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Women with Childhood ADHD: Comparisons by Diagnostic Group and Gender

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Abstract

This study compared adult women with childhood ADHD to adult women without childhood ADHD and to adult men with childhood ADHD. The participants, all from a larger longitudinal study, included 30 women and 30 men (approximately age 23 to 24) with childhood ADHD, and 27 women without ADHD. Women with childhood ADHD were matched to comparison women on age, ethnicity, and parental education, and to men with childhood ADHD on age, ethnicity, and IQ. Self- and parent-reports of internalizing, interpersonal, academic, and job impairment, as well as substance use and delinquency indicated group differences on measures of self-esteem,

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interpersonal and vocational functioning, as well as substance use. Follow-up planned comparison tests revealed that almost all of these differences emerged by diagnostic status, and not by gender. This study adds to research on the negative adult outcomes of ADHD and demonstrates that the outcomes of men and women with childhood ADHD are relatively similar.

Keywords

ADHD; Gender

Although a great deal of research has been conducted on ADHD, it has almost exclusively focused on males. In childhood, ADHD is estimated to occur two to nine times more frequently in boys than in girls (Gaub and Carlson 1997). Studies have found few differences in symptomology, impairment or treatment response between girls and boys with ADHD (Gaub and Carlson 1997; Hartung et al. 2002; Pelham et al. 1989), and as a result, ADHD had not been considered to be a relevant issue for females. Recent research on adult ADHD has challenged this assumption. In adult samples, the gender disparity in the prevalence of ADHD has been reported to decrease and to become virtually non-existent (Barkley 2006; Kessler et al. 2006), but little is known about the specific adult impairments of both women and men with ADHD.

Currently, the majority of literature on women with ADHD comes from samples of women who initially self-present with ADHD as adults (Barkley 2006), which may not accurately describe women with childhood ADHD. Self-referred adults likely have some insight into the nature of their problems, whereas individuals diagnosed with ADHD in childhood may have limited insight into their problems (e.g., Hoza et al. 2004), and therefore may not even present for ADHD treatment in adulthood. In addition, adults with childhood ADHD typically present with more severe impairment compared to self-referred adults with ADHD (Barkley 2006). Thus, there is a clear need to understand the adult outcomes of women with childhood ADHD prospectively, and whether or not there are differential gender outcomes of ADHD in adulthood that can inform identification and treatment. This study explores these questions: (1) are there differences in functioning between women with and without childhood ADHD? (2) are there differences in functioning between men and women with childhood ADHD diagnoses?

Comparisons of Women with and without Childhood ADHD

Three prospective longitudinal studies of girls with childhood ADHD have been reported, but none have reported adult outcomes (Babinski et al. 2011; Biederman et al. 1999; Hinshaw 2002). The first study compared girls (ages 6 to 12) with and without ADHD who were originally recruited to participate in summer enrichment camps (Hinshaw 2002), and found that girls with ADHD experienced more internalizing and externalizing psychopathology, and more cognitive, interpersonal, and academic impairment compared to girls without ADHD. After 5 years when the girls were approximately 14 years old, girls with ADHD were experiencing similar difficulties, along with new difficulties, including substance and eating problems (Hinshaw et al. 2006).

The second published prospective study included girls with ADHD ages 6 to 18 years old (Biederman et al. 1999) who were recruited from pediatric and psychiatric clinics. In this study, girls with ADHD compared to non-ADHD girls reported more psychopathology, substance use, and lower cognitive, family, academic, and overall functioning, which continued 5 and 10 years later (Biederman et al. 2006, 2010). Even though a proportion of the females in this study had reached adulthood during follow-up, limited inferences can be

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made about the adult functioning of these women as nearly half of the sample was still of adolescent age at the time of follow-up. In addition, the focus of this study has been on psychopathology, without describing functional outcomes that guide treatment.

We have also conducted a study of the outcomes of young women approximately 19 years old with and without childhood ADHD (Babinski et al. 2011). Our study found that females with ADHD experienced more depressive symptoms, more problems with family and peers, and lower levels of academic achievement compared to females without ADHD. Differences did not emerge in substance use, or job and romantic functioning. We speculated that our failure to find differences in these domains may have been related to the age of the sample, which included late adolescents and young adults. Substance use, for example, is relatively normative for this age range (SAMHSA 2003). Furthermore, half of the sample was still in school and not in full-time jobs. We speculated that differences would emerge in these areas when the females had aged further into adulthood.

These three prospective studies of females from childhood into late adolescence and early adulthood indicate a pattern of greater impairment in multiple areas for females with ADHD compared to females without ADHD. It seems likely that this pattern would persist later into adulthood. Prospective studies of boys with and without childhood ADHD show a similar pattern of greater impairment for individuals with ADHD in adulthood, but similar a priori investigations of the outcomes of women with childhood ADHD are needed (Barkley 2006).

Comparisons of Women and Men with Childhood ADHD

Studies of gender differences in ADHD (Gaub and Carlson 1997; Hartung et al. 2002; Pelham et al. 1989) in childhood and in adult-ascertained samples (Biederman et al. 2004), generally find few differences in symptoms and impairment. One notable exception is that females with ADHD have been found to display less hyperactivity, but greater cognitive impairment compared to males with ADHD (Gaub and Carlson 1997). We might then expect gender differences in adult functioning to involve problems related to greater hyperactivity for boys, such as higher rates of substance use (Clure et al. 1999) and delinquency (Patterson et al. 2000), and problems related to greater cognitive impairment for girls, such as lower educational (Duncan et al. 2007) and occupational (Schmidt and Hunter 2004) attainment. In an adult-ascertained sample of adults with ADHD, men with ADHD met diagnosis for substance use disorders and antisocial personality more often than women with ADHD (Biederman et al. 2004), but exploration of adults with childhood ADHD has not yet been done.

The existing prospective studies of girls with ADHD may shed light on potential gender differences, as these studies have described problems that have not been consistently reported in males with ADHD. All three studies found that girls with ADHD experienced more severe internalizing problems (Babinski et al. 2011; Biederman et al. 2006; Hinshaw 2002), while depression has not been clearly identified as a problem for males with ADHD. In addition, these studies have shown relationship difficulties for females with ADHD (e.g., relational aggression; Hinshaw 2002) above and beyond what has been described in samples of males with ADHD. Some theorists have suggested that girls diagnosed with gender atypical disorders, such as ADHD, may actually be at risk for greater impairment compared to men (Eme 1992). However, the majority of work in this field has been conducted in samples of boys and girls with conduct disorder, and whether or not the same pattern exists for ADHD has yet to be tested.

This study seeks to expand upon our earlier prospective study of female ADHD (Babinski et al. 2011) by exploring the outcomes of the same sample of women approximately 5 years later. This study contrasts existing literature on self-referred women with ADHD, who likely

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have insight into the nature of their problems (Barkley 2006). The outcomes of women with childhood ADHD will be compared both to those of women without ADHD and to men with childhood ADHD. In comparison to women without ADHD, it is hypothesized that women with ADHD will experience more internalizing, relationship, academic, job, substance use, and delinquency problems. It is also hypothesized that gender differences in the ADHD individuals will be found in some of the domains listed above. Specifically, women with ADHD are expected to manifest more internalizing and interpersonal impairment compared to men with ADHD, but fewer and less severe disciplinary problems at work, as well as less substance use and antisocial behavior compared to men with histories of ADHD.

Method

Participants

ADHD Group—Individuals were selected from 364 children with ADHD in the Pittsburgh ADHD Longitudinal Study (PALS; Molina and Pelham 2003), who were diagnosed with DSM-III-R or DSM-IV ADHD at the ADD Clinic and Western Psychiatric Institute and Clinic (WPIC) in Pittsburgh, PA during 1987 to 1996. All children with ADHD participated in the Summer Treatment Program (STP), an 8-week intervention with behavioral modification, parent training, and psychoactive medication trials where indicated (Pelham and Hoza 1996). Children were referred to the STP from across Allegheny County, PA by several large public sources, such as Pittsburgh Public Schools. Diagnostic information was collected in childhood using several sources, including the parent and teacher Disruptive Behavior Disorder (DBD) Rating Scale to assess DSM-III-R and DSM-IV symptoms of the disruptive behavior disorders (Pelham et al. 1992). Parents completed a semistructured diagnostic interview with a PhD level clinician consisting of DSM-III-R or DSM-IV descriptors for ADHD, ODD, and CD with supplemental questions regarding situational and severity factors (available at ccf.fiu.edu). Following DSM guidelines, diagnoses were made if a sufficient number of symptoms were endorsed (considering information from both parents and teachers). Two PhD level clinicians independently reviewed all ratings and interviews to confirm diagnoses and when disagreement occurred, a third clinician reviewed the file and the majority decision was used. Exclusionary criteria were assessed in childhood, including full-scale IQ<80, history of seizures or other neurological problems, and/or history of pervasive developmental disorder, schizophrenia, or other psychotic or organic mental disorder. Ages at initial evaluation and treatment ranged from 5 to 16 years of age, with over 90% of individuals in the ADHD group within elementary school-age. Of the 38 total girls with ADHD in the PALS, 30 had both baseline (STP) and adult data. A comparison group of thirty males from the sample with both baseline and adult data were matched with the ADHD females on age, IQ, and ethnicity. Since there were a total of 326 possible ADHD males for matching, matches were determined first by age. In most cases, there was an exact age match. When there was more than one male with the female's age, the male with the closest IQ and ethnicity was chosen. If there was still more than one eligible male for matching, one case was randomly selected. ADHD male and female groups were comparable on all childhood variables, except men more often had comorbid CD in childhood (see Table 1).

Non-ADHD Participants—All 27 non-ADHD females (drawn from 240 non-ADHD participants within PALS) were selected for comparison. Non-ADHD participants were recruited from the greater Pittsburgh area through several sources including pediatric practices in Allegheny County (40.8%), advertisements in local newspapers (27.5%), local universities and colleges (20.8%), and other methods (10.9%) such as Pittsburgh Public Schools and word of mouth. Like the ADHD group, non-ADHD participants were recruited on a rolling basis. Comparison recruitment lagged 3 months behind enrollment of the

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ADHD group to facilitate efforts to obtain demographic similarity (discussed below). A telephone screening was administered to parents of potential participants to gather demographic information, history of ADHD diagnosis or treatment, presence of exclusionary criteria as previously listed for the ADHD group, and a full checklist of ADHD symptoms. Individuals (age 18+) also provided self-report. ADHD symptoms were counted as present if reported by either the parent or the young adult. Individuals who met criteria for ADHD, either currently or historically, were excluded.

If a potential comparison participant passed the initial phone screen, research staff members determined whether he/she was demographically appropriate for the study by age, gender, race, and parent education level. A comparison participant was deemed study-eligible if his/her enrollment increased the comparison group's demographic similarity to the ADHD group. Demographic differences were not found between groups with the exception of Estimated Full-Scale IQ scores as measured by the combined WISC-IV Block Design and Verbal Comprehension subtests (Wechsler 2003) measured during their initiation to the follow-up study (see Table 2).

Procedure

Adult interviews were conducted annually in the ADD Program offices by postbaccalaureate research staff. Interviewers were not blind to group status (i.e., presence or absence of ADHD), but were trained to avoid bias in data collection by using a non-judgmental interviewing style and adhering to a standardized assessment protocol. Many questionnaires were completed privately (e.g., substance use measures). Informed consent was obtained and all participants were assured confidentiality, except in cases of impending danger or harm (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 needed. Self and parent report questionnaires were completed either with paper or computerized versions. While parent-reports are not commonly employed in studies of typically developing adults, parent reports were considered, when available, as individuals with ADHD have been found to have limited insight into the nature of their problems (e.g., Hoza et al. 2004) and may underreport their symptoms compared to parent reports (Barkley et al. 2002). For this study, age 24 follow-up data were selected, as this age would serve as an estimate for when the majority of individuals have completed college and have started to build an independent life and career (Arnett 2004). When 24 year old data were unavailable, data from the next closest age (>21 years old) were used (see Table 2).

Measures

Problems in Daily Living—The Impairment Rating Scale (IRS; Fabiano et al. 2006) assessed impairment in specific domains, including relationships with peers, family, and self-esteem. Initially developed for use with children, the IRS was adapted for the current study by adding age-appropriate domains of functioning, including impairment at work, relationship with co-workers, supervisors, and romantic relationships. Participants and parents rated their current problems and need for treatment on a scale from 0 (no problem) to 6 (extreme problem). The IRS has demonstrated acceptable validity and reliability in identifying impairment in children with ADHD (Fabiano et al. 2006). One year test-retest reliability of IRS items within PALS ranged from .50 to .69 by parent report, and .14 to .42 by self-report.

Internalizing Problems—The Center for Epidemiologic Studies Scale for Depression (CES-D; Radloff 1977) is a 20-item self-report measure of depressive symptomatology. Items are scored 0–3, and scores range from 0 to 60 with higher scores indicative of higher levels of depression. The CES-D demonstrates excellent internal consistency (alpha=.84)

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within the general population (Corcoran and Fisher 1987), and is highly correlated with other measures of depression in adults (Santor et al. 1995).

Education Level—Participants were asked whether or not they attended post-high school education, and the highest level of post high school education attained, including vocational school, junior college, 4-year college or university, and graduate school by self-report.

Job Performance—Work history was assessed by a computer-based self-report measure adapted from the CEDAR and PAARC studies by the study investigators. This measure included total jobs held, pay, and problematic behavior. For this study, a job loss score was calculated from the number of times the participant endorsed losing a job (i.e., fired, laid off, disabled, emotional problems, institutionalized or incarcerated, drug problems, dangerous work conditions) divided by the number of total jobs held. The highest job status was obtained by the Hollingshead (1975) index.

Substance Use and Delinquency—The Substance Use Questionnaire (SUQ; Molina et al. 2007b) is adapted from the Health Interview Questionnaire (Jessor et al. 1981) and the National Household Survey of Drug Abuse interview (NHSDA 1992). The SUQ assesses lifetime use and quantity/frequency of current use. For this study, participants reported on monthly binge drinking (5 or more drinks at least once a month), daily cigarette use, and monthly marijuana use. Two week test-retest reliability of the SUQ for these items is excellent within the PALS (i.e., r=.83, .87, and .88 for alcohol, cigarette, and marijuana use items, respectively). Number of arrests was assessed by the Self-Reported Delinquency questionnaire (Elliot et al. 1985), which has demonstrated adequate reliability and validity. Parent-report was compared to self-report, so that if an arrest was endorsed by one informant, it was coded as present to provide a more thorough detection of delinquent behavior (Sibley et al. 2010a, b).

Data Analytic Plan

Continuous variables were analyzed using one-way ANCOVAs with group (women with ADHD vs. women without ADHD vs. men with ADHD) as a factor and IQ as a covariate, given the significant IQ group differences. Categorical measures (e.g., substance use, education level) were analyzed with multinomial logistic regressions controlling for IQ. For all analyses, a Bonferroni adjusted p-value of .002 was used. If the omnibus test was significant at the p=.002 level, LSD planned comparisons (i.e., women with and without ADHD, women and men with ADHD) were conducted. Effect sizes (i.e. partial eta-squared) are provided to assist the reader in interpreting the findings, with small, medium, and large effects equivalent to partial η^2=0.10, 0.25, and 0.40 (Portney and Watkins 1997).

Results

Internalizing Problems

Women and men with ADHD experienced greater impairment compared to comparison women by parent report, but differences did not emerge on self-reported self-esteem impairment or depressive symptoms on the CES-D (see Table 3 for all adult functioning results).

Interpersonal Relationships

Group differences were found on parent reports of family, peer, and romantic relationship impairment, and planned comparisons revealed that women with ADHD were more impaired than women without ADHD, but there were no gender differences. No differences

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emerged on self reports of being in a relationship, or family, romantic, and peer relationship functioning.

Education Level

No significant group differences emerged regarding any of the levels of post high school educational attainment.

Job Performance

Differences emerged on self-reported job SES and parent-reported job impairment. Follow-up analysis showed that women with ADHD were more impaired than women without ADHD, but impaired at a level similar to men with ADHD. No other job differences emerged.

Substance Use and Delinquency

A group difference emerged on self-reported marijuana use, and follow-up tests revealed that women with ADHD reporting significantly less marijuana use than ADHD men. No group differences emerged on binge drinking, cigarette use, or ever being arrested.

Discussion

This study extends our earlier study of late adolescents and young women with ADHD (Babinski et al. 2011), by comparing adult women with childhood ADHD to women without ADHD and to men with ADHD. Similar to our earlier study, the current study found that women with childhood ADHD generally experienced more impairment than non-ADHD women. Furthermore, the impaired self-esteem and interpersonal relationships, reported by late adolescent and young women with ADHD in our earlier study (Babinski et al. 2011) appear to persist 5 years later. The current study also found evidence that women with ADHD experience more romantic relationship and occupational impairment compared to women without ADHD, which did not emerge in our earlier study (Babinski et al. 2011). On most outcomes, the level of impairment in women with ADHD was comparable to that experienced by men with ADHD, and only limited support for gender differences was found.

Comparisons of Women with and Without Childhood ADHD

Consistent with studies of ADHD in girls (e.g., Biederman et al. 2010; Hinshaw et al. 2006), and our previous study (Babinski et al. 2011), we found some evidence that women with childhood ADHD experience more internalizing problems. While significant differences on depressive symptoms (i.e., CES-D) did not emerge, the mean for women with ADHD (15.44) approached the clinical score of 16 (Radloff 1977), suggesting that internalizing problems are relevant to some women with ADHD.

Consistent with previous literature on strained parental relationships of children and adolescents with ADHD (Johnston and Mash 2001), this study found evidence that conflict with parents exists in adulthood, largely by parent report. Women with ADHD frequently reported living with parents, which might give rise to more opportunities to argue with parents than for individuals not living at home. Thus, it is not surprising that the high levels of impairment reported in parent-child relationships are similar to the levels found in the late adolescent/young adulthood period (Babinski et al. 2011). Furthermore, conflict between a parent and an adult child living at home is positively associated with the adult child's financial dependency and unemployment (Goldsheider et al. 2001), which may well describe the women with ADHD in this study in light of their impaired job functioning outcomes.

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We also found evidence of peer and romantic relationship impairment for females with ADHD, consistent with child (Hinshaw 2002; Pelham and Bender 1982), adolescent and adult research (Bagwell et al. 2001; Barkley 2006). In the late adolescent/young adult period reported in our earlier study (Babinski et al. 2011), romantic difficulties, which are just developing at this age, were not found. The findings of the current study suggest that romantic relationships become an area of impairment for females with ADHD in adulthood.

No significant educational differences were found. However, a pattern emerged showing that women with ADHD compared to women without ADHD from similarly educated families (as indicated by parent education) are less likely to attend post-high school education, and when they do, they typically enroll in lower level programs. Although not statistically significant, this pattern of relatively lower achievement for women with ADHD is consistent with outcomes reported for men with ADHD (Barkley 2006) and extends research on academic outcomes to adult females with ADHD. In contrast, non-ADHD women appear to be particularly high achieving, with 18.52% of them attending graduate school. This pattern of high achievement is consistent with research that indicates an achievement advantage over males for typically developing females (Buchmann and DiPrete 2006; U.S. Bureau of the Census 2007).

Women with ADHD had more job impairment by parent report, and lower status jobs by self-report compared to non-ADHD women. Differences had not previously emerged so clearly in females during late adolescence and early adulthood (Babinski et al. 2011). Thus, the job outcomes of women with ADHD appear to be consistent with impaired job outcomes for adult males with ADHD (Barkley 2006). The employment differences that emerged between ADHD and non-ADHD females might relate to their pattern of disparate academic achievement. Since non-ADHD women appear to attain higher education levels (although not statistically significant in our sample), they may well be better prepared to obtain jobs that require a higher level of skill.

Unlike previous studies of females with childhood ADHD (e.g., Biederman et al. 2006; Hinshaw et al. 2006), we did not find significant substance use differences between adult women with and without childhood ADHD. The absence of differences is consistent with findings from our previous study of these same women 5 years earlier (Babinski et al. 2011). We speculated that the absence of differences in the late adolescent/young adult period was related to somewhat normative substance use at this age (Molina et al. 2007b), and that differences would emerge as adults engaged in professional activities and responsibilities, but our current study did not support this speculation. Although adulthood substance use rates decreased from those reported in late adolescence/early adulthood (Babinski et al. 2011), ADHD and non-ADHD women endorsed similar rates of binge drinking and daily cigarette use, consistent with use rates from epidemiological studies (SAMHSA 2003). Only the rate of monthly marijuana use endorsed by women with ADHD compared to non-ADHD women was somewhat higher and might have reached statistical significance in a larger sample.

Significant differences in ever being arrested were not found. However, the pattern of results is in line with previous literature. Several studies report that females with ADHD compared to females without ADHD engage in more delinquent behavior in early adolescence (Molina et al. 2007a), adolescence (Biederman et al. 2006), and late adolescence and early adulthood (Babinski et al. 2011). Although one study of adolescent females with ADHD did not find differences among ADHD vs. non-ADHD adolescent females (Hinshaw et al. 2006), it was the only study to rely solely on self-reports of delinquency, whereas we also incorporated parent reports, which have been shown to raise the frequency of delinquency reports (Farrington et al. 1996; Sibley et al. 2010b). Presence/absence of arrest as an indicator of

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delinquent behavior may underestimate delinquent behavior, as arrests reflect only instances that law enforcement observes.

Comparisons of Women and Men with Childhood ADHD

Consistent with previous studies of children (Gaub and Carlson 1997) and adults with ADHD (Biederman et al. 2004), we found few gender differences among the adults diagnosed with childhood ADHD. Gender differences emerged regarding monthly marijuana use, but did not emerge on measures of other substance use, internalizing, peer, family, romantic, school, job or delinquency problems.

Our failure to find gender differences in internalizing problems is surprising in light of the studies that have reported depression for females (Biederman, et al. 2006) with ADHD but not men (Bagwell et al. 2006). However, all of our measures of internalizing problems indicate a pattern of higher impairment for women compared to men with ADHD, although nonsignificant. The mean level of depressive symptoms that women with ADHD endorsed on the CES-D (15.44) almost reached the clinical cut-off of 16, while that of men is only 11.11, suggesting that some women with ADHD experience significant levels of depression, more than men with ADHD. Thus, despite our null findings, given previous studies reporting internalizing problems in females with ADHD (Biederman et al. 2006), it may still be an important area of study.

The absence of gender differences in relationship functioning was also unexpected. While consistent with previous child and adolescent ADHD studies that have found few relationship differences (Bagwell et al. 2001; Pelham and Bender 1982), we had expected that women might be more impaired because of the salience of relationships for women and the new areas of social impairment identified for females with ADHD (e.g. relational aggression; Hinshaw 2002).

Consistent with child and adolescent studies, we did not find educational differences (Barkley 2006). However, there may be academic outcomes that differ by gender. For example, as Table 3 shows, compared to women with ADHD, more men with ADHD attended junior college vs. vocational school. Furthermore, even though we controlled for IQ, it may be useful to consider these gender-differential patterns of education in light of the cognitive impairment that has been reported for females with ADHD (Gaub and Carlson 1997). There was an almost 15 point IQ difference between females with and without ADHD in this study (Babinski et al. 2011), which contrasts the IQ difference between males with and without ADHD which is estimated to be about 10 points (Frazier et al. 2004). Females may choose post-high school programs, such as vocational school, that are less academically rigorous than junior college programs that men with childhood ADHD appear to attend more often.

The similar level of impairment in occupational outcomes extends earlier findings of job impairment in men with ADHD to women (Barkley 2006). Given extensive literature showing that girls with ADHD are generally less hyperactive and aggressive than boys with ADHD, we had expected that girls may be less disruptive at work and therefore lose their job less frequently and be less impaired, but they were just as impaired, and were employed in jobs of similar pay.

As mentioned above, the lower rates of marijuana use endorsed by women compared to men with ADHD was the only significant gender difference in this study. Women with ADHD endorsed lower levels of use compared to men in the other substance categories, although non-significant. The elevated rates of use in men are consistent with rates of substance use reported in adolescent ADHD samples (Molina et al. 2007a), adult-ascertained ADHD

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samples (Biederman et al. 2004), as well as the general population (Wilsnack and Wilsnack 2002).

Although no statistically different gender differences emerged for ever being arrested, men with ADHD were arrested almost 10% more than women with ADHD. This pattern is consistent with reports of gender differences in delinquency (Pajer et al. 2007) and may also explain why only one difference in substance use was found (i.e., ADHD risk for substance-related outcomes into early adulthood tends to co-occur with delinquency; Barkley 2006).

Significant differences emerged more often by parent report than by self report. It has been widely reported that ADHD children report less dysfunction than do their parents and teachers (Owens et al. 2007). However, such problems have rarely been studied in adults or in girls. This study suggests that problems in self-perception, which are well established in childhood, continue into adulthood for men and women with childhood ADHD, and that self-report in ADHD samples should be corroborated with multiple informants (e.g. parents, co-workers, significant others). This is relevant in domains such as employment, which have been typically evaluated only by self report. Our failure to find a difference regarding job loss, for example, may be because individuals indicated that they "quit" whereas their bosses would indicate that they were "fired." Interestingly, 40% to 60% of our sample lived with their parents, which may enhance the validity of parents as informants, even though parents are not traditionally reporters of their adult offspring. The functioning of self-referred adults with ADHD, those individuals with enough insight to report clinically significant problems, may then not accurately reflect individuals with childhood ADHD, who may be less likely to present for treatment, even though their parents report that significant impairments still exist.

A potential limitation of this study is the clinic-referred status of the participants with ADHD, who were diagnosed based on severe symptomatology and impairment in childhood. Thus, the outcomes in this study may be more severe and not generalizable to community samples of individuals with ADHD or to adults self-presenting with ADHD. However, because ADHD by definition begins in childhood, and diagnosis in adulthood must be retrospective for history and by self report for current symptoms (Barkley 2006), arguably a sample such as this one identified in childhood has greater face validity than samples of adult-identified ADHD, which have characterized the field of adult females with ADHD. The study of gender differences in this population is an appropriate first step in understanding the developmental course of ADHD, especially in women. This study may also have potential cohort effects, since the women were diagnosed with childhood ADHD from 1987 to 1996, when ADHD was less recognized in females compared to today, and thus may be rather severe.

Some researchers (Eme 1992; Hinshaw 2002) have suggested that females with gender atypical disorders, such as ADHD and CD, are at risk for more severe outcomes across the lifespan and a wider range of problems compared to individuals with gender typical disorders. However, we did not find evidence for such multifinality in our sample of ADHD females.

The outcomes for women with ADHD reported herein expand upon previous research on late adolescent and early adult females within the PALS sample (Babinski et al. 2011). This study provides evidence that differences between ADHD and non-ADHD girls persist into adulthood, and new areas of difficulty, including romantic relationship and job functioning develop. Few gender differences in ADHD emerged—at least in the measures used. Additional areas of functioning, such as parenting and financial status, may become relevant areas of impairment in later years. The impairment of women and men with ADHD in this

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study suggests that the treatment of ADHD for both genders should follow a chronic disease model into adulthood. There is little research on effective treatments for adults with ADHD other than medication (Adler and Chua 2002) and some very recent research on psychosocial approaches (Safren et al. 2005). Our results suggest that adult mental health practitioners should become more familiar with ADHD and effective interventions for it.

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Table 1

Characteristics of individuals with ADHD at time of initial treatment

	ADHD females	ADHD males	*p*-value
Age at initial treatment (*M, SD*)	9.14 (1.75)	9.13 (1.77)	.909
P/T DBD ADHD (*M, SD*)	2.10 (0.50)	2.05 (0.36)	.736
P/T DBD ODD (*M, SD*)	1.58 (0.74)	1.77 (0.66)	.321
ODD Diagnosis (%)	56.67	50.00	.446
CD Diagnosis (%)	10.00	30.00	.051

ADHD attention-deficit/hyperactivity disorder; *p-value* significance of statistical test; *M* mean; *SD* standard deviation; *P/T* combined parent and teacher severity ratings on the Disruptive Behavior Disorders rating scale (Pelham et al. 1992); Higher scores on the DBD indicate greater severity of symptoms

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Table 2

Adult demographic characteristics

	ADHD women	Comparison women	ADHD men	*p*-value
Age at follow-up (*M, SD*)	23.62 (1.88)	23.44 (2.28)	23.40 (1.90)	.907
Maternal education[a] (*M, SD*)	6.73 (2.19)	7.07 (1.87)	6.36 (1.63)	.557
Caucasian (%)	79.31	77.78	93.33	.207
Single parent household (%)	32.14	20.00	40.74	.270
Living with parents (%)	51.72	44.44	60.00	.500
Currently in school (%)	26.93	58.33	52.17	.105
Estimated Full Scale IQ (*M, SD*)	94.72 (16.92)$_a$	111.22 (15.98)$_b$	98.10 (15.86)$_a$	.001
Single status (%)	93.10	85.19	100.00	.919
Have kids (%)	10.34	3.70	6.67	.620

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

[a]Maternal education: 1 = less than 7th grade, 2 = junior high school (9th grade), 3 = partial high school, 4 = high school diploma or GED, 5 = technical/secretarial school, 6 = partial college (at least 1 year), 7 = associate's degree (2 year degree), 8 = college degree, 9 = graduate school; single status = not married, or cohabitating with a romantic partner; have kids was coded as present regardless of whether or not the participant lived with the child. Estimated Full Scale IQ was calculated from the combination of the Block Design and Verbal Comprehension subtests of the WISC-IV. In rows with significant omnibus tests, entries with different subscripts indicate that significant differences were found in planned comparison tests of women with and without ADHD or in tests of women and men with ADHD

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Table 3

Adult functional outcomes

	ADHD women	Comparison women	ADHD men	*df*	*F*	Partial η^2	χ^2	*OR* (D)	*OR* (G)
Internalizing Problems									
P IRS Self-esteem	3.26 (2.07)$_a$	0.60 (1.08)$_b$	2.67 (2.00)$_a$	(2, 75)	10.30**	0.29			
S IRS Self-esteem	1.93 (1.93)	1.37 (1.52)	0.76 (1.41)	(2, 83)	3.41	0.11			
S CES-D	15.17 (11.44)	11.44 (7.19)	11.11 (8.66)	(2, 83)	1.24	0.44			
Interpersonal Relationships									
P IRS family	2.96 (2.07)$_a$	0.24 (0.66)$_b$	2.67 (2.18)$_a$	(2,75)	11.72**	0.32			
P IRS peers	2.44 (1.91)$_a$	0.12 (0.33)$_b$	2.00 (2.00)$_a$	(2,75)	10.39**	0.29			
P IRS romantic relationship	2.25 (1.86)$_a$	0.15 (0.55)$_b$	2.83 (2.14)$_a$	(2, 34)	6.03**	0.43			
Currently in a relationship	62.07	66.67	62.07				0.17	1.22	1.00
S IRS family	0.86 (1.36)	0.33 (0.48)	0.72 (1.31)	(2,83)	1.12	0.04			
S IRS romantic relationship	1.33 (1.88)	0.67 (1.19)	0.44 (0.92)	(2, 64)	1.34	0.07			
S IRS peers	0.76 (1.38)	0.48 (1.01)	0.79 (1.10)	(2,83)	0.38	0.01			
Educational level									
No post high school	24.33	7.41	30.00						
Vocational school	24.32	7.41	13.33						
Junior College	18.92	7.41	30.00						
University	29.73	59.25	23.33						
Graduate school	2.70	18.52	3.33						
Job performance									
S Highest job SES	3.54 (1.64)$_a$	5.46 (1.41)$_b$	2.85 (1.43)$_a$	(2, 75)	13.68**	0.35			
P IRS work	2.20 (1.67)$_a$	0.14 (0.35)$_b$	1.91 (1.98)$_a$	(2, 61)	7.97**	0.28			
S IRS work	0.62 (1.36)	0.26 (0.54)	0.50 (0.88)	(2, 71)	0.64	0.03			
S Job loss	0.83 (1.44)	0.37 (0.69)	1.21 (1.24)	(2, 81)	2.37	0.08			
Substance Use & Delinquency									
S Monthly binge drinking (%)	20.69	18.52	37.93				3.37	1.40	2.27
S Monthly marijuana use (%)	10.34	3.70	34.48				10.83**	3.14	4.35**
S Daily cigarette (%)	44.83	37.04	51.72				1.22	1.11	1.27

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	ADHD women	Comparison women	ADHD men	*df*	*F*	Partial η^2	χ^2	*OR* (D)	*OR* (G)
S & P Ever arrested (%)	13.51	7.41	23.33				2.87	1.48	1.80

ADHD attention-deficit/hyperactivity disorder; *p-value* significance of statistical test;

** $p<0.002$; our significance level was corrected for the number of tests run to decrease Type I errors; *M* mean; *SD* standard deviation; *P* Parent-reported item; *S* self-reported item; *IRS* Impairment Rating Scale (Fabiano et al. 2006); *CES-D* Center for Epidemiological Studies Scale – Depression (Radloff 1977); On all continuous dependent variables, higher scores indicate greater impairment; Job loss item was calculated by dividing the number of times losing a job post-high school by the total number of jobs post-high school; In rows with significant omnibus tests, entries with different subscripts indicate that significant differences were found in planned comparison LSD tests of women with and without ADHD or in tests of women and men with ADHD. (*D*) odds ratio by diagnostic status; (*G*) odds ratio by gender