

Perceptions of Academic Skills of Children Diagnosed With ADHD

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Objective: This study investigates how the academic skills of children diagnosed with ADHD are perceived by teachers, parents, and the children themselves. **Method:** The authors analyze data collected for third graders in spring 2002 in the nationally representative Early Childhood Longitudinal Survey. They use linear regressions to estimate independent associations between perceptions of academic abilities and parent-reported ADHD diagnoses, controlling for scores on standardized reading and math tests, assessments of externalizing behaviors, and other factors. **Results:** Results show that for ADHD-diagnosed girls compared to other girls, both parents' and teachers' perceptions are substantially more negative. For ADHD-diagnosed boys, the differentials are also negative but less pronounced. Self-perceptions are not significantly different by ADHD status, except for boys' more negative self-perceptions related to math. **Conclusion:** Given the potentially damaging effects of these negative perceptions and expectations on self-esteem, motivation, and performance, efforts may be needed to bring perceptions of ADHD children more in line with the abilities they demonstrate on objective assessments. (*J. of Att. Dis.* 2007; 10(4) 390-397)

Keywords: ADHD; perceptions; stigma

Much of the controversy regarding ADHD centers on the increasing use of psychostimulants (Bokhari, Mayes, & Scheffler, 2005; MTA Cooperative Group, 2004; Rowland et al., 2002). A less publicized concern is that children with the disorder may be perceived negatively, and these negative perceptions may partly represent a stigma associated with the diagnostic label and the accompanying treatments. We examined this concern by analyzing parent, teacher, and own perceptions of academic skills for primary school children diagnosed with ADHD using a publicly available, nationally representative data set from the year 2002.

In recent years, there has been an increasing awareness that mental disorders are often associated with negative perceptions, and these perceptions may have pernicious consequences. Combating the stigma of mental disorders and mental health care is a major theme in both the 1999 Surgeon General's Report on Mental Health and the 2003 President's New Freedom Commission Report (New Freedom Commission on Mental Health, 2003; U.S. Department of Health and Human Services, 1999). Consequences of stigma may include lower self-esteem, increased feelings of hopelessness and isolation, and a

reduced likelihood of seeking and obtaining care (U.S. Department of Health and Human Services, 1999).

Negative perceptions represent a special concern in the context of childhood ADHD. Children's self-esteem and self-confidence have been shown to be highly sensitive to the perceptions expressed by peers, family, and teachers (Guevremont & Dumas, 1994; Roe, 1998; Wheeler & Carlson, 1994). Furthermore, the perceptions and expectations of parents and teachers affect their interactions with children, which can in turn affect children's behavior and academic success (Brattesani, Weinstein, & Marshall, 1984; Chi & Hinshaw, 2002; Feldman & Theiss, 1982). For example, teachers' and parents' expectations may create a self-fulfilling prophecy and affect the level of post-secondary education a child attains (Brophy, 1983; Madon, Gyll, & Spoth, 2004; Merton, 1948).

Our study focused on perceptions of reading and math skills of children diagnosed with ADHD. In essence, the analysis answered the following question: If two children,

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one diagnosed with ADHD and one not diagnosed with ADHD, have identical academic skills as measured by standardized assessments, identical externalizing behavior as assessed by teachers, and identical demographic, socioeconomic, and family characteristics, are their academic skills perceived any differently by parents, teachers, or themselves? We hypothesized that the academic skills of children diagnosed with ADHD are indeed perceived more negatively than those of children not diagnosed with ADHD, even after controlling for the factors listed above. We also hypothesized that these perceptions vary by the child's gender. This hypothesis was based on the idea that girls are less commonly diagnosed with ADHD and therefore those who are diagnosed may appear more conspicuous (to themselves and to others).

Previous research on perceptions of ADHD children's academic skills has largely compared parent perceptions to teacher perceptions (Chi & Hinshaw, 2002; Kemper, Gerhardstein, Repper, & Kistner, 2003; Wolraich et al., 2004) or child self-perceptions to parent and teacher perceptions (Gershman, 1981; Hoza, Pelham, Milch, Pillow, & McBride, 1993; Hoza, Pelham, Dobbs, Owens, & Pillow, 2002; Hoza et al., 2004; Owens & Hoza, 2003; Taylor & Brown, 1994). By contrast, our focus was the comparison between perceptions of skills and standardized math and reading assessment scores. Thus, we sought to answer whether perceptions of ADHD children are "biased" away from standardized measures, not how perceptions by different people compare to each other. To our knowledge, this is the first study to address this question using a large community sample.

Method

Sample

We analyzed the sample from the Early Childhood Longitudinal Survey–Kindergarten Cohort (ECLS-K), a longitudinal data set following a nationally representative cohort of children beginning kindergarten in fall 1998. The data set is publicly available and produced by the National Center of Education Statistics in the United States Department of Education. We obtained approval for the use of these data from the National Center for Education Statistics and the Health Sciences Institutional Review Board at the first author's local institution. ECLS-K followed a dual frame (public and private school), multistage (counties or county groups and then schools) sampling strategy. All children attending kindergarten in fall 1998 were eligible to be included. ECLS-K collected follow-up data in spring 1999, fall 1999, spring 2000, spring 2002, and spring 2004.

We restricted attention to measures recorded in spring 2002, at which point children were in third grade unless they had skipped (0.3%) or repeated one or more grades (8.7%) since kindergarten. Our sample included only those children for whom all information relevant to the analysis was obtained, yielding a sample size of 9,062 for parts of the analysis that required information from parents and children only and 7,520 for parts that required information parents, children, and teachers. As discussed below, these samples remain nationally representative with proper weighting.

Outcome Variables

Perceptions of children's reading and math skills were measured as follows:

Parents were asked,

Compared to other children in (CHILD)'s class, how well do you think (he/she) is doing in school this spring in (reading/language arts; math)? Do you think (he/she) is doing . . . much worse, a little worse, about the same, a little better, or much better?

Similarly, teachers were asked,

Overall, how would you rate this child's academic skills in each of the following areas (language and literary skills; mathematical skills), compared to other children of the same grade level? Possible answers are far below average, below average, average, above average, and far above average.

To measure self-perceptions, sample children were asked how much they agreed (*not at all true, a little bit true, mostly true, or very true*) with a series of statements about their grades, difficulty, interest, and enjoyment in various areas including math and reading. These questions were adapted from the Self-Description Questionnaire I (Marsh, 1992). Children's aggregated answers regarding each subject were converted by the producers of ECLS-K to 1 to 4 scales found to have high (0.9) split-half reliabilities (National Center for Education Statistics, U.S. Department of Education, 2003).

We converted all three scales described above into units with meaningful cardinal values by mapping their values to average percentiles. For example, 36% of parents rated their children as doing "much better" than peers in reading (the highest category). Thus, the "much better" category corresponded to Percentiles 64 to 100, yielding an average percentile of 82. We performed this rescaling because the percentile scale better reflected the differences across the response categories. We did not think it was appropriate to assume that the

differences from each category to the next were all equivalent.

Main Exposure Variable: ADHD Diagnosis

ADHD diagnoses were recorded based on parent reports. Parents could note the diagnosis in response to any of three separate questions about professional diagnoses related to learning, attention, or activity level, respectively. We coded a child as having a parent-reported ADHD diagnosis if it was noted in any of these three questions. Two obvious concerns are that parents may misreport (intentionally or not) diagnoses and that diagnoses, even if reported faithfully, may not accurately represent true disorder prevalence (to the extent that such a concept exists). We nevertheless focused on parent reports because the purpose of this research is to examine the role of perceptions of children with a diagnostic label, regardless of whether that label is strictly accurate from a clinical standpoint.

Main Control Variables: Math and Reading Scores and Perceptions of Behavior

We were interested in perceptions of academic skills that could not be explained by differences in academic performance and behavior, so we controlled for these factors with the various measures constructed by ECLS-K. First, academic performance was measured by math and reading standardized assessments. Test items were reviewed by elementary school curriculum specialists for appropriateness of content and difficulty and for sensitivity issues related to minority concerns. The content validity of the items was established by comparing the results with scores on the Woodcock-McGrew-Werder Mini-Battery of Achievement that was administered during the ECLS field test. Additional details are available in the ECLS-K codebooks (National Center for Education Statistics, U.S. Department of Education, 2003). We focused on scores normalized such that the cohort means were 50 and the standard deviations 10. We constructed categorical dummies corresponding to 5-point intervals (e.g., 45 to 50, 50 to 55) in the scores.

Second, perceptions of behavior were measured from the perspectives of both parents and teachers. Parents were asked, "Would you say (CHILD) behaves and relates to other children and adults . . . better than other children (his/her) age, as well as other children, slightly less well than other children, or much less well than other children?" Teachers were asked about children's externalizing problem behaviors using a set of questions that yielded a score on a 1 to 4 scale (National Center for Education Statistics, U.S. Department of Education,

2003). We converted both parent-based and teacher-based perceptions to percentile variables following the method described earlier. We ran regressions both with and without controlling for perceptions of behavior to examine how much differentials by ADHD status in perceptions of academic skills were mediated by perceptions of behavior.

Other Potentially Confounding Variables

We controlled for several other variables: whether the child was reported by school administrators to have a learning disability on an individualized education plan, child's race/ethnicity (reported by parent), geographic setting (large city, midsized city, large suburb, etc., as defined in the data set), whether the child lived with each biological parent, number of siblings, parents' education levels, whether each parent was born in the United States, and family income quintile. We included these variables because we believed for various reasons they could be correlated with both perceptions of academic abilities and the likelihood of having an ADHD diagnosis (Bussing, Schoenberg, Rogers, Zima, & Angus, 1998; Bussing, Zima, & Belin, 1998; Cuffe, Waller, Cuccaro, Pumariega, & Garrison, 1995; Kalff et al., 2001; Schneiders et al., 2003).

Missing Data

Relative to the initial ECLS-K cohort of fall 1998, which included 21,260 children, data were missing in the spring 2002 collection for the following reasons: nonresponse (school level or child level) at baseline, nonresponse (school level or child level) at follow-up, and the moving of the child's family between baseline and follow-up. The producers of ECLS-K constructed various weights to account for these sources of missing data. Different weights were used in our analysis depending on which set of variables were being analyzed (National Center for Education Statistics, U.S. Department of Education, 2003). The weights ensured that the sample in our analysis remained nationally representative in terms of characteristics including school type, geographic region, demographic, and socioeconomic characteristics.

Data Analysis

We analyzed perceptions of academic skills for boys and girls separately, because ADHD has been shown to have a different profile by gender (Quinn & Wigal, 2004). We began our data analysis by comparing means of all variables across ADHD diagnosis status. We then used weighted linear regressions to examine adjusted

differences in means. In each regression, we included an interaction term for gender and ADHD diagnosis status to see the separate associations by gender. We also ran regressions with the whole sample (boys and girls) to estimate results for ADHD-diagnosed children in general. We constructed 95% confidence intervals for point estimates using a linearization-based variance estimation that accounted for the stratified, clustered sampling design (StataCorp, 2003).

Sensitivity Checks

Differences by community in average academic skills could confound the estimated relationship between ADHD diagnoses and perceptions of academic skills, if ADHD diagnoses are more common in higher or lower achieving communities. We addressed this possibility in separate regressions in which we included community-level dummy variables to control for differences in community “standards.” We also conducted the analyses using multinomial logistic regressions with the dependent variables as the original response categories for the perception variables (rather than the rescaling to percentiles).

Results

Four hundred and five children, or 5.4%, of our sample were reported to have been diagnosed with ADHD. Table 1 presents mean values of characteristics of children diagnosed with ADHD versus those not diagnosed. The results show that ADHD-diagnosed children were perceived on average by parents, teachers, and themselves to be doing less well in both reading and math. Other notable differences include the following: ADHD-diagnosed children were more likely to have a learning disability on record and to be non-Hispanic White, less likely to be Black, Hispanic (any race), or Asian; performed less well on standardized reading and math assessments; and were perceived by parents and teachers to have more externalizing problem behaviors.

Table 2 shows differentials in perceptions of academic skills after controlling for test scores and other potential confounders. Each row corresponds to two regressions: one that estimates coefficients for boys (Column 1) and girls (Column 2) separately and one for the whole sample (Column 3). For ADHD-diagnosed girls compared to other girls, parents’ and teachers’ perceptions of skills in reading and math were substantially more negative, regardless of whether we controlled for parents’ perceptions of externalizing behavior. For example, parents’ perceptions of reading skills were 12.27 percentile points

(95% confidence interval: $-17.59, -6.96$) lower. For ADHD-diagnosed boys, after we controlled for teachers’ perceptions of behavior, only the differential in teachers’ perceptions of reading skills was significantly different from 0 in a two-tailed *t* test (95 confidence interval: $-8.56, -0.36$). Self-assessed skills and interest were significantly different for ADHD children only in the case of boys’ perceptions pertaining to math (95% confidence interval: $-9.52, -0.28$).

Controlling for perceptions of behaviors generally reduced the magnitudes of the negative differentials in perceptions of academic skills but only by modest amounts. This suggests that only a small part of the negative differentials can be explained by perceptions of behavior.

In our sensitivity check controlling for community-level differences in average perceptions of children’s skills, we found that the basic pattern of results for perceptions of ADHD-diagnosed children did not change. Our main results also remained similar when we used multinomial logistic regressions rather than linear regressions.

Discussion

This study examined perceptions of academic skills of ADHD-diagnosed children using a nationally representative community sample. For ADHD-diagnosed girls, we found that parents’ and teachers’ perceptions were substantially more negative, even after adjusting for standardized assessment scores, perceptions of externalizing behavior, and other variables. For boys, differences in perceptions across ADHD diagnosis status were less clear cut overall, but there was evidence for a negative differential in teachers’ perceptions of reading and language performance. We found no significant differences across ADHD diagnosis status for self-perceptions of skills and interest in reading or math, except that ADHD-diagnosed boys had more negative self-perceptions regarding math than other boys.

The perception differential for girls may be more negative for a variety of reasons. First, ADHD is less commonly diagnosed for girls. In our study and other population-based studies, the male-female ADHD prevalence ratio is around 3:1 (Gaub & Carlson, 1997). As a result, ADHD symptoms, or the simple fact that a girl has the diagnosis, may be more noticeable to parents and teachers. ADHD may also be more conspicuous or less accepted for girls because of social expectations about female and male behaviors. Another possible explanation is that ADHD-diagnosed girls are more likely to be of the inattentive but not hyperactive type than ADHD-diagnosed boys (Biederman et al., 2002; Lahey et al.,

Table 1
Means of Study Variables by ADHD Status and Gender

	Non-ADHD- diagnosed Boys	ADHD- diagnosed Boys	Non-ADHD- diagnosed Girls	ADHD- diagnosed Girls
<i>N</i>	4,307	301	4,350	104
Outcome variables				
Parents' perception of how child is doing ^a				
Reading	50.0*	37.9	52.7*	30.1
Math	54.0*	43.3	48.6*	29.5
Teacher's perception of how child is doing ^a				
Reading and language	51.3*	35.6	56.5*	33.1
Math	54.5*	43.5	52.0*	32.7
Child's self-perception of aptitude and interest ^a				
Reading	47.8*	41.3	54.9	53.8
Math	53.6*	48.0	47.3	44.3
Control variables				
Age	9.3	9.3	9.2	9.4
Learning disability on record	4.3*	21.1	3.4*	19.6
White, non-Hispanic	60.7*	81.1	63.4*	77.9
Black, non-Hispanic	9.9*	6.7	8.8*	1.3
Hispanic (any race)	21.3*	6.3	20.0	15.1
American Indian or Alaska native	1.6	0.8	1.4	1.5
Asian	3.5*	0.2	3.8*	1.5
Native Hawaiian, other Pacific Islander	0.7	1.0	0.9	1.1
More than one race, non-Hispanic	2.3	3.8	1.8	1.5
Standardized assessment: Reading score	50.8*	47.1	52.4	47.0
Standardized assessment: Math score	52.8*	48.6	50.7	43.3
Parent's perception of behavior ^a	48.6*	27.1	51.8	33.4
Teacher's perception of behavior ^a	49.7*	27.1	63.4	46.8
Northeast	18.8	17.6	19.5	14.1
Midwest	23.3	26.0	25.3*	35.7
South	33.3*	44.9	31.5	35.2
West	24.7*	11.5	23.7*	15.0
Large city	14.5*	8.9	14.1	6.7
Midsized city	18.9	21.5	20.1	16.5
Large suburb	32.4	32.3	32.5	28.8
Midsized suburb	8.6	10.5	7.6	13.4
Large town	3.9	3.4	3.6	5.0
Small town	8.3	9.2	9.0	9.1
Rural	13.3	14.2	13.1	20.5
Lives with biological mother	95.8*	89.4	95.0*	83.8
Lives with biological father	83.3*	63.5	83.5*	65.7
Number of siblings	1.6*	1.5	1.6	1.4
Mother graduated high school	86.8	90.9	87.6	85.3
Father graduated high school	84.0	84.3	85.7	93.6
Mother graduated college	27.5	25.4	27.6	29.0
Father graduated college	28.9*	24.5	30.4*	20.7
Mother born in the United States	79.2*	94.8	80.1*	94.4
Father born in the United States	79.7*	93.2	79.7*	90.6

a. These variables have been converted to 0 to 100 percentiles. See the Method section for details.

*Indicates that surrounding values are significantly different for $p < .05$, according to t -test.

1994; Quinn & Wigal, 2004). Academic abilities of children with this subtype may be perceived more negatively in general. Alternatively, because inattentive subtypes of ADHD cases are less likely to be detected, girls

with relatively mild, inattentive types may have been underrepresented in the sample with reported diagnoses, leaving a disproportionate fraction of more severe cases for the analysis.

Table 2
Differentials in Perceptions of Academic Competence by ADHD Status, Controlling
for Test Scores and Other Potential Confounders

Sample	ADHD-Diagnosed Boys (Compared to Boys Not Diagnosed With ADHD)		ADHD-Diagnosed Girls (Compared to Girls Not Diagnosed With ADHD)		ADHD-Diagnosed All (Compared to Children Not Diagnosed With ADHD)	
	Point Estimate	95% Confidence Interval	Point Estimate	95% Confidence Interval	Point Estimate	95% Confidence Interval
Parent's perception of how child is doing						
Not controlling for parent's perception of externalizing behavior						
Reading	-4.56	(-8.83, -0.29)	-12.27	(-17.59, -6.96)	-6.54	(-10.2, -2.87)
Math	-5.72	(-10.1, -1.31)	-10.12	(-15.17, -5.07)	-6.85	(-10.35, -3.35)
Controlling for parent's perception of externalizing behavior						
Reading	-2.85	(-7.28, 1.59)	-10.36	(-15.65, -5.06)	-4.78	(-8.62, -0.93)
Math	-4.15	(-8.75, 0.46)	-8.56	(-13.69, -3.44)	-5.28	(-8.96, -1.6)
Teacher's perception's of how child is doing						
Not controlling for teacher's perception of externalizing behavior						
Reading and language	-4.46	(-8.56, -0.36)	-10.85	(-17.32, -4.39)	-6.09	(-9.88, -2.31)
Math	-0.49	(-4.2, 3.23)	-6.3	(-11.22, -1.38)	-1.98	(-5.21, 1.25)
Controlling for teacher's perception of externalizing behavior						
Reading and language	-3.29	(-7.42, 0.83)	-10.12	(-16.75, -3.49)	-5.05	(-8.9, -1.2)
Math	0.82	(-2.9, 4.54)	-5.54	(-10.55, -0.53)	-0.83	(-4.05, 2.39)
Child's self-perception of aptitude/interest						
Reading	-1.56	(-6.53, 3.42)	0.57	(-7.11, 8.25)	-1.01	(-5.22, 3.2)
Math	-4.9	(-9.52, -0.28)	-1.36	(-6.5, 3.78)	-3.99	(-7.73, -0.26)

Notes: Perceptions of academic competence measured on 0 to 100 percentile scale (see Method section for details).

Each row corresponds to two regressions: one that estimates the coefficients for boys and girls separately and one for the whole sample. Control variables listed in Table 1 (and described in Method section) are included in all regressions.

The focus of this research was the comparison between perceptions and objectively measured standards, the child's assessment scores in reading and math. Previous studies have used teachers' assessment of children's abilities as a comparator for assessing parents' assessments (Chi & Hinshaw, 2002; Kemper et al., 2003; Wolraich et al., 2004), but we found that even teachers' perceptions of ADHD children were substantially more negative than could be explained by assessment scores, perceived externalizing behaviors, and other factors. This suggests that previous studies may have understated the degree to which ADHD is associated with negative perceptions.

Limitations

This study's limitations suggest caution in interpreting the results. Most notably, the analysis was based on

nonrandomized data, so we could not make definitive conclusions regarding causal mechanisms by which negative perceptions arise. The direction of causation may run in both directions: from ADHD diagnosis to negative perceptions and vice versa. Also, standardized assessment scores do not capture all aspects of academic abilities; therefore, to some extent, the negative perception differentials we estimated may have reflected truly lower performance in other areas (e.g., ability to complete homework consistently or ability to work in groups).

Focusing on a parent report of ADHD diagnoses has disadvantages and advantages. Some parents may have misreported the diagnosis. For example, if some parents did not report ADHD diagnoses out of embarrassment or shame, our estimates may have understated the negative differential in perceptions for ADHD-diagnosed children. Although a parent-reported diagnosis is not necessarily

accurate from a clinical standpoint, we believe it captures an important factor in the perceptions of children: whether the parent thinks the child has been diagnosed with the disorder.

There are a variety of nonmutually exclusive explanations for why parents' perceptions of ADHD-diagnosed children appear more negative on average than those of teachers. Parents may truly hold more negative views about the disorder, perhaps because they are less familiar with it. Alternatively, ADHD-diagnosed children may behave and perform assignments more poorly in the home environment than in the school environment, especially children who take medication to help mostly with the part of the day when they are at school. Finally, teachers are probably less likely to be aware of ADHD diagnoses in children, although we cannot verify this in the data.

We could not verify that the sample remained representative in the key variables of our study by comparing these variables in the original sample at baseline (fall 1998) to the sample used in our analysis (spring 2002) because these variables (e.g., parent perceptions, ADHD diagnosis) naturally change between kindergarten and third grade. Thus, although we used statistical weights to account for any changes in basic characteristics in the sample (e.g., demographics), sample attrition may have still affected the key variables in our analysis. It is less likely, however, that sample attrition substantially affected the relationships between these key variables, which were the focus of our study.

We could not distinguish between different types (inattentive, hyperactive, and combined) of ADHD diagnoses in the ECLS-K data set, and these types may be subject to different perception biases. Also, the negative differentials for parents' and teachers' perceptions we estimated may have also have reflected that parents and teachers with more demanding expectations were more likely to seek or advocate professional consultations that could lead to ADHD diagnoses. Furthermore, in these data we could not observe whether children received medication or other services. Distinguishing how the receipt of various treatments mediates perceptions of children is an important step for future work. Finally, in our examination of self-perceptions, it is important to emphasize that the measures pertained to both skills and interest. Thus, this set of results is not directly comparable to other analyses of self-perceptions that focused on skills per se.

Potential Clinical and Policy Implications

The sizeable magnitudes of teachers' and parents' perception differentials by ADHD status raise concerns that

these differentials could exacerbate problems with academic development, self-esteem, and general emotional health. These results suggest that measures may be needed to bring perceptions of ADHD-diagnosed children more in line with the abilities they demonstrate on objective assessments. For example, parents of ADHD-diagnosed children may benefit from counseling and education designed to help the parents achieve a more positive understanding of their children's talents and the obstacles they may face. In addition, previous research indicates that there are some knowledge gaps and misconceptions that teachers exhibit when questioned about ADHD (Bekle, 2004). Teachers must be knowledgeable about ADHD and its implications for particular students. A pediatrician-led intensive training on the knowledge of school teachers related to ADHD can improve teacher knowledge about abilities of ADHD children (Barbarese & Olsen, 1998).

Mental health professionals can assist with these goals in a couple of ways. First, they can monitor situations in which parents or teachers express unproductively pessimistic views of ADHD children's abilities. In these situations, they may be able to provide helpful information, counseling, or support. Second, they can consider carefully how their communication with parents and teachers regarding children may influence the perceptions of those children's capabilities. These recommendations are undoubtedly practiced already by many professionals, but our research suggests that even greater efforts may be necessary.

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