a given row differ significantly, following Tukey post hoc corrections. [e]Continuous measure of family income. [f]Reading achievement standard score.

Table 2. *Differences Between ADHD and Comparison Girls on Predictors and Outcomes*

		Combined[a]		Inattentive[b]		Comparison[c]		
Variable	***n***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***p*[d]**
ADHD Predictors								
SNAP Hyperactivity/Impulsivity	228	7.30	2.00_a	3.600	2.30_b	0.280	0.710_c	< .00
SNAP Inattention	228	7.90	1.60_a	7.900	1.40_a	0.910	1.900_b	< .00
Externalizing Predictors								
Observed Noncompliance	228	0.15	0.09_a	0.070	0.06_b	0.040	0.040_c	< .00
Observed Overt Aggression	228	0.01	0.02_a	0.005	0.01_b	0.002	0.004_b	< .00
Covert ASB	213	0.19	0.45_a	0.140	$0.47_{a,b}$	0.020	0.150_b	< .01
Sociometric Predictors								
Social Preference	228	–0.12	0.29_a	0.001	0.16_b	0.130	0.120_c	< .00
Conduct Problems Outcomes								
ODD + CD Symptoms	204	16.30	8.10_a	15.100	5.70_a	10.500	6.000_b	< .00
School Functioning Outcomes								
WIAT Composite (Math/Reading)	204	–0.77	1.70_a	–0.680	1.80_a	1.100	1.300_b	< .00
Suspensions/Expulsions	202	0.26	0.57_a	0.000	0.00_b	0.000	0.000_b	< .00
Internalizing Outcomes								
Internalizing Symptoms	197	38.80	18.50_a	34.100	17.00_a	20.100	14.000_b	< .00
CDI	206	7.80	6.50_a	6.500	4.00_b	5.300	5.700_b	< .05
Peer Status (Teacher Ratings)								
Negative Social Preference	152	2.70	2.60_a	1.700	1.60_b	0.890	1.300_b	< .00
Substance Use Outcomes								
Variety	205	0.76	1.50	0.900	1.80	0.440	0.850	*ns*
Dependence Symptoms	207	0.53	2.40	0.050	0.31	0.020	0.220	< .08

Note: ADHD = attention deficit hyperactivity disorder; SNAP = Swanson, Nolan, and Pelham rating scale; ASB = antisocial behavior; Conduct Problems Outcomes = sum of parent and youth oppositional defiant disorder (ODD) and conduct disorder (CD) symptoms; WIAT = Wechsler Individual Achievement Test; Internalizing symptoms = sum of parent and youth internalizing symptoms; CDI = Child Depression Inventory; Variety = number of different substances used; Dependence = total number of symptoms of substance dependence from the Diagnostic Interview Schedule for Children (parent version).

[a]$n = 93$. [b]$n = 47$. [c]$n = 88$. [d]Group differences were tested via one-way ANOVA. Means with different superscripts in a given row differ significantly, following Tukey post hoc corrections.

did not differ at baseline on ethnicity, family structure, maternal education, and total family income (see Hinshaw, 2002). All families participated free of charge after giving full written consent.

As described in Hinshaw (2002), although about half of the ADHD sample was being treated with stimulant medications prior to the summer programs, most of the relevant caregivers agreed to their daughters' participation without medication. For the remaining families ($n = 23$), we performed a single-blind medication trial during the summer programs, such that on approximately half of the days, the girls received no medication. All data reported herein reflect unmedicated behavior patterns.

During the school year between 4 and 5 years after their initial involvement, families were invited to participate in our follow-up protocol via two on-campus sessions (Hinshaw et al., 2006). Parents provided full written consent for and adolescents assented to all procedures. Prior to the visits, parents and two secondary school teachers completed paper-and-pencil measures about each participant's behavior. Each visit lasted 3 to 4 hr, with separate parent and child assessments. Parents completed structured interviews and psychopathology ratings while their daughters completed tests of neuropsychological functioning and academic achievement and self-reports of psychopathology. Parent–adolescent interactions were also videotaped. Of the 228 original participants, 209 were assessed (92%), with an age range from 11.3 to 18.2 years ($M = 14.1$). The participants appear representative of the full sample (Hinshaw et al., 2006). Both the summer programs and the follow-up studies received full Institutional Review Board approval from the University of California, Berkeley Committee for the Protection of Human Subjects.

To test for differential attrition, we compared the 19 girls who did not participate with the 209 who did. Chi-square and independent sample t tests showed no significant differences between the two groups of girls on baseline variables: diagnostic status (ADHD vs. comparison), $\chi^2(1, N = 228) = .43$, $p = .51$, social preference, $t(226) = -1.9$, $p = .06$; overt aggression, $t(226) = -1.1$, $p = .28$; NC, $t(226) = -.22$, $p = .83$; covert ASB, $t(211) = .64$, $p = .52$; Full Scale IQ, $t(224) = -.80$, $p = .43$; maternal education level, $t(226) = -.23$, $p = .82$; family income, $t(217) = -1.82$, $p = .09$; age, $t(226) = .58$, $p = .56$; and ethnicity, $\chi^2(1, N = 228) = 2.1$, $p = .71$.

Baseline Measures

ADHD symptoms. We evaluated ADHD symptom dimensions of inattention and HI with the parent–teacher Swanson, Nolan, and Pelham Questionnaire (Swanson, 1992). To use multiple informants, we

followed Molina and Pelham (2003) by taking the higher score from the parent or teacher rating. To obtain symptom counts, we followed the convention that scores of 2 (*pretty much*) and 3 (*very much*) signify symptom presence, whereas scores of 0 (*not at all*) and 1 (*just a little*) are counted as absent (see Hinshaw, March, et al., 1997). Inattention symptoms from parent and teacher ratings were correlated with $r(226) = .79$; for HI, $r(226) = .66$. Cronbach αs were .79 and .88 for HI and inattention, respectively. The Swanson, Nolan, and Pelham Questionnaire has received extensive validation in differentiating children with and without a diagnosis of ADHD (Swanson, 1992) and as an indicator of treatment response (Swanson et al., 2001).

Aggression and NC. Microanalytic observations of social interactions were conducted by trained undergraduate observers in teams of four, rotated throughout camp periods. During individual 1-hr playground periods or classroom activities, observers coded behaviors "from the sideline." Using randomized rosters of girls' names and blind to their diagnostic and medication status, raters followed audiotaped commands from headphones. Three-second "find" commands were followed by 5-sec "observe" and 3-sec "record" intervals. Behaviors were placed in one of six mutually exclusive categories (NC, verbal or physical aggression, social isolation, compliant, and prosocial). NC was conceptualized and measured separately from verbal and physical aggression. Behaviors included annoying, intrusive, and norm-violation acts but did not involve verbal threats or taunts and physical contact with another individual. Verbal aggression included swearing or explicit verbal threats or insults. Physical aggression was acts directed toward others resulting in physical contact, including kicking, hitting, and shoving. Percentage of agreement among raters for these two categories was as follows: NC = .70 and physical or verbal aggression = .60 (Hinshaw, 2002). This system has received extensive validation in terms of differentiating groups of children with and without diagnoses of disruptive behavior disorders (Hinshaw, Simmel, & Heller, 1995), as an indicator of medication response (Hinshaw, Henker, Whalen, Erhardt, & Dunnington, 1989), as a predictor of initial sociometric impressions (Erhardt & Hinshaw, 1994), and as a criterion measure for the effects of parenting behavior (Anderson, Hinshaw, & Simmel, 1994).

Laboratory measure of covert ASB. During the final week of each summer camp, girls participated in a laboratory measure of covert ASB (Hinshaw et al., 1995). Children were instructed to work independently on a worksheet without adult supervision. Temptations, in the form of money and desirable small toys, were available, and some girls destroyed property (e.g., writing on walls with permanent markers). We estimated stealing (0 to 5) by adding the amount of money stolen ($0, $1, or $2) and the number of toys taken (0 to 3). Property destruction ranged from 0 (*no damage*) to 3 (*major damage*; e.g., writing on furniture). In prior research, covert ASB scores were shown to differentiate male ADHD and comparison samples; showed test–retest reliabilities of $r(20) = .41$, $p = .06$ for stealing and $r(20) = .59$, $p < .01$ for property destruction over consecutive days (comparison boys only); and, importantly, predicted severity of delinquency 5 years later (Hinshaw, Heller, & McHale, 1992; Hinshaw et al., 1995; Lee & Hinshaw, 2004).

Peer sociometrics. At the end of the first, middle, and last week of each summer camp, all participants were asked to nominate three classmates with whom they would most and least like to be friends (Blachman & Hinshaw, 2002). Each confidential interview was conducted away from the camp activities. Picture boards with identical head-and-shoulders photos of classmates were available to children to improve the nomination process. To account for minor differences in the number of children in classrooms and across summers, we created a peer regard measure by subtracting the total number of negative nominations from positive nominations and then dividing by the number of children in the classroom. Psychometrics reveal stability across the 5-week programs: $r(228) = .51$ for positive nominations and $r(228) = .85$ for negative nominations. This procedure has distinguished ADHD and comparison children (Blachman & Hinshaw, 2002) and has been sensitive to medication effects (Whalen, Henker, & Granger, 1989).

Follow-Up Measures in Adolescence

DISC–IV. The computerized DISC–IV (Shaffer et al., 2000) provides symptom counts and diagnoses using *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) criteria based on parent and youth reports including impairment criteria. In a sample of 84 parents and 82 children (ages 9 to 17; $M = 12.6$ years), 1-year test–retest kappas for the youth interview were κ = .51 for ODD, κ = .65 for CD, κ = .92 for major depression, and κ = .25 to .68 for anxiety disorders (M κ = .46; Shaffer et al., 2000). Kappas for the parent interview for the same modules were κ = .54 (ODD), κ = .43 (CD), κ = .66 (major depression), and ranged from .54 to .96 for anxiety disorders (M κ = .68). For conduct problems, we summed symptoms of ODD and CD from the parent and youth interviews (coefficient α = .58). Internalizing symptoms reflected separation anxiety, generalized anxiety, social phobia, agoraphobia, panic disorder, and major depression from parent and youth interviews (coefficient α = .47). Substance dependence symptoms were similarly derived (α = .74). In a sample of 369 youth in a residen-

tial treatment facility, ODD and CD diagnoses yielded from the computerized youth DISC–IV were associated with independent measures of aggression and ASB (Friman et al., 2000). Similarly, the computerized DISC–IV was the core diagnostic measure in the Multimodal Treatment Study of ADHD (MTA Cooperative Group, 1999).

School functioning. We used two measures of school functioning. First, we utilized the Wechsler Individual Achievement Test–Screener (Wechsler, 1992). Reading and math subtests are normed against a representative sample of American youth. Test–retest stability over a period of 12 to 52 days (*Mdn* = 17 days) in a sample of 367 five- to 17- year old youth ranged from .87 to .92 for reading and .74 to .92 for math (Wechsler, 1992). Second, we asked caregivers to indicate family status information, as well as services received by the child and family, on a year-by-year basis from the summer program through the follow-up period (see Hinshaw et al., 2006). We focused, however, on the number of suspensions and expulsions between the summer camp and the follow-up assessment, recorded on a year-by-year grid.

Children's Depression Inventory (CDI). The CDI (Kovacs, 1992) is 27-item, self-report measure yields a total score and five separate factor scores. Test–retest reliabilities ranged from .50 to .67 for the 6-week interval and .56 to .77 for a 1-month interval in separate samples of 1,266 school children and 134 clinically diagnosed children (age range from 10 to 15 years old; Kovacs, 1992). The CDI has been validated with adolescent girls by differentiating diagnostic groups (e.g., depressed vs. aggressive youth; Liss, Phares, & Liljequist, 2001). We used the total score, which had a coefficient α of .80 in this sample.

Dishion Social Preference Scale. The Dishion Social Preference Scale (Dishion, 1990). This is a three-item (5-point metric) teacher-completed measure of peer acceptance, rejection, and being ignored. Using a sample of more than 200 boys from the Oregon Youth Study, Dishion (1990) showed that peer sociometric status at age 10 was associated with social preference 2 years later. In the same sample at age 12, social preference correlated with ASB, depression, and deviant peer association (.60, .30, and .51, respectively). We estimated negative social preference by subtracting the reject from the accept rating and then reverse scoring it. This approach was sensitive to diagnostic group differences in a sample of 255 children with and without ADHD (ages 4 to 6 at baseline and assessed annually for 4 years; Lahey et al., 2004). Specifically, ADHD was associated with higher levels of negative social preference than age- and ethnicity-matched comparison children.

Substance Use Questionnaire (SUQ; Molina & Pelham, 2003). The SUQ is a structured interview adapted from the Health Interview Questionnaire (Jessor, Donovan, & Costa, 1989). The SUQ includes lifetime exposure and frequency questions. Among 250 children with and without ADHD (Molina & Pelham, 2003), kappas for 2-week test–retest reliability for "ever trying" substances averaged .84, ranging from .70 (cigarettes) to .91 (marijuana). For categorical variables, psychometrics were as follows: $r(155) = .90$, $\kappa = .90$ for "ever had a drink?"; $r(100) = .94$, $\kappa = .93$ for "ever been drunk?"; $r(99) = .89$, $\kappa = .44$ for "frequency of five or more drinks." Molina and Pelham found that inattention symptoms predicted substance use 5 years later using the SUQ. Given the age of our sample (M = 14 years) and low base rates of some substance use indicators, we supplemented the parent-reported DISC–IV substance dependence measures by scoring the SUQ for the number of different substances used, given its differentiation of girls with and without abuse histories (Bailey & McCloskey, 2005).

Results

Data Analytic Plan

To test the independent contribution of our predictors (inattention and HI dimensions, NC, overt aggression, covert ASB, and social preference) to the five domains of adolescent outcome (conduct problems, school functioning as indexed by academic achievement and the number of suspensions or expulsions, substance use, internalizing problems, and negative social preference), we performed hierarchical linear regressions, entering first a block of covariates (age and family income) followed by preordered predictors. Although Verbal IQ deficits were associated with ADHD (Cohen's d = .95 between probands and comparisons in our sample), results were virtually identical with and without Verbal IQ in the models; thus, we report results without Verbal IQ controlled. Predictors were centered using the sample mean, and each predictor was entered last to test the significance of the variance explained in the outcome with control of all covariates and other predictors. After all main effects, Predictor × Diagnostic Group interactions were entered at the final step. Table 2 provides diagnostic group differences between girls with ADHD and comparison girls for our predictor and outcome measures.

Zero-Order Correlations

Correlations among predictors are presented in Table 3. Although some of the predictors were moderately correlated (e.g., overt aggression and NC were correlated at r = .57 and HI and peer status at r = –.51),

Table 3. *Intercorrelations Among Predictors and Outcome Variables*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Noncompliance	—	.57**	.34**	–.45**	.58**	.46**	39**	–.27**	.40**	.21**	.37**	.38**	.15*	.07
2. Overt Aggression	—	—	.09	–.46**	.41**	.31**	.25**	–.28**	.27**	–.01	.25**	.34**	–.02	.03
3. Covert ASB	—	—	—	–.13	.22**	.19**	.13	–.05	.23**	.22**	.20**	.11	–.09	–.04
4. Peer Status	—	—	—	—	–.51**	–.42**	–.22**	.30**	–.31**	–.16*	–.27**	–.50**	.12	.01
5. SNAP Hyperactivity–Impulsivity	—	—	—	—	—	.76**	.39**	–.39**	.37**	.19**	.52**	.36**	.14*	.19**
6. SNAP Inattention	—	—	—	—	—	—	.37**	–.46**	.27**	.17*	.46**	.27**	.16*	.11
7. Conduct Problems	—	—	—	—	—	—	—	–.22**	.29**	.38**	.55**	.26**	.46**	.38**
8. WIAT Achievement	—	—	—	—	—	—	—	—	–.21**	–.14	–.32**	–.14	–.19**	–.23**
9. Suspensions/Expulsions	—	—	—	—	—	—	—	—	—	.07	.30**	.22**	.06	.27**
10. CDI	—	—	—	—	—	—	—	—	—	—	.52**	.24**	.31**	.17*
11. Internalizing Symptoms	—	—	—	—	—	—	—	—	—	—	—	.25**	.26**	.19**
12. Negative Social Preference	—	—	—	—	—	—	—	—	—	—	—	—	–.03	.001
13. Substance Variety	—	—	—	—	—	—	—	—	—	—	—	—	—	.53**
14. Substance Dependence	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Note: Overt Aggression = observed Physical + Verbal aggression; ASB = antisocial behavior (Stealing + Property Destruction); SNAP = Swanson, Nolan, and Pelham rating scale; Conduct Problems = sum of parent and youth oppositional defiant disorder and conduct disorder symptoms; WIAT Achievement = composite of Wechsler Individual Achievement Math and Reading; CDI = Child Depression Inventory; Internalizing Symptoms = sum of parent and youth internalizing disorder symptoms; Substance Variety = number of different substances used; Substance Dependence = number of substance use dependence symptoms.
*$p < .05$. **$p < .01$.

the magnitude of the associations does not suggest redundancy. Their overlap, however, requires simultaneous control of the other predictors.

Hierarchical Regression Analyses Predicting Adolescent Outcomes

The results of the hierarchical regression analyses predicting conduct problems in adolescence are presented in Table 4. HI significantly predicted conduct problems (R^2 = .03, β = .29, p < .03) after controlling for all covariates and all other predictors, but inattention did not (R^2 = .00, β = .02, p = .86). NC also independently predicted conduct problems (R^2 = .03, β = .24, p < .02) but overt aggression, covert ASB, and peer status did not. None of the interactions between predictors and group status was significant.

Results of analyses predicting standardized achievement scores in adolescence are also reported in Table 4. Inattention significantly predicted the composite index of academic achievement (R^2 = .04, β = –.32, p < .01) but HI did not (R^2 = .00, β = –.05, p = .68). Although the HI × Group interaction term was significant (R^2 = .03, β = .62, p < .01), separate examinations of HI and achievement in the ADHD and control groups did not yield meaningful differences (ADHD: R^2 = .00, β = .03, p = .77; Comparison: R^2 = .00, β = .06, p = .61). However, this analysis may not be adequately powered to examine predictor–outcome models separately by diagnostic group. None of the other predictors was significant, and neither were any interaction terms.

Table 4. *Summary of Hierarchical Regressions: Predicting Conduct Problems and Academic Achievement*

Follow-Up Measures	ΔR^{2a}	β[b]	p[c]
Outcome Domain: Conduct Problems (ODD + CD Symptoms)			
Hyperactivity–Impulsivity Symptoms	.03	.29	< .05
Inattention Symptoms	.00	.02	*ns*
Overt Aggression	.01	.15	*ns*
Covert Antisocial Behavior	.01	.08	*ns*
Observed Noncompliance	.03	.24	< .05
Peer Status	.00	.07	*ns*
Substance Variety	.01	.18	ns
Outcome Domain: Reading and Math Achievement (Composite)			
Hyperactivity–Impulsivity Symptoms	.00	–.05	ns
Hyperactivity–Impulsivity × Group Interaction	.03	.62	< .01
Inattention Symptoms	.04	–.32	< .00
Overt Aggression	.01	–.15	*ns*
Covert Antisocial Behavior	.00	.01	*ns*
Observed Noncompliance	.00	.07	< .00
Peer Status	.01	.10	*ns*

Note: ODD = oppositional defiant disorder; CD = conduct disorder.
[a]Change in R^2 associated with each predictor with control of all preceding variables. [b]Beta reflects association with outcome with simultaneous control of previous variables. [c]Significance level associated with predictor at final step, following entry of all main effects.

The regression analyses for school suspensions and expulsions are provided in Table 5. NC and peer status were significant predictors (R^2 = .09, β = .41, p < .00 and R^2 = .02, β = –.20, p < .05, respectively) after controlling for covariates and all other predictors. Inattention did not have a significant main effect for suspensions and expulsions, but there was a significant interaction with diagnostic group (R^2 = .03, β = .21, p < .05). Separate regressions for the ADHD and comparison group showed a modest relation in the ADHD group (R^2 = .01, β = .12, p = .23). Analyses could not be conducted for the comparison girls because all 16 children with a history of suspensions and expulsions were in the ADHD group. HI, NC, overt aggression, covert ASB, and their respective interaction terms with group membership were not significant.

The results of the regression analyses predicting negative social preference scores in adolescence are also provided in Table 5. HI and inattention did not significantly predict negative social preference, and none of the other externalizing predictors was independently associated with peer status. As expected, however, baseline peer status predicted the follow-up negative social preference score, even controlling for initial externalizing behavior (R^2 = .07, β = –.36, p < .01). Interaction terms were not significant, suggesting that predictor–outcome relations did not differ by diagnostic group.

The results of the hierarchical regression analyses predicting internalizing symptoms and depression are provided in Table 6. HI significantly predicted internalizing symptoms (R^2 = .04, β = .36, p < .01) but not

Table 5. *Summary of Hierarchical Regressions: Predicting Suspensions/Expulsions and Negative Social Preference*

Follow-Up Measures	ΔR^{2a}	β[b]	p[c]
Outcome Domain: Number of Suspensions/Expulsions			
Hyperactivity–Impulsivity Symptoms	.00	.08	*ns*
Inattention Symptoms	.00	.00	*ns*
Inattention × Group Interaction	.03	.21	< .05
Overt Aggression	.00	–.03	*ns*
Covert Antisocial Behavior	.00	.06	< .00
Observed Noncompliance	.09	.41	*ns*
Peer Status	.02	–.20	< .05
Outcome Domain: Negative Social Preference			
Hyperactivity–Impulsivity Symptoms	.01	.18	*ns*
Inattention Symptoms	.00	–.02	*ns*
Overt Aggression	.00	.03	*ns*
Covert Antisocial Behavior	.00	–.04	*ns*
Observed Noncompliance	.01	.12	*ns*
Peer Status	.07	–.36	< .00

[a]Change in R^2 associated with each predictor with control of all preceding variables. [b]Beta reflects association with outcome with simultaneous control of previous variables. [c]Significance level associated with predictor at final step, following entry of all main effects.

Table 6. *Summary of Hierarchical Regressions: Predicting Internalizing Symptoms and Child Depression*

Follow-Up Measures	ΔR^{2a}	β^b	p^c
Outcome Domain: Internalizing Symptoms			
Hyperactivity–Impulsivity Symptoms	.04	.36	< .00
Inattention Symptoms	.00	.09	*ns*
Overt Aggression	.01	.13	*ns*
Covert Antisocial Behavior	.03	.20	*ns*
Observed Noncompliance	.02	.19	< .05
Peer Status	.00	–.01	ns
Outcome Domain: Child Depression[d]			
Hyperactivity–Impulsivity Symptoms	.01	.12	*ns*
Inattention Symptoms	.00	–.09	*ns*
Overt Aggression	.00	–.07	ns
Covert Antisocial Behavior	.08	.31	< .00
Observed Noncompliance	.00	.09	*ns*
Peer Status	.00	–.08	*ns*

[a]Change in R^2 associated with each predictor with control of all preceding variables. [b]Beta reflects association with outcome with simultaneous control of previous variables. [c]Significance level associated with predictor at final step, following entry of all main effects. [d]Total score from the Children's Depression Inventory.

Table 7. *Summary of Hierarchical Regressions: Predicting Substance Use Variety and Dependence*

Follow-Up Measures	ΔR^{2a}	β^b	p^c
Outcome Domain: Substance Dependence Symptoms			
Hyperactivity–Impulsivity Symptoms	.04	.34	< .05
Inattention Symptoms	.01	–.15	*ns*
Overt Aggression	.00	.05	*ns*
Covert Antisocial Behavior	.00	–.03	*ns*
Observed Noncompliance	.01	.10	*ns*
Peer Status	.01	.13	*ns*
Outcome Domain: Number of Different Substances Used			
Hyperactivity–Impulsivity Symptoms	.01	.18	*ns*
Inattention Symptoms	.00	–.10	*ns*
Overt Aggression	.00	.00	ns
Covert Antisocial Behavior	.00	–.04	*ns*
Observed Noncompliance	.02	.21	< .05
Peer Status	.02	.18	*ns*

[a]Change in R^2 associated with each predictor with control of all preceding variables. [b]Beta reflects association with outcome with simultaneous control of previous variables. [c]Significance level associated with predictor at final step, following entry of all main effects.

the CDI ($R^2 = .01$, $\beta = .12$, $p < .40$). Inattention was unrelated to both emotional distress measures. NC significantly predicted internalizing symptoms ($R^2 = .02$, $\beta = .21$, $p < .05$) but not the CDI ($R^2 = .01$, $\beta = .12$, $p < .23$). Covert ASB also predicted the CDI ($R^2 = .05$, $\beta = .23$, $p < .01$) with a marginal effect for internalizing symptoms ($R^2 = .03$, $\beta = .20$, $p = .07$), whereas overt aggression, peer status, and their interactions with group membership did not yield significant predictions.

Table 7 summarizes the final set of regression analyses predicting substance use. HI significantly predicted parent-reported substance dependence ($R^2 = .04$, $\beta = .34$, $p < .05$) but was unrelated to substance use variety ($R^2 = .01$, $\beta = .18$, $p = .18$). Inattention, overt aggression, and covert ASB did not significantly predict either substance-related outcome after controlling for covariates and other predictors. NC significantly predicted substance use variety ($R^2 = .02$, $\beta = .21$, $p < .05$). Finally, none of the interaction terms with group membership was significant.

Discussion

Given the paucity of prospective research on girls with ADHD, we tested several key hypotheses regarding the predictive strength of ADHD symptom dimensions, NC, overt aggression, covert ASB, and peer status on key domains of adolescent functioning in preadolescent girls followed prospectively 5 years later. We selected a broad spectrum of ecologically relevant outcomes, including conduct problems, academic functioning, substance use, internalizing behavior, and negative social preference.

Consistent with recent interest in research on conduct problems in girls (Moffitt, Caspi, Rutter, & Silva, 2001), we contrasted HI and inattention as predictors of ASB. HI significantly predicted conduct problems, consistent with other findings that HI predicts ASB over time (Babinski, Hartsough, & Lambert, 1999). Recent work also suggests that HI in girls may actually represent the same underlying trait that is expressed as CD in boys (Hartung, Milich, Lynam, & Martin, 2002). Finally, NC predicted conduct problems whereas overt aggression, covert ASB, and social preference did not. The importance of NC in the origins of conduct problems mirrors our previous report using boys (Lee & Hinshaw, 2004), which revealed that NC independently predicted delinquency severity at a 5-year follow-up.

Why might NC be an important predictor of conduct problems? First, higher base rates of NC than aggression during observational periods may have made NC more capable of explaining variance. At baseline, NC may have been a more developmentally sensitive measure of ASB. This may be particularly true for girls, who show lower rates of overt aggression than boys (Keenan & Shaw, 1997). NC is also the midpoint in the overt–covert continuum, perhaps including the separate risk factors associated with the overt and covert spectrum (e.g., overt aggression being more heritable than covert ASB; Edelbrock, Rende, Plomin, & Thompson, 1995; Loeber & Schmaling, 1985; Loeber et al., 1993). NC may also mirror ODD as a precursor of later delinquency (Lahey, McBurnett, & Loeber, 2000).

Past research connecting conduct problems and academic achievement problems during childhood may

have been misleading, given the overlap of aggressive behavior with ADHD and the independent contribution of early ADHD to underachievement (Hinshaw, 1992). As result, we hypothesized that externalizing behavior and peer status would not significantly predict adolescent underachievement with ADHD controlled. As with boys (Hinshaw, 1992), inattention significantly predicted academic achievement, whereas HI, ASB, and peer status did not. The predictive strength of inattention to academic problems, even with control of HI, diverse forms of ASB, and peer status, underscores impairments associated with this dimension in ADHD girls. Note that in the same sample of girls, Hinshaw et al. (2006) showed that a categorical diagnosis of ADHD in childhood was a specific predictor of adolescent achievement problems, over and above demographics, comorbidity, and even IQ. These findings suggest that it was the inattention dimension that accounted for this relation.

For an index of school behavior (suspensions or expulsions), we found that only girls with ADHD had histories of suspensions or expulsions during the transition from primary to secondary school and that both NC and peer status were independently associated with school behavior problems. Evidence for the independent predictive role of peer status and later adjustment is inconsistent (Lee & Hinshaw, 2004; Nelson & Dishion, 2004), but these findings suggest that examining ecologically valid outcomes may be crucial. For example, using school behavior problems (as reported by peers or teachers) minimizes the influence of shared method variance. Second, symptoms of ODD and CD refer to a narrow range of acts that do not account for the full range of ASB (e.g., relational aggression). Finally, suspensions and expulsions implicitly involve impairment whereas symptoms do not involve impairment per se (see Pelham, Fabiano, & Massetti, 2005, for a thoughtful discussion on the relevance of symptoms vs. impairment).

Because adolescent experimentation with substance use can be somewhat normative, we featured outcomes over and above simple use of substances. That is, we employed measures that assessed substance dependence and the variety of substances used. Contrary to Molina and Pelham (2003), we found that HI (and not inattention) predicted substance dependence symptoms. Such discrepancies reveal that the link between specific dimensions of ADHD and substance abuse requires additional study. Potential explanations for these discrepant results include the selection of covariates (e.g., we controlled overt and covert ASB and peer status), sex-specific differences in the association, and the age range of participants. Note that NC also significantly predicted the number of different substances used, revealing its ubiquity as a predictor of poor outcome.

Internalizing symptoms are particularly relevant for adolescent girls, for whom pubertal onset marks the beginning of a rise in symptoms relative to boys (Lewinsohn et al., 1993). In this study, HI was the more relevant ADHD dimension in predicting this symptom domain. The most striking finding, however, was that covert ASB and NC predicted different aspects of emotional distress. Specifically, covert ASB was associated with self-reported depression and NC predicted internalizing symptoms. An association between externalizing behavior and later emotional problems in girls is not unexpected (Pajer, 1998). For example, Keenan and Shaw (1997) suggested that girls may be funneled toward internalizing problems after the age of 3 to 4 years given their advanced cognitive and language abilities and emotion regulation relative to boys.

After controlling for diverse forms of ASB and childhood social preference, HI and inattention did not significantly predict negative social preference in adolescence, nor did any other predictors except childhood peer status. This underscores the continuity of indicators of peer relationships over time (Coie & Dodge, 1983). However, we emphasize that positive peer regard may not be universally associated with successful development. For example, social preference in the context of association with deviant peers or siblings may accentuate negative outcomes (Stormshak, Comeau, & Shepard, 2004). Similarly, within low socioeconomic neighborhoods, delinquency may be positively correlated with social preference (Coie & Jacobs, 1993).

There are some important limitations to this study. First, the variance accounted for in adolescence for all outcome measures was under 10%. Therefore, although we identified precursors to various problems in adjustment, most of the variance in these outcomes remains unexplained. Refining measurement by using person-centered approaches that identify subgroups of children (e.g., latent class analysis) and building transactional models that include translational research methods (e.g., genetic, pathophysiology) should improve predictions. Second, although the participants were ethnically and socioeconomically diverse, the sample was a combination of children with ADHD and a comparison group. Thus, the sample was not representative of either clinic-referred or community-recruited children. Third, the few significant interactions may be a result of modest power and the difficulty of finding interactions in nonexperimental research (McClelland & Judd, 1993). Fourth, two-occasion data helped to sort the temporal ordering of variables but did not allow for tests of mediation (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). Such tests would be possible with additional waves of data collection. Fifth, the age range of our participants did not allow for subgroup analyses within externalizing children (early- vs. adolescent-onset ASB). For example, at follow-up, some girls had not even entered adolescence, whereas others had more exposure to risk factors re-

lated to adolescent development (e.g., deviant male peers). Thus, different developmental patterns may not be readily detected given that developmental risk was not equitably distributed among the girls.

In conclusion, these analyses suggest that early hyperactivity and NC are important predictors of adolescent functioning across a number of key domains, independent of their association with important covariates. Thus, multifinalilty appears pertinent for girls with early externalizing problems. We also emphasize that heterotypic continuity is particularly salient in this sample of girls, given that covert ASB and NC both significantly predicted different aspects of emotional distress. It has been suggested that internalizing outcomes (e.g., somatization) of aggressive girls may be comparable to antisocial outcomes of aggressive boys (Lilienfeld, 1992). Intervention efforts, particularly early in development, are indicated given the functional deficits associated with externalizing behavior in girls. Finally, for future investigations, we recommend tests of moderation to specify risk–outcome relationships that include multiple levels of influence (e.g., callous–unemotional traits, genetic risk using measured genotypes). Tests of mediation are also essential to identify the underlying mechanisms governing these statistical associations (e.g., effective parenting, successful coping strategies). Collectively, these tests should provide key insights into the transactional nature of atypical development in girls with ADHD.

References

Achenbach, T. M. (1991a). *Manual for the Child Behavior Checklist/4–18 and 1991 profile.* Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M. (1991b). *Manual for the Teacher Report Form and 1991 profile.* Burlington: University of Vermont, Department of Psychiatry.

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

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Anderson, C. A., Hinshaw, S. P., & Simmel, C. (1994). Mother–child interactions in ADHD and comparison boys: Relationships to overt and covert externalizing behavior. *Journal of Abnormal Child Psychology, 22,* 247–265.

Armstrong, T. D., & Costello, E. J. (2002). Community studies on adolescent substance use, abuse, or dependence and psychiatric comorbidity. *Journal of Consulting and Clinical Psychology, 70,* 1224–1239.

Babinski, L. M., Hartsough, C. S., & Lambert, N. M. (1999). Childhood conduct problems, hyperactivity–impulsivity, and inattention as predictors of adult criminal activity. *Journal of Child Psychology & Psychiatry, 40,* 347–355.

Bailey, J. A., & McCloskey, L. A. (2005). Pathways to adolescent substance abuse among sexually abused girls. *Journal of Abnormal Child Psychology, 33,* 39–53.

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (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.

Blachman, D. R., & Hinshaw, S. P. (2002). Patterns of friendship in girls with and without attention deficit/hyperactivity disorder. *Journal of Abnormal Child Psychology, 30,* 625–640.

Chen, W. J., Faraone, S. V., Biederman, J., & Tsuang, M. T. (1994). Diagnostic accuracy of the Child Behavior Checklist scales for attention-deficit hyperactivity disorder: A receiver-operating characteristic analysis. *Journal of Consulting and Clinical Psychology, 62,* 1017–1025.

Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology, 8,* 597–600.

Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A five-year longitudinal study. *Merrill–Palmer Quarterly, 29,* 261–282.

Coie, J. D., & Jacobs, M. R. (1993). The role of social context in the prevention of conduct disorder. *Development and Psychopathology, 5,* 263–275.

Coie, J. D., Lochman, J. E., Terry, R., & Hyman, C. (1992). Predicting early adolescent disorder from childhood aggression and peer rejection. *Journal of Consulting and Clinical Psychology, 60,* 783–792.

Dishion, T. (1990). The peer context of troublesome child and adolescent behavior. In P. E. Leone (Ed.), *Understanding troubled and troubling youth: Multiple perspectives* (pp. 128–153). Thousand Oaks, CA: Sage.

Edelbrock, C., Rende, R., Plomin, R., & Thompson, L. A. (1995). A twin study of competence and problem behavior in childhood and early adolescence. *Journal of Child Psychology & Psychiatry, 36,* 775–785.

Erhardt, D., & Hinshaw, S. P. (1994). Initial sociometric impressions of ADHD and comparison boys: Predictions from social behaviors and from nonbehavioral variables. *Journal of Consulting and Clinical & Psychology, 62,* 833–842.

Fischer, M., Barkley, R. A., Edelbrock, C. S., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: II. Academic, attentional, and neuropsychological status. *Journal of Consulting & Clinical Psychology, 58,* 580–588.

Fischer, M., Barkley, R. A., Smallish, L., & Fletcher, K. R. (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.

Friman, P. C., Handwerk, M. L., Smith, G. L., Larzelere, R. E., Lucas, C. P., & Shaffer, D. M. (2000). External validity of conduct and oppositional defiant disorders by the NIMH Diagnostic Interview Schedule for Children. *Journal of Abnormal Child Psychology, 28,* 277–286.

Hartung, C. M., Milich, R., Lynam, D. R., & Martin, C. A. (2002). Understanding the relations among gender, disinhibition, and disruptive behavior in adolescents. *Journal of Abnormal Psychology, 111,* 659–664.

Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111,* 127–155.

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 & Clinical Psychology, 70,* 1086–1098.

Hinshaw, S. P., & Blachman, D. R. (2005). Attention-deficit/hyperactivity disorder. In D. Bell-Dolan, S. Foster, & E. J. Mash

(Eds.), *Handbook of behavioral and emotional problems in girls* (pp. 117–147). New York: Kluwer Academic/Plenum.

Hinshaw, S. P., Heller, T., & McHale, J. P. (1992). Covert antisocial behavior in boys with attention-deficit hyperactivity disorder: External validation and effects of methylphenidate. *Journal of Consulting & Clinical Psychology, 60,* 274–281.

Hinshaw, S. P., Henker, B., Whalen, C. K., Erhardt, D., & Dunnington, R. E. (1989). Aggressive, prosocial, and nonsocial behavior in hyperactive boys: Dose effects of methylphenidate in naturalistic settings. *Journal of Consulting & Clinical Psychology, 57,* 636–643.

Hinshaw, S. P., Lahey, B. B., & Hart, E. L. (1993). Issues of taxonomy and comorbidity in the development of conduct disorder. *Development and Psychopathology, 5,* 31–49.

Hinshaw, S. P., March, J. S., Abikoff, H., Arnold, L. E., Cantwell, D. P., Conners, C. K., et al. (1997). Comprehensive assessment of childhood attention-deficit hyperactivity disorder in the context of a multisite, multimodal clinical trial. *Journal of Attention Disorders, 1,* 217–234.

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

Hinshaw, S. P., Owens, E., Sami, N., & Fargeon, S. (2006). Prospective follow-up of girls with attention-deficit/hyperactivity disorder (ADHD) into adolescence: Evidence for continuing cross-domain impairment. *Journal of Consulting & Clinical Psychology, 74.*

Hinshaw, S. P., Simmel, C., & Heller, T. (1995). Multimethod assessment of covert antisocial behavior in children: Laboratory observations, adult ratings, and child self-report. *Psychological Assessment, 7,* 207–219.

Hinshaw, S. P., Zupan, B. A., Simmel, C., Nigg, J. T., & Melnick, S. (1997). Peer status in boys with attention-deficit/hyperactivity disorder: Predictions from overt and covert antisocial behavior, social isolation, and authoritative parenting beliefs. *Child Development, 68,* 880–896.

Jessor, R., Donovan, J. E., & Costa, F. M. (1989). *Health Behavior Questionnaire.* Boulder: University of Colorado, Institute of Behavioral Science.

Keenan, K., & Shaw, D. S. (1997). Developmental and social influences on young girls' early problem behavior. *Psychological Bulletin, 121,* 95–113.

Kovacs, M. (1992). *Manual: Children's Depression Inventory.* Toronto, Ontario, Canada: MultiHealth Systems.

Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer. D. (2001). How do risk factors work together? Mediators, moderators, independent, and overlapping, and proxy risk factors. *American Journal of Psychiatry, 158,* 848–856.

Lahey, B. B., McBurnett, K., & Loeber, R. (2000). Are attention-deficit/hyperactivity disorder and oppositional defiant disorder developmental precursors to conduct disorder? In A. J. Sameroff, M. Lewis, & S. M. Miller (Eds.), *Handbook of developmental psychopathology* (2nd ed., pp. 431–446). New York: Kluwer Academic/Plenum.

Lahey, B. B., Pelham, W. E., Loney, J., Kipp, H., Ehrhardt, A., Lee, S. S., et al. (2004). Three-year predictive validity of *DSM–IV* - attention-deficit/hyperactivity disorder in children diagnosed at 4–6 years of age. *American Journal of Psychiatry, 161,* 2014–2020.

Lee, S. S., & Hinshaw, S. P. (2004). Severity of adolescent delinquency among boys with and without attention-deficit hyperactivity disorder (ADHD): Predictions from early antisocial behavior and peer status. *Journal of Clinical Child and Adolescent Psychology, 33,* 705–716.

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other *DSM–III–R* disorders in high school students. *Journal of Abnormal Psychology, 102,* 133–144.

Lilienfeld, S. O. (1992). The association between antisocial personality and somatization disorders: A review and integration of theoretical models. *Clinical Psychology Review, 12,* 641–662.

Liss, H., Phares, V., & Liljequist, L. (2001). Symptom endorsement differences on the Children's Depression Inventory with children and adolescents on an inpatient unit. *Journal of Personality Assessment, 76,* 396–411.

Loeber, R., Farrington, D. P., Stouthamer-Loeber, M., & Van Kammen, W. B. (1998). *Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence.* Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Loeber, R., & Schmaling, K. B. (1985). Empirical evidence for overt and covert patterns of antisocial conduct problems: A meta-analysis. *Journal of Abnormal Child Psychology, 13,* 337–352.

Loeber, R., Wung, P., Keenan, K., Giroux, B., Stouthamer-Loeber, M., Van Kammen, W. B., et al. (1993). Developmental pathways in disruptive child behavior. *Development and Psychopathology, 5,* 103–133.

Mannuzza, S., & Klein, R. G. (1999). Adolescent and adult outcomes in attention-deficit/hyperactivity disorder. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 279–294). New York: Plenum.

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

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties in detecting interactions and moderator effects. *Psychological Bulletin, 114,* 376–390.

Moffitt, T. E., Caspi, A., Rutter, M., & Silva, P. A. (2001). Sex differences in antisocial behaviour: Conduct disorder, delinquency, and violence in the Dunedin longitudinal study. Cambridge, England: Cambridge University Press.

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). Fourteen-month randomized clinical trial of treatment strategies for attention-deficit hyperactivity disorder. *Archives of General Psychiatry, 56,* 1073–1086.

Nadder, T. S., Rutter, M., Silberg, J. L., Maes, H. H., & Eaves, L. J. (2002). Genetic effects on the covariation attention deficit-hyperactivity disorder (ADHD) and oppositional-defiant disorder/conduct disorder (ODD/CD) symptomatologies across informant and occasion of measurement. *Psychological Medicine, 32,* 39–53.

Nelson, S. E., & Dishion, T. J. (2004). From boys to men: Predicting adult adaptation from middle childhood sociometric status. *Development and Psychopathology, 16,* 441–459.

Pajer, K. A. (1998). What happens to "bad" girls? A review of the adult outcomes of antisocial adolescent girls. *American Journal of Psychiatry, 155,* 862–870.

Pelham, W. E., Fabiano, G. A., & Massetti, G. M. (2005). Evidence-based assessment of attention deficit hyperactivity disorder in children and adolescents. *Journal of Clinical Child and Adolescent Psychology, 34,* 449–476.

Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children, Version IV (NIMH DISC–IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry, 39,* 28–38.

Stormshak, E. A., Comeau, C. A., & Shepard, S. A. (2004). The relative contribution of sibling deviance and peer deviance in the prediction of substance use across middle childhood. *Journal of Abnormal Child Psychology, 32,* 635–649.

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

Swanson, J. M., Kraemer, H. C., Hinshaw, S. P., Arnold, L. E., Conners, C. K., Abikoff, H. B., et al. (2001). Clinical relevance of the primary findings of the MTA: Success rates based on severity of ADHD and ODD symptoms at the end of treatment. *Journal of the American Academy of Child & Adolescent Psychiatry, 40,* 168–179.

Wechsler, D. (1992). *Wechsler Individual Achievement Test.* New York: Psychological Corporation.

Whalen, C. K., Henker, B., & Granger, D. A. (1989). Ratings of medication effects in hyperactive children: Viable or vulnerable? *Behavioral Assessment, 11,* 179–199.

Willis, T. A., & Dishion, T. J. (2004). Temperament and adolescent substance abuse: A transactional analysis of emerging self-control. *Journal of Clinical Child and Adolescent Psychology, 33,* 69–81.

Woodward, L. J., & Fergusson, D. M. (1999). Childhood peer relationship problems and psychosocial adjustment in late adolescence. *Journal of Abnormal Child Psychology, 27,* 87–104.

Received August 1, 2005
Accepted February 21, 2006