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Late Adolescent and Young Adult Outcomes of Girls Diagnosed with ADHD in Childhood: An Exploratory Investigation

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Abstract

Objective—The study aims to characterize the late adolescent and young adult outcomes of girls diagnosed with ADHD in childhood.

Method—The study included 58 females from a larger longitudinal study of ADHD. Thirty-four ($M=19.97$ years old) met DSM criteria for ADHD in childhood, while the remaining 24 ($M=19.83$ years old) did not. Self- and parent-reports of psychopathology, delinquency, interpersonal relationships, academic achievement, job performance, and substance use were collected.

Results—The findings suggest that girls with ADHD experience difficulties in late adolescence and young adulthood, such as more conflict with their mothers, being involved in fewer romantic relationships, and experiencing more depressive symptoms than comparison women. However, differences did not emerge in all domains, such as job performance, substance use, and self-reported ADHD symptomatology.

Conclusion—The findings of this study add to the literature on the negative late adolescent and young adult outcomes associated with childhood ADHD in females.

Until recently, ADHD was considered a male disorder, occurring 2 to 9 times more frequently in males than females (Barkley, 2006). Now, researchers have turned their attention to studying ADHD in girls and have found that they manifest psychopathology and impairment similar to boys (Pelham, Walker, Sturges, & Hoza, 1989; Waschbusch, King, & Northern Partners In Action for Children and Youth, 2006). However, developmental outcomes for women with ADHD remain largely unexplored. There are popular books on women with ADHD (e.g. *Understanding ADHD in Women* by Kathleen Nadeau and Patricia Quinn), but these books typically lack empirical support or are based on case studies of women who present with ADHD for the first time in adulthood, and whether or not they had childhood ADHD is unclear. Although both adult and child ascertained women with ADHD have been reported to experience psychopathology such as high rates of anxiety, mood and substance disorders, (Biederman et al., 2006; Quinn, 2005), some research suggests that women diagnosed in childhood experience more psychopathology and impairment than women referred for the first time in adulthood (Barkley, 2006; Biederman et al., 2004). No study, however, has explored late adolescent and young adult outcomes of girlhood ADHD

prospectively. Thus, there is a clear need to better understand the developmental outcomes of childhood ADHD for women.

Two longitudinal studies have followed girls with ADHD into *adolescence*. In one study (Hinshaw, 2002), girls with ADHD (mean age approximately 9 years old) were found to experience more psychopathology, and social, academic, and cognitive impairment than girls without ADHD. After five years (mean age approximately 14 years old), similar problems persisted and new difficulties, including substance use and eating problems, also emerged for girls with ADHD (Hinshaw, Owens, Sami, & Fargeon, 2006). The other study of female ADHD included a broader age range (6 to 18, mean age 11.2 +/- 3.4 years old; Biederman et al., 1999) but found similar impairment for girls with ADHD compared to girls without ADHD, such as more psychopathology, substance use, and lower cognitive, family, academic, and overall functioning, which persisted five years later (Biederman et al., 2006).

These two studies show that girls with ADHD experience more difficulties than girls without ADHD, at least into adolescence. Late adolescence and young adulthood may present new challenges because of the increased responsibility required in this developmental period (Arnett, 2007) combined with gender-specific vulnerabilities such as internalizing symptoms. Inattention, hyperactivity, and impulsivity associated with ADHD may impair completing school, securing employment, living independently, and negotiating romantic relationships.

Late adolescent and young adult females with ADHD may experience problems which have not been reported in ADHD males (Bagwell, Molina, Kashdan, Pelham & Hoza, 2006), including depression. Women in general are twice as likely as men to experience depression (Lewinsohn, Rhode, Seeley, & Baldwin, 2001), and studies of female ADHD have found an increased risk of depression for girls with ADHD compared to girls without ADHD, at least into adolescence (Biederman et al., 2008; Hinshaw et al., 2006).

It is also important to explore delinquency outcomes in late adolescent and young women with ADHD. Biederman and colleagues (2006) reported higher rates of ODD, CD, and ASPD in females with ADHD compared to females without ADHD, and Molina and colleagues (2007) also showed that even within the 11 to 13 year old age range, females with ADHD engaged in delinquency more often than females without ADHD. However, the rates of delinquency in females were still lower than those reported in ADHD males (Barkley, 2006; Sibley et al., in preparation). Work by Silverthorn and Frick (1999) suggests that a significant portion of females begin to engage in delinquent behavior beginning in adolescence. Thus it is particularly important to understand delinquency for females in late adolescence and young adulthood.

Interpersonal impairment in peer and family relationships has long been documented for girls with ADHD during childhood (e.g. Pelham & Bender, 1982). Blachman and Hinshaw (2002) found that girls with ADHD (ages 6 to 12) had fewer friends compared to girls without ADHD, and their parent-daughter interactions were also more negative (Peris & Hinshaw, 2003). Given that childhood relationship difficulties often persist into adolescence and adulthood (Bagwell, Molina, Pelham, & Hoza, 2001), it is likely that young women with childhood diagnoses of ADHD continue to experience considerable problems in relationships with peers, family, and romantic partners. In fact, Barkley (2006) has found that women with ADHD are less likely to marry than women without ADHD or males with ADHD.

Academic and employment outcomes reported in male ADHD samples (Barkley, 2006), include higher rates of receiving special education services, grade retention, discipline,

dropout, and lower occupational status compared to males without ADHD (Mannuzza & Klein, 1999). Since the school difficulties of females with ADHD, unlike males with ADHD, are more often related to inattention rather than to disruptive behavior (Gaub & Carlson, 1997), it is likely that they experience intellectual impairment, but not disciplinary problems. Late adolescent and young adult academic as well as job difficulties for women with ADHD have not been explored.

Substance use may be a relevant issue for young ADHD women. Both adolescent longitudinal studies of female ADHD (Biederman et al., 1999; Hinshaw et al., 2006) reported more substance use in females with ADHD compared to females without ADHD. However, other studies have not found such a link (Disney, Elkins, McGue, & Iacono, 1999; Molina et al., 2007). Adolescent males with childhood ADHD compared to males without ADHD have reported heavier alcohol, cigarette, and illicit drug use (Molina & Pelham, 2003; Molina, Pelham, Gnagy, Thompson, & Marshal, 2007), but substance use has not been explored prospectively into adulthood for females with ADHD.

This study seeks to explore the outcomes of late adolescent and young women who have been diagnosed in childhood with ADHD within the Pittsburgh Adolescent Longitudinal Study (PALS; e.g. Molina et al., 2007). In comparison to females without a childhood diagnosis, it is predicted that young women with ADHD will have more overall impairment and psychopathology. Particular domains of interest include internalizing psychopathology, delinquency, interpersonal relationships, academic achievement, employment status, and substance use.

Method

Participants

Overview—The PALS includes 364 children that were diagnosed with and treated for DSM-III-R or DSM-IV ADHD at the ADD Clinic and Western Psychiatric Institute and Clinic (WPIC) in Pittsburgh, PA from 1987 to 1996. These individuals were later recontacted and recruited for a follow-up study for which 240 demographically matched comparison individuals without ADHD were also recruited. Follow-up interviews began in 1999 and were conducted annually for both probands and comparison individuals.

Probands in Childhood—Probands were diagnosed with ADHD in childhood and participated in the Summer Treatment Program (STP), an 8-week intervention with behavioral modification, parent training, and psychoactive medication trials where indicated. Age at initial evaluation and treatment ranged from 5 to 16 years old. Over 90% of probands were in the elementary school-aged range. Childhood diagnostic information was collected using the parent and teacher Disruptive Behavior Disorder (DBD) Rating Scale, which assesses DSM-III-R and DSM-IV symptoms of disruptive behavior disorders (Pelham et al., 1992). Parents completed a semistructured diagnostic interview with a PhD level clinician consisting of the DSM-III-R or DSM-IV descriptors for ADHD, ODD, and CD with supplemental probe questions regarding situational and severity factors, and comorbidities. Diagnoses were made if a sufficient number of symptoms were endorsed (considering parent and teacher ratings). When 2 clinicians disagreed, a third clinician reviewed the file and the majority decision was used. Of the 34 probands in the study, 18 met criteria for comorbid ODD and 5 additional probands met criteria for comorbid CD. Exclusionary criteria included full-scale IQ<80, history of seizures, neurological problems, pervasive developmental disorder, schizophrenia, or other psychotic or organic mental disorder.

Follow-up Study—Probands were contacted approximately 8 years after initial diagnosis and treatment (follow-up wave 1) for a follow-up study when they had reached adolescence

and young adulthood. Follow-up interviews were conducted annually by postbaccalaureate research staff. Interviewers were not blind to recruitment source (i.e., presence or absence of childhood ADHD), but they were trained to avoid bias in data collection. Many questionnaires are completed privately by participants (e.g., substance use measures) to minimize interviewer contamination. Informed consent was obtained and all participants were assured, except in cases of impending danger or harm to self or others (reinforced with a DHHS Certificate of Confidentiality). In cases where distance prevented participant travel to WPIC, information was collected through mail and telephone; home visits were offered as need dictated. Questionnaires were completed either with paper and pencil or computerized versions. For this study, self and parent reports were collected from the second wave of data collection (follow-up wave 2), which includes the most comprehensive assessment of the late adolescent to young adulthood age range. While parent-reports are not commonly employed in studies of typically developing young women, it is important to consider parent reports for individuals with ADHD, who have been found to have limited insight into the nature of their problems (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). Of the 364 children with ADHD in the PALS, 38 were females. For the current study, 34 were included (3 were omitted because they were younger than 15 years old and 1 could not be contacted). At this time (at follow-up wave 2), approximately 9 years after initial diagnosis, 26% were ages 15 to 18, 45% were 19 to 22, and 9% were 23 to 25 years old.

Comparison participants—Twenty four young women were selected from the 240 PALS comparison participants who were recruited from the greater Pittsburgh area between 1999 and 2001 for their demographic similarity to the probands at follow-up (See Table 1). Twenty-five percent were between 15 to 18 years old, 58% were between 19 to 22 years old, and 17% were between 23 and 25 years old. Most were recruited through large pediatric practices in Allegheny County serving patients from diverse socioeconomic backgrounds. The remaining controls were recruited via advertisements in local newspapers and the university hospital staff newsletter, local universities and colleges, and other methods (Pittsburgh Public Schools, word of mouth, etc.). A telephone screening interview administered to parents of the controls gathered basic demographic characteristics, history of ADHD symptoms and other behavior problems, presence of exclusionary criteria as previously listed for probands, and a checklist of ADHD symptoms. Women 18 years old and older also provided self-report. ADHD symptoms were counted as present if reported by either the parent or young adult. Individuals who met DSM-III-R criteria for ADHD (8 or more symptoms) currently or historically were excluded. Control participants with subthreshold ADHD symptomatology or other psychiatric disorders were retained.

For this study, data for both proband and comparison individuals was collected from follow-up wave 2, which included the most comprehensive assessment of late adolescent and young adult outcomes. However, ADHD symptomology, IQ and achievement scores were collected at wave 1 (only 1 year earlier than the rest of the measures reported), as we did not collect these data after the follow-up wave 1. Footnotes have been provided within the tables to assist the reader in interpreting the timing of data collection.

Measures

General Daily Life Functioning—The Impairment Rating Scale (IRS; Fabiano, et al., 2006) assesses impairment overall and in specific domains, including interpersonal relationships, academic performance, and self-esteem, and was adapted for the current study to include age-appropriate domains of functioning, including employment and romantic relationships. Parents and women rated the women's current problems and need for treatment on a scale from 0 (no problem) to 6 (extreme problem). The IRS has demonstrated adequate validity and reliability in for children with ADHD (Fabiano, et al., 2006), and we

have conducted an initial investigation within the PALS sample suggesting that the IRS is an appropriate assessment tool for adolescents, young adults, and their parents (Karch et al., in preparation). Because the IRS assesses almost all of the domains of interest for this study, it was used as an initial estimate of functioning. Subsequent measures expanded upon and complemented the IRS domains.

Internalizing and Externalizing Problems—The Center for Epidemiologic Studies Scale for Depression (CES-D; Radloff, 1977) is a 20-item self-report measure which assesses depressive symptomatology. Items are scored 0 to 3, and scores range from 0 to 60 with higher scores indicative of greater depressive symptomatology. Reliability coefficients of 0.85 are reported in the general population and validity appears to be acceptable (Radloff, 1977).

Parents and women reported DSM ADHD symptom counts using an adult ADHD scale developed by Barkley (Barkley, 2006) for females aged 18 and older (n=46) and by the Disruptive Behavior Disorders Rating Scale (DBD; Pelham, Gnagy, Greenslade & Milich, 1992) for females younger than 18 (n=12). Items on both measures assess symptoms from 0 (rarely or not at all) to 3 (very much). Endorsement of at least 6 threshold (score of 2 or higher) symptoms of inattention or hyperactivity/impulsivity received a diagnosis of ADHD. Symptom counts were collected in the first wave of data because they were not assessed after for females over age 18. Parent ratings have demonstrated internal consistency and reliability, however, self report of ADHD may provide limited information (Smith, Pelham, Gnagy, Molina, & Evans, 2000).

Delinquency—The Self-Reported Delinquency questionnaire (Elliott, Huizinga, & Ageton, 1985) assessed delinquency severity and breadth by age 18. Parent and self reports were compared and the more severe score was adopted. Severity was coded according to the scheme used in the Pittsburgh Youth Study (Loeber, Stouthamer-Loeber, Van Kammen, & Farrington, 1991): 0 = no delinquency; 1 = minor delinquency only at home (e.g., theft of less than \$5 or vandalism); 2 = minor delinquency outside of the home (e.g., vandalism, cheating someone, shoplifting less than \$5); 3 = moderately serious delinquency (e.g., vandalism, theft of \$5 or more, major arson); 4 = serious delinquency (e.g., breaking and entering, attacking someone with the intent to seriously hurt or kill, rape); and 5 = engagement in two or more different level 4 offenses. Breadth was the number delinquent acts endorsed out of 34 specific categories.

Interpersonal Relationships—The Conflict Behavior Questionnaire (CBQ; Robin & Foster, 1989) is a 20-item measure of parent-child conflict, scored from 1 (strongly agree) to 5 (strongly disagree), with higher scores indicative of higher conflict. The CBQ has high internal consistency (Robin & Foster, 1989) and was completed by women and their parents. Number of close friendships was completed by both self and parent reports on a measure revised by Loeber (1989), and women reported lifetime number and length of romantic relationships using a measure developed by C. Bagwell and J. Davila.

Academic Performance—The Wide Range Achievement Test (WRAT; Wilkinson, 1993; Jastak & Jastak, 1976) measured reading, spelling and arithmetic achievement. The WRAT has excellent reliability and validity. The Vocabulary and Block Design subtests from the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981) were administered for women 17 years of age and older (n=55), and Vocabulary and Block Design sections of the Wechsler Intelligence Scale for Children-III (WISC-III; Wechsler, 1991) were administered for women younger than 17 years of age (n=3). These subtests correlate highly with total verbal and performance subtest scores and have been shown to have moderate correlations with Full Scale IQ and generalized intelligence (Wechsler,

1991). Scores on the WRAT, WISC, and WAIS were collected during the first wave of follow-up collection (one year before all other measures reported herein), because they were not collected in subsequent waves. Additional information was gathered from parent report to assess school disciplinary problems in grades K-12, total number of years receiving academic support services, and years held back a grade between kindergarten and twelfth grade. Because most (68%) of the women had finished high school prior to this follow-up assessment, current academic information was not analyzed.

Job Performance—Work history was assessed by a measure adapted from the CEDAR and PAARC studies, which included a timeline of total jobs held, pay, satisfaction, and problematic behavior. For this study, the highest occupational status attained using the Hollingshead index (Hollingshead, 1975) and a severity score of employment-related disciplinary actions was calculated, ranging from 0 to 3, by adding 1 point for each of the following instances: ever received a warning, ever denied a raise or promotion, and ever fired.

Substance Use—The Substance Use Questionnaire (SUQ; Molina et al., 2003) is a structured questionnaire adapted the Health Interview Questionnaire (Jessor, Donovan & Costa, 1989) and National Household Survey of Drug Abuse interview (NHSDA, 1992). The SUQ assesses lifetime use and quantity/frequency of current use and has demonstrated adequate reliability (Molina & Pelham, 2003). For this study, rates within the past year of monthly binge drinking (5 or more drinks), daily cigarette use, and monthly marijuana were calculated.

Data Analytic Plan

The analytic plan for this study consisted of a series of nonparametric Mann-Whitney U tests for differences between proband and comparison females. Due to large variances in self report measures, nonparametric tests were conducted on all continuous dependent variables, because they are unbiased by outlying scores and do not assume normality. Chi-squares assessed categorical outcome measures, such as rates of substance use.

This study is exploratory. The small sample size may increase the Type II error rate, as there may not be adequate power to detect differences at the $p=.05$ level, and the large number of statistical comparisons may inflate the Type I error rate. Since little is known about female ADHD outcomes, alpha corrections have not been made. Effect sizes (Cohen's d) have been provided to assist the reader in interpreting the findings, with small medium, and large effects equivalent to $d=.20$, $.50$, and $.80$ (Cohen, 1992).

Results

Demographics

As described in Table 1, no significant demographic differences emerged, except that proband women had significantly lower IQ scores. With one exception (achievement) we did not control for IQ in subsequent analyses due to the use of nonparametric U tests and because lower IQ in individuals with ADHD may be partly attributable to the ADHD syndrome itself (Kuntsi et al., 2003). Thus, employing IQ as a covariate may not be ideal (Miller & Chapman, 2001).

Internalizing and Externalizing Problems

As reported in Table 2, significant differences emerged in parent reported self-esteem and ADHD symptoms. Only 41% of probands met diagnostic criteria for ADHD in late adolescent and young adulthood based on parental report, and only 12% would have met

diagnostic criteria by self-report. Self-reported outcomes were not statistically significant, although 45% of probands compared to 26% of comparison women reported clinically significant levels of depression (CES-D score of 16 and above), and delinquency severity was higher in probands. Forty-six percent of probands reported moderate to serious levels of delinquency (score of 3 or higher; Lee & Hinshaw, 2004; Molina et al., 2007), compared to only 21% of comparison females, but no women in either group committed delinquent acts in the most serious category (level 5 delinquency).

Interpersonal Relationships

Significant differences were found on parent report of impairment with family, parents (on both the CBQ and IRS), siblings, and peers (on both the IRS and number of close friends), and self report of impairment with family, mother-daughter conflict, and lifetime number of relationships. No differences were found in parent report of romantic impairment, or self report of conflict with father, impairment with parents and siblings, peer relations (IRS and # of close friends), and relationship quality (IRS romantic relationships and average length), but relationship measures were administered only to women and their parents who were in relationships (56% of probands and 79% of comparison).

Academic Performance

Significant differences were found in parent-reported academic impairment, years of academic support, grade retention (17% of probands versus 0 comparison women, and all probands were retained in elementary school), and achievement, but not in discipline or self-reported academic progress. Because the academic achievement dependent variables were normally distributed, parametric tests controlling for IQ were conducted and showed that statistically significant differences in all variables did not remain.

Job Performance

Only the 29 proband and 20 comparison women who currently had a job at the time of the study were included in analyses of job performance ($p=.23$). Significant group differences were found in parent-reported job impairment and self-reported disciplinary actions emerged, but not in self-reported job impairment and occupational status.

Substance Use

No group differences emerged through self-reports in monthly binge drinking, daily cigarette use, and monthly marijuana use.

Discussion

To our knowledge, this is the first study to report on late adolescent and young adult outcomes of girls diagnosed with ADHD in childhood. This study extends previous findings on impairment in adolescent females with ADHD (Hinshaw et al., 2006; Biederman et al., 2006), and explores domains relevant for late adolescents and young adults, including psychopathology, delinquency, interpersonal impairment, academic achievement, job performance, and substance use. Parent reports revealed more evidence of impairment for proband women than did self report alone.

The current study found some evidence of internalizing problems in proband females, consistent with other female ADHD studies (Biederman et al., 2008; Hinshaw et al., 2006). Forty-five percent of proband women (compared to only 26% of comparison women) had scores of 16 or higher (Beekman et al., 2002), but the majority of the probands (55%) did not exhibit elevated levels of depression. Thus, only a subset of ADHD females appears to be at risk for depression in late adolescence and young adulthood. Parents of probands also

indicated clinically impaired levels of self-esteem for women with ADHD, but there were no self-reported differences, which may be related to problems with self-perception often reported in individuals with ADHD (Owens et al., 2007) discussed below.

Parents of ADHD females reported that their daughters experienced more ADHD symptoms than comparison females, and a small to moderate effect size was observed by self-report. However, the median of 3 ADHD symptoms endorsed by parents is lower than the 6 symptoms needed for diagnosis (APA, 2000). Using symptom counts, only 41% of probands met DSM criteria in adulthood based on maternal report, and 12% of probands would have met criteria by self report. If a cut-off score of ADHD symptoms 1.5 standard deviations above the mean of the comparison sample was used to diagnose ADHD (cf. Barkley, Fischer, Smallish, Fletcher, 2002), 57% of probands by parent report, and 23% by self report would have met diagnosis, compared to 5% by parent report and 8% by self-report in comparison females. The reduction in symptoms for proband females in late adolescence and young adulthood is consistent with developmental trends in ADHD diagnosis for boys into adulthood (Barkley et al., 2002; Willoughby, 2003), and the percentage of comparison women who meet criteria in late adolescence and young adulthood challenges the validity of ADHD diagnoses in adulthood.

Consistent with previous research, we found some evidence that proband females engage in more delinquency than comparison females (Biederman et al., 2006; Molina et al., 2007). However, the median level of offending reported by females with ADHD in this study is only moderate, (e.g. theft of approximately 5 dollars outside the home), and less severe than levels previously reported in males (e.g. Molina et al., 2007). Over 9% of males within PALS engaged in serious levels of delinquency, which includes more than one instance of acts such as assault and murder (Sibley et al., in preparation), but no women endorsed such severe delinquency.

Parent and sibling relationships for probands appear to suffer, particularly as reported by parents. The findings of this study extend upon research on interpersonal difficulties in families affected by childhood ADHD (Peris & Hinshaw, 2003; Pelham & Lang, 1999), into young adulthood. It is not clear what proband behavior and parent-offspring interactions (e.g. mother-daughter) give rise to these negative evaluations. In childhood, noncompliance with parental requests and an impulsive, oppositional interpersonal style characterizes the social relationships of ADHD males and females (Pelham & Bender, 1982). It is reasonable to speculate that the interpersonal style with a concomitant negative impact on relationship with others continues in females with ADHD. These negative interactions are likely exacerbated for women who continue to live at home. The greater conflict in relationships with mothers compared to fathers is consistent with research on young adult females (Laursen, Coy, & Collins, 1998), however because the majority of parent report was from mothers, further research could clarify whether parent-child difficulties in ADHD women are specific to mothers or is a result of our methods

The impaired peer and romantic relationships experienced by proband females extend literature on interpersonal difficulties for females with ADHD (Barkley, 2006; Blachman & Hinshaw, 2002; Pelham & Bender, 1982) into late adolescence and young adulthood. The same impulsive and oppositional interpersonal style speculated to affect females with ADHD's parental relationships may also interfere in peer and romantic relationships. The absence of group differences in romantic relationships may be because measures were only administered to females (56% of probands and 79% of comparison) who were in relationships (and their parents). It is possible that the probands who are in romantic relationships are the females with the best interpersonal skills and provide an overestimation of ADHD women's functioning in this domain.

The lower achievement and greater academic support and grade retention for probands in this study correspond with previous literature (Hinshaw et al., 2006; Biederman et al., 2006). It is notable that when IQ was controlled, differences in academic performance did not remain, suggesting that achievement deficits are not driven exclusively by ADHD (Neisser et al., 1996). The nearly 15-point IQ difference between women with and without ADHD in this study is larger than the discrepancy reported for males with and without ADHD (Frazier, Demaree, & Youngstrom, 2004). This finding, combined with the absence of school disciplinary problems, serves as evidence that academic difficulties for ADHD females are likely to be a function of general cognitive functioning (e.g. inattention, overall intelligence) rather than disruptive behavior, which may be an important cause of academic achievement problems in ADHD males. Females with ADHD may be more likely than males to be referred for treatment for learning problems (Gaub & Carlson, 1997), rather than disruptive school behavior.

Consistent with research on occupational problems in males with ADHD (Barkley, 2006), probands reported more disciplinary actions and parent rated impairment. However, the absence of group differences in occupational status and self reported job performance may be because approximately a third of the sample was 18 years old or younger, so even if the women were employed, they were in low-level part-time jobs in which they could function relatively well. Given the academic difficulties of young women with ADHD, females in the comparison group may be more likely than probands to pursue jobs that require higher education and skill when they move into the full time work force. Occupational differences may emerge later.

We did not find evidence of greater substance misuse in probands. The rates of alcohol, cigarette, and marijuana use were not higher than rates of comparison women, and reflect typical use patterns (SAMSHA, 2003). These null findings are likely related to the normative increased substance use in young adults, in general. In a sample of PALS males, adolescents (11 to 17 years old) reported more alcohol use compared to controls, but there were no group differences for young adult males (18 to 25 years old; Molina et al., 2007). Substance misuse may become more salient in female ADHD samples as typically developing women engage in more professional activities, such as obtaining a job and home, marrying, and having children. Alternatively, in the context of impaired social relationships for probands, substance use may be low due to fewer social opportunities to engage in substance use and the fact that many women in both samples are still living with their parents. Substance use is an important domain to continue to study through the risk period for substance abuse to understand if the risk for alcohol and other drug use emerges at a later age.

A common thread throughout the results was that parents reported more impairment than their daughters with ADHD. This discrepancy extends previous research on reporting problems in children with ADHD (Barkley et al., 2002; Smith et al., 2000). Further support for problems in self-perception for late adolescent and young adult females with ADHD was found by considering the anchoring of the questions. When questions were asked to infer that women have problems (e.g. "have you experienced problems with alcohol?") as opposed to questions that can be answered with objective statements (e.g. "how many beers do you typically consume in a week?"), proband women may be less likely to endorse the item. In this study, women reported fewer relationships and more work disciplinary actions, but when asked specifically about "problems," group differences did not emerge.

Limitations and conclusions

The small sample size reduced power to detect statistically significant group differences. The use herein of unbiased nonparametric tests and reporting of effect sizes increases

confidence that in a larger sample, larger group differences between proband and comparison women might emerge in several of the domains we assessed. In addition, clinic-referred females such as those in our study have been shown to display more severe impairment compared to community samples of females with ADHD (Gaub & Carlson, 1997). Thus, the findings from this study may not generalize to all females with ADHD, and without comparing young adult female outcomes to the outcomes of males with ADHD, we are unable to determine whether there are gender-specific young adult outcomes of ADHD.

Almost the entire field of ADHD research has been developed from predominantly male samples. Consistent with previous research on females with ADHD (Biederman et al., 2006; Hinshaw et al., 2006), this study found evidence that female ADHD in late adolescence and young adulthood is a significant problem which persists into young adulthood for a substantial portion of females. The findings of the current study along with the growing literature on women self-identifying with ADHD in adulthood, highlight the importance of continued efforts to identify and understand ADHD in females.

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Table 1

Demographics Characteristics

	ADHD	Comparison	<i>p</i> -value
Age at follow-up Wave 1 (<i>M, SD</i>)	19.21 (2.97)	18.83 (2.37)	.61
>17 years old at follow-up Wave 1 (%)	76.47	75.00	.57
Age at follow-up Wave 2 (<i>M, SD</i>)	19.97 (2.94)	19.83 (2.44)	.85
>17 years old at follow-up Wave 2 (%)	76.47	83.33	.38
Monthly family income* (<i>M, SD</i>)	1.97 (1.66)	2.30 (1.30)	.45
Maternal education (% post high school)	78.79	70.80	.35
Parents Married (%)	66.67	86.36	.09
Caucasian (%)	85.29	79.17	.40
Maternal report (%)	87.88	95.65	.31
Women living with parents (%)	58.82	54.17	.62
Women currently in school (%)	69.70	66.67	.52
Estimated Full Scale IQ [†] (<i>M, SD</i>)	93.24 (16.92)	111.88 (15.23)	.00

Note: ADHD=attention-deficit/hyperactivity disorder; *M*= mean; *SD*=standard deviation; *p*-value=significance of test;

* for monthly income, 1=less than \$200, 2=\$200-\$400, 3=\$500-\$999, 4=\$1000-\$1999, 5=\$2000-\$2999, 6=\$3000-\$4999, 7=\$5000-\$6999, 8=\$7000 or more.

[†] Estimated Full Scale IQ was collected in wave 1 of follow-up (one year before other measures)

Table 2

Late Adolescent and Young Adult Outcomes (at Follow-up Wave 2)

	ADHD	Comparison		
	Median (Range)	Median (Range)	<i>p</i> -value	Effect size
<i>Internalizing and Externalizing Problems</i>				
P IRS – Self-esteem	3.00 (0.00–6.00)	0.00 (0.00–3.00)	0.00	1.74
P ADHD Symptom count†	3.00 (0.00–18.00)	0.00 (0.00–6.00)	0.00	1.29
S CES-D	15.00 (3.00–48.00)	10.00 (2.00–29.00)	0.12	0.47
S IRS – Self esteem	1.00 (0.00–5.00)	1.00 (0.00–5.00)	0.53	0.14
S ADHD Symptom count†	0.00 (1.00–9.00)	0.00 (1.00–5.00)	0.70	0.44
S & P Delinquency severity	2.00 (1.00–4.00)	1.00 (1.00–4.00)	0.03	0.54
S & P Breadth of delinquency	4.00 (0.00–16.00)	3.00 (0.00–9.00)	0.09	0.51
<i>Family Relationships</i>				
P IRS – relationship with family	2.00 (0.00–6.00)	0.00 (0.00–2.00)	0.00	1.41
P CBQ – conflict with daughter	2.63 (0.00–4.48)	1.68 (1.05–3.47)	0.00	0.99
P IRS – relationship with parents	2.00 (0.00–6.00)	0.00 (0.00–2.00)	0.00	1.34
P IRS – relationship with siblings	3.00 (0.00–6.00)	0.00 (0.00–2.00)	0.00	1.86
P IRS – relationships with peers	3.00 (0.00–6.00)	0.00 (0.00–3.00)	0.00	1.34
P # of close friends	3.00 (0.00–10.00)	4.00 (0.00–10.00)	0.06	0.47
S IRS – relationship with family	0.00 (0.00–4.00)	0.00 (0.00–2.00)	0.06	0.63
S CBQ – conflict with mother	2.07 (1.25–4.60)	1.70 (1.00–3.75)	0.03	0.53
S # of romantic relationships	1.00 (0.00–7.00)	2.00 (0.00–7.00)	0.00	0.81
P IRS – romantic relationship	0.00 (0.00–4.00)	0.00 (0.00–1.00)	0.30	0.74
S CBQ – conflict with father	2.25 (1.00–3.95)	2.00 (1.05–3.55)	0.36	0.33
S IRS – relationship with parents	0.00 (0.00–5.00)	0.00 (0.00–3.00)	0.28	0.43
S IRS – relationship with siblings	0.00 (0.00–6.00)	0.00 (0.00–5.00)	0.28	0.34
S IRS –relationship with peers	0.00 (0.00–6.00)	0.00 (0.00–1.00)	0.93	0.18
S # of close friends	4.00 (0.00–20.00)	4.00 (1.00–15.00)	0.79	0.02

	ADHD	Comparison	<i>p</i> -value	Effect size
	Median (Range)	Median (Range)		
S IRS – romantic relationships *	0.00 (0.00–6.00)	0.00 (0.00–4.00)	0.92	0.32
S Average relationship length *	0.00 (0.00–32.00)	0.00 (0.00–87.00)	0.93	0.17
<i>Academic Performance</i>				
P IRS – Academic Progress	3.00 (0.00–6.00)	0.00 (0.00–3.00)	0.00	1.67
P # of years with academic support	3.00 (0.00–12.00)	0.00 (0.00)	0.00	1.36
P # years retained a grade	0.00 (0.00–2.00)	0.00 (0.00)	0.00	1.36
P Lifetime disciplinary actions	3.00 (0.00–158.00)	2.00 (0.00–145.00)	0.64	0.24
WRAT reading standard score†	97.00 (53.00–118.00)	112.00 (73.00–122.00)	0.00	1.09
WRAT spelling standard score†	97.00 (62.00–123.00)	108.00 (82.00–120.00)	0.00	0.99
WRAT mathematics standard score†	86.00 (54.00–115.00)	104.00 (77.00–130.00)	0.00	0.93
S IRS – academic progress	0.00 (0.00–6.00)	0.00 (0.00–3.00)	0.17	0.66
<i>Job Performance</i>				
P IRS – Job performance	1.00 (0.00–5.00)	0.00 (0.00–1.00)	0.00	1.24
S # lifetime work disciplinary actions	0.00 (1.00–3.00)	0.00 (0.00–1.00)	0.03	0.69
S IRS – Job performance	0.00 (0.00–6.00)	0.00 (0.00–1.00)	0.57	0.42
S Highest occupational status	3.00 (1.00–9.00)	3.00 (2.00–5.00)	0.64	0.23
<i>Substance Use</i>				
S Monthly binge drinking last year (%)	28.6	22.2	0.45	
S Daily cigarette use last year (%)	47.1	37.5	0.33	
S Monthly marijuana use last year (%)	29.4	25.0	0.54	

Note: All measures are from wave 2 except ADHD symptom report and WRAT; S = self report; P= parent report; Higher scores indicate greater severity; IRS = Impairment Rating Scale; CES-D = Center for Epidemiologic Studies Scale-Depression; ADHD symptom count = total threshold ADHD symptoms; CBQ = Conflict Behavior Questionnaire;

* Romantic relationship questionnaires were given only to women in relationships (19 ADHD, 19 Comparison; $p=0.05$); WRAT = Wide Range Achievement Test; IRS academic progress was collected only from women currently in school (23 ADHD, 15 Comparison; $p=0.52$). Measures of job performance were distributed only to employed women (29 ADHD, 20 Comparison; $p=0.23$). Occupational status = Hollingshead index (Hollingshead, 1975). Lifetime work disciplinary actions were from 0 to 3, by adding whether or not the participant had ever received a written or verbal warning (0 or 1), had ever been denied a raise or promotion (0 or 1), and had ever been fired (0 or 1).