

## ABSTRACT

Children diagnosed with ADHD continue to have symptoms that persist into adulthood. It is well known that children with ADHD face substantial academic difficulties. However, it is less well known how these difficulties contribute to young-adult and adult vocational and educational outcomes. This study serves to explore the academic and vocational differences between controls and probands as well as predictors of these outcomes. Participants for this investigation are from the Pittsburgh ADHD Longitudinal Study (PALS) which include 364 probands and 240 age matched controls. This study confirms that compared to controls, adults diagnosed with childhood ADHD are more likely to have lower high school grades, forego higher education, have lower-status jobs, and lose their jobs.

## INTRODUCTION

### Background:

- It is well known that ADHD is the most commonly occurring childhood disorder in the United States. However, the rate at which childhood ADHD persists into adulthood is inconsistent, with reported percentages ranging from 4% to 86% differing based on the type of report used (self vs. parent) and diagnostic criteria, with DSM IV diagnostic criteria reporting highest rates and DSM II, the lowest (Spencer, 2007)
- Several studies have reported considerable academic impairment in children and adolescents with ADHD; however, less is known about vocational outcomes and the effects of academic underachievement.
- Given the high prevalence and continuation of symptoms in adulthood, it is necessary to understand the long-term consequences of being diagnosed with ADHD as a child.
- In addition to academic difficulties in elementary and high school, adults with ADHD report unstable employment situations that include changing jobs frequently, a decreased number of full time jobs, and three times the likelihood of being fired from a job (Barkley, 2002; Biederman, 2006).
- The current study serves to replicate findings with a larger sample from previous studies about educational and vocational achievement, including high school and college outcomes. Previous studies using current diagnostic criteria for ADHD typically report solely on academic impairments, with the majority of research based on children and adolescents.

### Aims:

- Present group differences in educational and vocational outcomes for the probands and controls from high school to age 32.
- Examine child, adolescent, and young adult predictors that may elucidate the divergent outcomes associated with ADHD.

## METHOD

### Participants:

Participants were recruited as part of the Pittsburgh ADHD Longitudinal Study, 364 individuals diagnosed with ADHD in childhood and 240 individuals without ADHD. Probands were diagnosed at the ADD Clinic at the Western Psychiatric Institute and Clinic in Pittsburgh, PA during the years 1987–1996. Age at initial evaluation ranged from 5.0 to 16.92 years, with 90% in their elementary school-aged years (ages 5–12). All probands met diagnostic criteria for ADHD in childhood according to the DSM-III-R or DSM-IV. Participants were excluded for the following reasons: full scale IQ less than 80, a history of seizures or other neurological problems, and/or history of pervasive developmental disorder, schizophrenia, or other psychotic or organic mental disorders. Females were excluded from the current analyses.

### Measures

- In childhood, a number of instruments were used to gather baseline information for the probands. These included a diagnostic interview with parents and multiple standardized measures of parent and teacher report of behavior.
- Annual PALS interviews are conducted in-clinic, supplemented by home visits, telephone interviews, and mailed paper-and-pencil questionnaires. For this investigation, self-report of ADHD symptoms were obtained using the Adult ADHD scale developed by R. Barkley. Overall high school average was obtained from high school report cards and self-report of educational and vocational information were obtained from measures administered yearly.

### Analyses

- T Tests were used to calculate significant differences between controls and probands for: childhood full scale IQ, DSM ADHD symptom count at age 18, overall high school average, total number of jobs since high school (also broken down by part-time versus full-time), choosing to leave a job and negative reasons for losing a job.
- Choosing to leave a job includes leaving a job due to dissatisfaction with the job, salary, and not having enough time. Negative reasons for losing a job includes losing a job due to incarceration or institutionalization, getting laid off or fired and emotional or drug problems.
- Chi Square analysis was used to determine significant differences between controls and probands for: choice of school versus work after high school and job status.
- Job status was calculated by dividing the Hollingshead (Hollingshead, A.B., 1975) categories into three groups of increasing prestige: Group 1 includes menial and semi skilled workers, Group 2 includes skilled manual workers and semi professionals, and Group 3 includes minor professionals and executives.
- Binary logistic regression was used to predict whether full scale IQ score, high school overall average, DSM ADHD symptom count or ADHD status (proband vs. control) increased or decreased the probability of choosing to attend post high school education from age 19-22.

# Adult Educational and Vocational Outcomes of Children Diagnosed with ADHD

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## RESULTS

- Probands and controls were divided into three age groups: High School (HS, age 15-18), Post High School (PHS, age 19-22) and Post High School & College (PHSC, age 23-32).
- Probands and controls differed significantly on overall high school grade average, childhood full scale IQ, and ADHD symptom count at age 18 (Table 1).
- In the PHS group probands and controls differed significantly in their choice to attend school immediately after high school (Table 2;  $p < .001$ ).
  - Compared to controls, probands were less likely to attend additional schooling right after high school ( $OR = 0.25$ ,  $p < .01$ ). In addition, among the probands and controls, having a higher IQ and higher overall average in high school increased the probability of attending an educational program post-high school ( $OR = 1.027$ ,  $p < .05$ ;  $OR = 1.059$ ,  $p < .01$ ).
  - Endorsing a greater number of ADHD symptoms did not significantly predict whether probands or controls chose to attend school after high school.
- In the PHSC group, the percentage of probands and controls differed significantly within the job status groups (Table 2;  $p < .001$ ).
  - Significantly more probands ( $M = 1.43$ ,  $SD = 1.81$ ) lost a job due to negative reasons compared to controls ( $M = .39$ ,  $SD = .80$ ) ( $p < .001$ ).
  - Significantly more probands ( $M = 1.54$ ,  $SD = 1.74$ ) chose to leave their job compared to controls ( $M = 1.14$ ,  $SD = 1.49$ ) ( $p < .05$ ).
  - Probands and controls did not differ on the total number of jobs they had after high school. Controls had significantly more part-time jobs after high school, while probands had significantly more full-time jobs after high school.
  - Within the job status groups, 85.7% of Group 3, 85.5% of people in Group 2, and 71.2% of Group 1 had attended post high school education ( $p < .05$ ).

Table 1. Mean Differences between Probands and Controls

	ADHD	Control
Full Scale IQ	105.12 (14.45)	110.51 (13.99)***
Symptom Count	3.11 (3.77)	1.31 (2.36)***
High School Average	74.8 (8.37)	82.77 (6.85)***

Standard Deviations are presented in parentheses.  
\*\*\* $p < .001$

Table 2. Vocational and Educational Outcomes after High School

	ADHD	Control
Attended Post High School Education	66.7%	92.5%
Hollingshead Job Category		
Job Group 1	70.9%	42.1%
Job Group 2	23.5%	41.4%
Job Group 3	5.6%	16.6%

## CONCLUSIONS

- As previously reported, children diagnosed with ADHD have significantly lower grades in high school than those without an ADHD diagnosis.
- Regardless of current endorsement of ADHD symptoms, people diagnosed with childhood ADHD were less likely to continue education after high school compared to controls.
- As expected, attending post high school education was significantly related to job status. However, findings may be more robust if type of education (vocational vs. four year degree) was also considered.
- Surprisingly, the control group had significantly more part-time jobs in the 23-32 age range. However, since significantly more controls attended higher education, perhaps the mid-twenties reflected a time when the controls were obtaining their first jobs. Examining ages 19-22, 23-25, and 25-30 separately may reveal a more intricate pattern of vocational and educational outcomes.
- On the other hand, probands had a greater number of full time jobs after high school. This perhaps reflects the greater probability of probands to seek a job straight after high school.
- In the future it would be interesting to examine how adulthood ADHD, ODD and CD symptom endorsement affects job performance, stability and status.
- To further explore the heterogeneity in outcomes for the ADHD sample, it would be interesting to group the sample into high, low, and medium achievement levels and examine the variables that differentiate the three groups from each other and how those three groups differ from a control sample.

## REFERENCES

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