

The Stigma of ADHD: Teacher Ratings of Labeled Students

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Abstract

Despite the increasing prevalence of Attention-Deficit Hyperactivity Disorder (ADHD), little sociological research has focused on effects of diagnosis in schools. This study, which is grounded in the modified labeling approach, relies on three waves of Early Childhood Longitudinal Study (ECLS-K:2011) data to determine if teachers evaluate the academic performance of ADHD students as less promising than non-diagnosed peers. Results indicate that teachers are more likely to rate ADHD students as performing below grade level and are less likely to acknowledge these students as performing above grade level—regardless of demonstrated ability on subject-specific tests. The latter finding is, in part, a function of real and/or perceived behaviors in the classroom that inform teachers' grade-level performance ratings. We argue that diagnosis may be a double-edged sword for children and their families, as it can provide access to special resources in the school but may activate teachers' negative stereotypes about diagnosed students.

Keywords

ADHD, developmental disorders, teacher perceptions, labeling theory, stigma

Estimates suggest that more than one in 10 children in the United States are diagnosed with Attention-Deficit Hyperactivity Disorder (ADHD), and numbers have only increased over time (Centers for Disease Control and Prevention 2011; Danielson et al. 2018). Typically, at least one student diagnosed with ADHD is present in every classroom (Hoza 2007). ADHD is a medical diagnosis characterized by a constellation of symptom presentations: inattentiveness, hyperactive-impulsivity, and comorbid inattentiveness with hyperactivity-impulses (American Psychiatric Association 2013). The medical community often assumes that symptoms of ADHD make it more challenging for students to engage with academic lessons. Parents frequently inform the school of a diagnosis to receive accommodations that may support their children's learning.

ADHD diagnosis, however, may come with social stigma. Numerous studies suggest that individuals labeled as having ADHD face negative stereotypes and social rejection. For example, Jack K. Martin et al. (2007) show that adult respondents are the least willing to have contact with children diagnosed with ADHD, as compared with children exhibiting other health issues.

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Children and adolescents are also more likely to make negative attributions about peers with ADHD, particularly with regard to antisocial behavior and violence (Walker et al. 2008; also see Law, Sinclair, and Fraser 2007). Similarly, social aversion toward people diagnosed with ADHD is present among college undergraduates (Canu 2008).

Despite the increasing prevalence of ADHD and stigma associated with this diagnosis, little sociological research has focused on the effects of the ADHD diagnosis in schools. We know that teachers are not immune to stereotype bias, as their perceptions of students are influenced by assumptions about different social groups (Bates and Glick 2013; Cherng 2017; Downey and Pribesh 2004; Irizarry 2015b; McGrady and Reynolds 2012). Research in other fields suggests that teachers are often uninformed about ADHD and may hold negative attitudes about students with this diagnosis (e.g., Anderson et al. 2012; Ghanizadeh, Bahredar, and Moenini 2006). Teacher expectations for student performance may also be lower for ADHD-diagnosed students; however, this research has been based on small, nonrepresentative surveys of older, cross-sectional data (see Batzle et al. 2010; Eisenberg and Schneider 2007).

In this study, we bring a social-psychological lens to the study of the relatively new realm of teacher expectations and neurodevelopmental disorders. We ask, Does the ADHD label lead teachers to evaluate the academic performance of students more negatively? Specifically, using the second to fourth grade waves of the Early Childhood Longitudinal Study (ECLS-K:2011), we examine the relationship between the diagnostic label of ADHD and teacher ratings of below and above grade-level student achievement in five subjects: math, reading, science, writing, and oral language. We argue that the ADHD diagnosis operates as a stigmatized label—leading teachers to assume that these students are less capable than their non-diagnosed peers. Analyses also control for factors likely to be associated with both the diagnosis of ADHD and negative teacher ratings, including sociodemographic characteristics, school context, academic performance, and classroom behavior.

Routes to ADHD Diagnosis

There are two common routes to juvenile ADHD diagnosis, both of which frequently involve parents *and* teachers. Parents may proactively pursue diagnosis, often involving professionals outside of the school. Teachers may be asked to fill out evaluations that inform diagnosis. But teachers can also initiate evaluations. ADHD symptoms such as impulsivity and inattentiveness may become particularly noticeable in the restrictive environment of schools, where children are asked to sit and focus for long periods of time. In schools staffed with professionals trained to identify and diagnose ADHD, parents may be asked for permission to have their children tested, often at a teacher's request.

An official diagnosis is typically required to push for accommodations within schools, such as extra time for testing and increased ability for movement. These accommodations often require additional personnel and equipment, which make them expensive for schools. An Individualized Education Plan (IEP) or 504 Plan, which are linked to two different laws regarding the accommodation of physical or mental impairments, are official documents internal to schools that lay out accommodations. Teachers are not only informed of these plans—they are often primarily responsible for executing them.

Parents and educators may believe that obtaining an ADHD diagnosis is uniformly positive for children, as it can provide access to accommodations and set children on a course of treatment. In fact, this may be helping to drive the rise in ADHD diagnoses, which some researchers have deemed as potential “overdiagnosis” (e.g., Bruchmüller, Margraf, and Schneider 2012). As we detail below in our discussion of modified labeling theory, the social stigma associated with the ADHD label may also have troubling effects.

Modified Labeling Theory and ADHD

ADHD is understood and treated as a mental disorder. As Bruce G. Link and Jo C. Phelan (2017) point out, the genetics revolution has shaped perceptions of mental illness and increased the readiness with which people attribute psychiatric disorders to biological factors. Yet, core stereotypes associated with mental illness (e.g., dangerousness and incompetence) have not changed, or have become even stronger, with the medicalization of mental illness. When identified as having a mental illness, individuals often experience pejorative labeling and social stigma that can reduce their quality of life.

Modified labeling theory helps us to make sense of how stigma around mental illness leads to consequential disparities (Link et al. 1989). This approach focuses on what happens after an individual is labeled with a mental illness. The process of stigmatization starts when perceived human differences are distinguished and labeled. Next, dominant cultural beliefs link labeled persons to negative stereotypes. Finally, negative stereotypes shape how people perceive labeled individuals and, thus, how the diagnosed are treated in interaction. The primary driver of disadvantage is discrimination by others—impacting educational opportunities, employment chances, social networks, and self-esteem (Link and Phelan 2001).

Social-psychological research on mental illness recognizes that debate over the effects of labeling as solely positive or negative is misguided. Indeed, it is more useful to think of diagnosis as a “double-edged sword” or a “package deal” that includes both potentially helpful and harmful elements (Link and Phelan 2017). Diagnosis can allow individuals to receive treatments and accommodations that improve overall quality of life. At the same time, the labels that accompany diagnosis initiate the process of stigmatization. Thus, as Rosenfield (1997) indicates, the receipt of mental health services and stigma are related, but in opposite directions, to quality of life measures. Below, we explore ways in which teachers’ negative perceptions of ADHD may lead to biased evaluations of student performance.

Teacher Perceptions and Bias

Student performance relies heavily on teachers, as teachers interact with students regularly (Alvidrez and Weinstein 1999; Hamre and Pianta 2001; Rosenthal and Jacobson 1968). Teachers’ assessments may be shaped by their perceptions of students—which may or may not reflect students’ actual academic abilities. For instance, teachers often use sibling performance, behavior, race, and sex to inform their perceptions of their students (Brophy and Good 1974; Ferguson 2007; Rosenthal and Jacobson 1968; Van den Bergh et al. 2010).

A significant amount of research has explored teacher perceptions of racially marginalized groups. For example, teachers (especially white teachers) more negatively evaluate black, Latino/a, and Native American students (Bates and Glick 2013; Cherng 2017; Downey and Pribesh 2004; Irizarry 2015a, 2015b; McGrady and Reynolds 2012). Differences in perception may be related to group disparities in academic achievement (Ferguson 2003; Jussim and Harber 2005). However, teachers also rely on racial stereotypes that lead them to perceive students of color as less capable (Irizarry 2015a, 2015b). Indeed, even when considering high academic performers, teachers rate students of color less favorably in comparison to their white peers (Cherng 2017; Irizarry 2015a).

Just as teachers’ ratings of minoritized students often do not match students’ skill levels, the same may be true for children with ADHD. Children labeled as having ADHD are generally assumed to be lazier, more violent, and at a significantly higher risk of getting in trouble (Walker et al. 2008; also see Hoza 2007; Law et al. 2007; Martin et al. 2007). Especially in elementary school, behavior and diligence are important for positive evaluations. If educators assume that ADHD children are unmotivated troublemakers, then they may more negatively perceive the

academic capabilities of diagnosed children. This can occur even without intent on the part of a teacher (see research on “implicit bias” by Greenwald, McGhee, and Schwartz 1998).

There are reasons to believe that the stigma associated with ADHD bleeds into the classroom. Although diagnosed students represent a full spectrum of academic abilities, diagnostic labels (e.g., emotionally disturbed or learning disabled) can make it difficult for teachers to objectively evaluate students (see Shifrer 2013, 2016; also Algozzine 1981; Ysseldyke and Foster 1978). Vignette studies have presented descriptions of children with ADHD symptoms, but varied the presence of an ADHD diagnostic label. When the label was present, teachers saw students as having more serious behavioral issues, being more likely to disrupt the classroom, and requiring more time and effort than they were able to provide (Ohan et al. 2011). Christina S. Batzle et al. (2010) and Daniel Eisenberg and Helen Schneider (2007) argue that teachers (as well as parents and peers) view ADHD-diagnosed students less positively.

Negative teacher expectations can lead to unjustifiably low evaluations of students. This is a problem, as teachers’ evaluations may be linked to gatekeeping actions; for example, a student may be held back for a year or refused access to more rigorous curriculum. Lower ratings can lead to negative perceptions of students by future teachers. Eventually, teachers’ negative expectations and poor evaluations may lead to a self-fulfilling prophecy, in which young students who are viewed as poor performers eventually become the students that their teachers expect them to be (Brophy 1983; Eisenberg and Schneider 2007).

Alternative Explanations

The purpose of this study is to determine if teachers rate the academic performance of students diagnosed with ADHD more negatively than non-diagnosed students and to systematically assess if these lower ratings can be attributed to ADHD bias. Quantitative research addressing teachers’ negative perceptions of marginalized groups often assesses bias by ruling out other explanations for lower evaluations (see, for example, Cherng 2017; Downey and Pribesh 2004; Irizarry 2015a, 2015b; McGrady and Reynolds 2012). If teachers rate students from a particular group poorly, *even after accounting for other explanatory factors*, bias is a likely culprit. Below, we explore alternative explanations to ADHD bias.

Sociodemographic Factors

Sociodemographic characteristics of students who are more likely to be diagnosed may lead to the false attribution of negative teacher ratings to ADHD bias. For instance, approximately 13.2 percent of males are diagnosed with ADHD, whereas only 5.6 percent of females receive a similar diagnosis (Centers for Disease Control and Prevention 2011). Girls earn better grades than boys at all levels of education, and teachers rate them as having stronger skills (DiPrete and Buchmann 2013; Downey and Vogt Yuan 2005; Dumais 2002). Teacher’s negative ratings of students with ADHD might be explained by the fact a high proportion of diagnosed students is male.

Diagnosis also varies by racial background (Centers for Disease Control and Prevention 2011; Danielson et al. 2018). Although ADHD was once more commonly diagnosed among white children, the incidence rate for black children is now higher than for white children, and Puerto Rican children are diagnosed at similar rates as white children (Centers for Disease Control and Prevention 2011; Danielson et al. 2018). Racial performance gaps are a function of inequities in educational and family resources (Brooks-Gunn et al. 2003; Duncan and Magnuson 2005), as well as teachers’ racialized perceptions of students’ academic abilities (Cherng 2017; Hughes, Gleason and Zhang 2005; Irizarry 2015a). Teachers’ negative ratings of ADHD-diagnosed students, therefore, may be related to student racial background.

The average age of diagnosis is seven, with numbers increasing as students age (Centers for Disease Control and Prevention 2011). Older students, in general, often have greater mastery over classroom skills; however, as individual students age through elementary school, gaps in performance become more visible—and a greater share of the population receives diagnosis. Teachers' negative perceptions of older children in their classroom (some of whom may have repeated a grade) could create the appearance of ADHD bias.

Children from lower income households are most likely to be diagnosed (Cuffe, Moore, and McKeown 2005; Froehlich, Lanphear and Epstein 2007), as are those with less educated parents (Cuffe et al. 2005), but this is predicated on access to insurance (Froehlich et al. 2007; Morgan et al. 2013). There is a positive relationship between parental income and education and student achievement (Blau and Duncan 1967; Bourdieu and Passeron 1977; Jencks et al. 1972; Lareau 2003). Greater income and education facilitate access to material resources that enhance children's performance and increase exposure to cultural capital that is rewarded in schools. Therefore, diagnosed students may be rated lower by teachers because of their less advantaged family background.

School Characteristics

Organizational contexts may be related to diagnosis patterns and classroom support offered for ADHD students, potentially shaping teacher perceptions. For example, economically disadvantaged parents, who may be more likely to have diagnosed children, may have less access to private schools that potentially have greater resources to assist teachers with diagnosed students. Sufficient school resources may help moderate ADHD stigma, as teachers with support may be less likely to rate diagnosed students negatively. In addition, regional variation in family wealth and school conditions may be related to teacher perceptions of diagnosed students.

Academic Underperformance

Academic underperformance is an issue faced by many, but not all, children with ADHD (DuPaul et al. 2001; Harris et al. 2005). On average, children diagnosed with ADHD have lower mathematical and reading skill scores (Lahey et al. 1998; McGee et al. 1991). Some evidence also suggests that ADHD is characterized by deficits in the cognitive domain, such as working memory, spatial memory, and reading impairments (August and Garfinkel 1990; Goldberg et al. 2005; Martinussen et al. 2005). Yet, the recent recognition of "twice exceptional" students—for example, those that are diagnosed as having ADHD and also test as "gifted"—suggests that it is too simplistic to assume that diagnosed children always underperform (King 2005; Winebrenner 2003). Analyses should, nevertheless, address the possibility that teachers' perceptions of diagnosed students accurately reflect these students' capabilities. If this is the case, then alternative measures of performance, other than teacher-administered grades, should mirror teachers' grade-level ratings.

Behavioral Problems

As Walter R. Gove (1975) pointed out in his critique of labeling theory, rejection surrounding mental illness may be a response to symptomatic behaviors displayed by those who are labeled, rather than a function of the labeling process. Student behavior can shape teachers' ratings of grade-level performance in two different ways. First, classroom behavior issues may directly impact student learning, which is then reflected in teacher ratings. Students with ADHD are often less engaged in the classroom, spend more time participating in off-task behaviors, and are more likely to exhibit aggression and noncompliance—making it difficult to learn (Barkley 2006;

DuPaul et al. 2011; Vile Junod et al. 2006). In addition, behavioral issues may also have an effect on grade-level ratings if teachers are negatively biased toward symptomatic students who are difficult to manage (or thought to be difficult to manage—biases can extend to ratings of behavior; Hamre and Pianta 2001). In either case, it may not be the ADHD label per se but behavioral features associated with the disorder that lead teachers to rate ADHD-diagnosed students more negatively.

Our analyses account for the possibility that sociodemographic factors, school context, academic underperformance, and behavioral problems (real or imagined) are related to teacher ratings of ADHD-diagnosed students. We will attribute teachers' harsher ratings of ADHD-diagnosed children to ADHD bias if we can eliminate these alternative explanations. Below, we turn to the data, measures, and methods utilized in this study.

Data, Measures, and Methods

Analyses rely on data from the Early Childhood Longitudinal Study, Second, Third, and Fourth Grade Waves (ECLS-K:2011). These nationally representative data are collected annually from kindergarten through fifth grade and utilize a multistage sampling design. First, a list of U.S. counties was used to form primary sampling units (PSUs), from which a subset of PSUs was sampled. PSUs with the largest number of five-year-old children were included, along with a stratified random sample of the remainder. The second stage of sampling involved drawing samples of public and private schools that educate kindergarteners from within the sampled PSUs. Schools were selected with probability proportional to their size. Finally, around 23 kindergarteners were randomly selected from a list of all enrolled students of this age in each of the sampled schools, with an oversample of Asian/Pacific Islander students. The ECLS-K:2011 follows the base year sample as they age through school. Information is collected from children, as well as their families, teachers, schools, and after-school care providers.

The focus of this paper is on early school experiences, and all measures are from the ECLS-K:2011 Spring 2013, 2014, and 2015 waves. Because many children are not diagnosed until spending some time in school, the average age of diagnosis is seven (Centers for Disease Control and Prevention 2011). We focus on second grade through fourth grade, which are the prime diagnosis years. The ECLS-K:2011 restricted-use data are the best available data for studying teachers' perceptions of ADHD because they include a measure of medical diagnosis, as well as additional measures pertaining to this disorder. The dataset also includes information on student characteristics, family background, student performance, teacher perceptions of student performance, and school characteristics.

Total possible observations are 54,522, corresponding to 18,174 unique children. The largest number of missing data came from our outcomes of interest (teacher grade-level ratings), followed by ADHD diagnosis and Item Response Theory (IRT) test scores. Students did not need to have data for all three years to be included in the sample. The sample size for analyses ranges from 22,466 to 26,859 observations (representing 11,014 to 11,287 unique students), differing by missing values on subject-specific test scores and teacher ratings of students' subject abilities, to preserve as many observations as possible. Attrition between ADHD-diagnosed and non-diagnosed samples are fairly similar. For example, while 27 percent of non-diagnosed observations are missing on math grade-level ratings, 29 percent of diagnosed observations are missing.

Key Dependent and Independent Measures

Analyses rely on two key measures: diagnosis of ADHD and teacher grade-level rating. See the Appendix for descriptions of variables.

ADHD diagnosis. The key independent variable is a dichotomous measure of ADHD diagnosis. In the Spring Semester Parent Interview of each year, parents are asked about their children having attention issues and subsequently being diagnosed with ADHD or ADD (Attention Deficit Disorder, which does not include the hyperactivity component). We combined ADHD and ADD diagnoses, consistent with current diagnostic criteria. ADD as an official diagnosis ceased to exist in 1994, with the publication of the *Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV)*. Instead, the *DSM-IV* only listed ADHD, which could be divided into three subtypes (one of which included those formerly diagnosed with ADD). The *Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition (DSM-V)*, published in 2013, maintained the language of the *DSM-IV*. Given this, asking questions about ADD versus ADHD diagnoses is problematic. Students with predominately inattentive ADHD could be coded as ADHD, consistent with diagnostic criteria, or they could be coded as ADD. Because we have no way of separating students diagnosed with various ADHD subtypes, we included all diagnosed students in one group.

It is impossible to determine with complete certainty if teachers have been informed of an ADHD diagnosis. However, as described earlier, even when diagnoses are initiated by parents and not the school, teachers are frequently involved in the diagnostic process, and/or parents are motivated by the desire to receive accommodations from the school (which would require notifying school personnel). Another way to assess this is to consider the other indicators of potential teacher awareness. In our sample of individual children diagnosed with ADHD, 35 percent have an IEP in place, 68 percent have had parent-teacher discussion of behavioral issues, and 77 percent are taking ADHD-related medication, which usually requires school notification. In fact, 37 percent of ADHD-diagnosed students are actually taking a dose of medicine while at school.¹ This suggests that, at least in most cases, teachers have been alerted to an ADHD diagnosis (or a potential diagnosis) in concert with parents.

The dataset does not provide information on the date of diagnosis, making it difficult to determine when children were officially assigned the label of ADHD. Research suggests, however, that potentially disruptive ADHD-related behaviors, such as an inability to sit still or difficulty following directions, often initiate the process of seeking professional help to obtain a diagnosis (Arcia et al. 2000; Ohan et al. 2011). As data are collected in the spring (i.e., the latter half) of each academic year, some time has passed since students entered the classroom, and diagnoses are likely in place. If anything, these analyses are a conservative test of the effect of the ADHD label on teacher perceptions, as the ADHD sample may not include all the children who are perceived as having such a disorder.

Teacher grade-level rating. We follow prior literature in using grade-level outcomes to assess teacher perceptions of student abilities (see Irizarry 2015a). Dependent variables are teacher grade-level ratings in math, science, reading, writing, and oral language. Ratings are determined through a survey given to teachers in the spring of each year. Teachers rate students based on their own perceptions of how students are performing. Students can receive a rating of below grade level, about on grade level, and above grade level, in comparison with children of the same grade, for each subject. We created two dichotomous outcomes—below grade rating versus at or above grade level and above grade rating versus at or below grade level.

Explanatory Variables

Explanatory variables are included to rule out alternative explanations for potentially biased ratings of ADHD students, as presented earlier.

Subject-specific test scores. We include a measure for student's academic ability on standardized tests related to each subject. IRT math, science, and reading student scores are used in all

subject-specific models predicting teachers' ratings of grade-level competence.² There is not an individual IRT score for writing and oral language, thus, models for these two subjects utilize students' IRT reading scores. Notably, depending on the particular IRT subject, between 21 percent and 26 percent of ADHD-diagnosed children are in the top quintile. That is to say, roughly the same percentage of this population is high scoring as in the overall population.

Student characteristics. We include an indicator of female status in analyses. Respondent race is coded in five categories: white (non-Hispanic), black (non-Hispanic), Hispanic, Asian (non-Hispanic), other racial category (non-Hispanic), and two or more races.³ White is the reference category. Finally, we measure student age in months.

Parent characteristics. Parental income is captured by a series of categorical measures, with the highest category (\$100,001 or more) as the reference. The highest level of parental education is operationalized as a set of dummies, with advanced degree as the reference category.

School characteristics. Private school control is treated as a dummy variable, with 1 indicating a private school and 0 indicating public school. In addition, we control for regional differences with a series of dummy variables (Northeast is the reference category). Diagnosis is highest in the South and lowest in the Northeast (Morgan et al. 2013).

Positive classroom behavior. We use a mean scale of 13 behavioral assessment items rated by teachers ($\alpha = .94$).⁴ To construct this scale, we summed the assessment items and divided by 13. These items, detailed in the Appendix, tap into symptoms of inattentiveness and hyperactivity that often accompany ADHD. A low score reflects negative behaviors, and a high score reflects positive behaviors. It is important to note that we cannot discount the possibility that teacher evaluations of students' behaviors (like their evaluations of students' abilities) are influenced by negative stereotypes associated with ADHD. Thus, this measure may partially capture teachers' negative perceptions as much as any actual behavioral issues displayed by students.

Analytic Strategy

The first step is to present descriptive statistics for diagnosed versus non-diagnosed students and establish basic patterns in the data. Next, we turn to regression analyses where our key independent variable of interest is ADHD diagnosis and our outcome variables are teachers' below grade-level ratings (vs. at or above grade level) and above grade-level ratings (vs. at or below grade level) for five subjects—math, reading, science, writing, and oral language. Because we have multiple observations per student in our data (second–fourth grade waves) and students are nested in schools, the assumption of linear regression that the residual errors are uncorrelated is likely violated. To address this, we estimate random effects logistic regression models with clustered standard errors that address any residual heteroskedasticity.⁵

We first examine the influence of ADHD diagnosis on teacher perceptions of below grade-level rating and then move to above grade-level rating. For each grade-level rating, we use math and reading, two core subjects, as an illustration of patterns in our data. We proceed as follows. First, we estimate a bivariate model where ADHD diagnosis is used to predict teacher perceptions of academic performance. We then include standardized IRT test scores for relevant subjects to account for students' demonstrated ability levels. Next, we estimate a third model that adds student, parent, and school characteristics. Finally, we include the positive classroom behavior scale to help determine if teachers' perceptions of ADHD students are explained by perceived behavioral symptoms. We then provide ADHD coefficients for each subject, to capture the overall patterns.

Results

Diagnosed versus Non-diagnosed Students

See Table 1 for descriptive statistics by ADHD diagnosis. In the second-grade wave, around 5 percent of the sample is diagnosed; this number slightly increases with each wave. We see that teachers rate students diagnosed with ADHD lower across subjects, with the averages falling between below and at grade level. ADHD-diagnosed students also have lower test scores than their non-diagnosed peers, on average. Those that are diagnosed are less likely to be female. Both white and black students face a higher likelihood of diagnosis, while Asian students and those categorized in another racial category have the lowest likelihood. Diagnosed students are on average slightly older (about a month) than non-diagnosed students.

Parents with lower incomes (i.e., \$30,000 or less) are most likely to have children diagnosed with ADHD, whereas higher income families are significantly less likely. At both ends of the educational distribution, we see families with lower likelihoods of ADHD diagnosis. Parents with less than a high school education are the least likely to have ADHD-diagnosed children—most likely due to limited insurance coverage. Those with bachelor's degrees or advanced degrees are also less likely to have children diagnosed with ADHD.

ADHD-diagnosed students are less likely to attend private school. Diagnosed students are most likely to live in the Southern United States and less likely to live in the Northeast and West. Finally, consistent with research on the symptoms of ADHD, children who are diagnosed are significantly less likely than their non-diagnosed peers to display positive classroom behaviors. Below, we determine if the alternative explanations (detailed earlier) or teacher bias best account for teachers' lower ratings of diagnosed students.

Below Grade-level Ratings

We start with teacher grade-level ratings of math and reading, as research clearly demonstrates that stereotypes shape perceptions of math and reading performance. Table 2 presents regression coefficients for teacher rating of students as below grade level versus at or above grade-level performance in math and reading. The bivariate results in Model 1 indicate that teachers are more likely to rate children with ADHD as performing below grade level in both math and reading (math: $b = 1.60, p < .001$; reading: $b = 1.66, p < .001$), suggesting that these students are perceived as less capable than others.

Next, Model 2 adds IRT math and reading test scores to disentangle teacher perceptions of achievement from a more objective indicator of achievement. Predictably, as IRT scores increase, the likelihood of teachers rating students as below grade level decreases. Results reveal that, even controlling for this measure of math and reading skills, teachers are still more likely to rate children diagnosed with ADHD as performing below grade level in math and reading (math: $b = .92, p < .001$; reading: $b = 1.09, p < .001$).

Model 3 adds variables for student, parent, and school characteristics. Once again, results show that, even accounting for these additional factors, teachers are still more likely to rate children diagnosed with ADHD as performing below grade level in both subjects (math: $b = .77, p < .001$; reading: $b = .83, p < .001$). That these effects persist even when accounting for key explanatory variables is notable.

Control variables operate largely as expected. Asian students, as compared with their white peers, show a reduced likelihood of being rated below in math and reading, respectively. The same is true for black students in math and students in the "other" racial category in reading. Our findings for student race, however, must be interpreted with the knowledge that in supplemental models without parent income or education, black and Hispanic students are

Table 1. Summary Statistics, by ADHD Diagnosis: ECLS-K:2011, Second to Fourth Grade Waves.

Variable	N	M	SD	Group characteristics ADHD Non-ADHD	
Key Independent Variable					
ADHD Diagnosis	32,190	0.05	0.21	1	0
Dependent Variables ^a					
Science Grade-level Rating	29,902	1.04	0.54	0.82***	1.09
Math Grade-level Rating	29,969	1.05	0.68	0.73**	1.11
Reading Grade-level Rating	35,550	1.05	0.76	0.65***	1.11
Writing Grade-level Rating	35,523	0.88	0.68	0.45***	0.94
Oral Language Grade-level Rating	35,491	1.09	0.60	0.83***	1.14
Subject-specific Test Scores					
IRT Literacy Score	38,777	114.13	16.12	106.68***	115.47
IRT Science Score	38,744	58.40	12.78	55.32***	59.48
IRT Math Score	38,776	99.42	18.15	91.87***	100.91
Student Characteristics					
Female	54,405	0.49	0.50	0.27***	0.50
Race					
White	54,390	0.47	0.50	0.60***	0.50
Black	54,390	0.13	0.34	0.14***	0.10
Hispanic	54,390	0.25	0.43	0.18***	0.26
Asian	54,390	0.09	0.28	0.02***	0.08
Other race	54,390	0.02	0.12	0.00**	0.01
Two or more races	54,390	0.05	0.21	0.05	0.04
Age	38,838	108.61	10.56	109.47**	108.51
Parent Characteristics					
Income					
\$30,000 or less	33,858	0.29	0.46	0.37***	0.28
\$30,001–\$50,000	33,858	0.17	0.37	0.16	0.17
\$50,001–\$75,000	33,858	0.15	0.36	0.17	0.16
\$75,001–\$100,000	33,858	0.13	0.33	0.10***	0.13
\$100,001 or more	33,858	0.26	0.44	0.20***	0.27
Education					
Less than HS	34,715	0.09	0.29	0.06***	0.09
HS diploma/equivalent	34,715	0.19	0.40	0.20	0.19
Some College/Voc. Prog.	34,715	0.29	0.46	0.39***	0.29
Bachelor's Degree	34,715	0.22	0.41	0.20*	0.22
Advanced Degree	34,715	0.20	0.40	0.15***	0.21
School Characteristics					
Private	39,130	0.09	0.29	0.07***	0.10
Region					
Northeast	39,130	0.17	0.37	0.15*	0.17
Midwest	39,130	0.21	0.41	0.22	0.21
South	39,130	0.36	0.48	0.47***	0.36
West	39,130	0.27	0.44	0.16***	0.27
Positive Classroom Behavior	35,633	3.61	0.91	2.70**	3.69

Note. Test significance indicates differences between non-diagnosed students and students diagnosed with ADHD. ADHD = Attention-deficit Hyperactivity Disorder; ECLS = Early Childhood Longitudinal Study; IRT = Item Response Theory; HS = High School.

^a0 = below grade level, 1 = at grade level, 2 = above grade level.

* $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed tests.

Table 2. Logistic Regression Coefficients for Teachers' Below Grade-level Ratings on ADHD Diagnosis and Explanatory Variables, ECLS-K:2011, Second to Fourth Grade Waves.

	Math (N = 22,562)												Reading (N = 26,859)											
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4									
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE								
ADHD	1.60***	(.15)	0.92***	(.10)	0.77***	(.11)	0.23*	(.11)	1.66***	(.16)	1.09***	(.11)	0.83***	(.11)	0.33**	(.11)								
IRT Score			-0.08***	(.00)	-0.12***	(.00)	-0.11***	(.00)			-0.11***	(.00)	-0.16***	(.00)	-0.15***	(.00)								
Student Characteristics																								
Female			-0.04	(.06)	-0.04	(.06)	0.55***	(.06)					-0.08	(.06)	0.38***	(.06)								
Race																								
Black			-0.27**	(.10)	-0.27**	(.10)	-0.29**	(.10)					0.02	(.10)	-0.10	(.10)								
Hispanic			-0.09	(.08)	-0.09	(.08)	0.09	(.08)					-0.15*	(.08)	-0.01	(.08)								
Asian			-0.55***	(.16)	-0.55***	(.16)	-0.37*	(.16)					-0.36**	(.13)	-0.14	(.13)								
Other race			-0.18	(.23)	-0.18	(.23)	-0.01	(.24)					-0.81**	(.27)	-0.67*	(.28)								
Two or more races			0.08	(.15)	0.08	(.15)	0.12	(.15)					-0.13	(.15)	-0.16	(.16)								
Age			0.13***	(.00)	0.13***	(.00)	0.13***	(.00)					.12***	(.00)	0.11***	(.00)								
Parent Characteristics																								
Education																								
Less than HS			0.67***	(.14)	0.67***	(.14)	.65***	(.14)					0.71***	(.14)	0.68***	(.14)								
HS			0.51***	(.12)	0.51***	(.12)	.45***	(.12)					0.59***	(.11)	0.53***	(.11)								
Some College			0.51***	(.11)	0.51***	(.11)	.41***	(.11)					0.50***	(.10)	0.38***	(.10)								
Bachelor's Degree			0.17	(.11)	0.17	(.11)	.15	(.11)					0.33**	(.10)	0.30**	(.10)								
Income																								
<\$30,001			0.22*	(.11)	0.22*	(.11)	.10	(.11)					0.26**	(.10)	0.19*	(.10)								
\$30,001-\$50,000			0.30**	(.11)	0.30**	(.11)	.26*	(.11)					.31**	(.10)	0.28**	(.10)								
\$50,001-\$75,000			0.05	(.10)	0.05	(.10)	.04	(.10)					0.12	(.09)	0.12	(.10)								
\$75,001-\$100,000			-0.03	(.11)	-0.03	(.11)	.02	(.11)					0.13	(.10)	0.17*	(.10)								
School Characteristics																								
Private School			-0.40**	(.12)	-0.40**	(.12)	-.42***	(.11)					-0.03	(.11)	-0.05	(.11)								
Region																								
Midwest			-0.02	(.10)	-0.02	(.10)	-.01	(.10)					-0.30**	(.09)	-0.26**	(.10)								
South			-0.50***	(.09)	-0.50***	(.09)	-.54***	(.09)					-0.67***	(.08)	-0.69***	(.09)								
West			0.11	(.09)	0.11	(.09)	.07	(.09)					-0.09	(.09)	-0.11	(.09)								
Positive Behavior																								
Constant			-3.14***		5.59***		-4.92***						-3.12***		10.83***									
							-2.15***						3.70***		-0.96***									
															6.09***									

Note. Omitted categories are white, advanced degree, \$100,001 or more, and Northeast. Sample size varies by missing for subject-specific outcomes and IRT scores. Robust standard errors are in parentheses. ADHD = Attention-Deficit/Hyperactivity Disorder; ECLS = Early Childhood Longitudinal Study; IRT = Item Response Theory; HS = high school diploma or equivalent. *p < .05. **p < .01. ***p < .001, two-tailed tests.

Table 3. Logistic Regression Coefficients for Teachers' Below Grade-level Ratings for All Subjects, ECLS-K:2011, Second to Fourth Grade Waves.

Below grade level				
Subject	Model 1	Model 2	Model 3	Model 4
Math	1.60***	0.92***	0.77***	0.23*
Reading	1.66***	1.09***	0.83***	0.33**
Science	1.39***	1.13***	0.99***	0.34**
Writing	1.77***	1.46***	1.23***	0.55***
Oral Language	1.28***	.81***	0.70***	0.30**

Note. Omitted categories are white, advanced degree, \$100,001 or more, and Northeast. Sample size varies by missing for subject-specific outcomes and IRT scores. Sample sizes are as follows: Math $N = 22,562$, Reading $N = 22,859$, Science $N = 22,466$, Writing $N = 26,833$, and Oral Language $N = 26,815$. ECLS = Early Childhood Longitudinal Study; IRT = Item Response Theory.

* $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed tests.

significantly more likely (and Asian students are less likely) to be perceived by their teachers as performing below grade level in both subjects—indicating the presence of racial stereotypes. Because income and wealth are racialized, controlling for income and education may mask racial patterns. In Model 3, as age increases for both math and reading, so does the likelihood of being rated as below grade level; this is a function of students falling further behind as they age through elementary school.

Patterns associated with parental social class are clear and consistent. Compared with children whose parents hold an advanced degree, children in households with lower levels of education are significantly more likely to be rated below grade level in math and reading. For reading, we even see a difference between those whose parents hold bachelor's degrees and those whose parents hold advanced degrees. Children whose parents are in the bottom two income categories are more likely to be rated as performing below grade level, as compared with those from the most affluent families in the sample.

Being enrolled in private school decreases the chances of being rated as below grade level in math. There are several regional effects: For math, attending school in the South compared to the Northeast decreases the possibility of being rated as below grade level; for reading, attending school in the South and Midwest decrease the likelihood of being rated as below grade level. These differences could be a function of different expectations of what "at grade" performance looks like in private versus public schools and in different regions of the country—most notably the South.

Finally, Model 4 adds positive classroom behavior. Positive classroom behaviors significantly reduce the likelihood of a child being rated below grade level in math and reading. However, the coefficient for ADHD remains significant and positive in both subjects. Teachers are still more likely to rate children with ADHD as below grade level relative to their non-diagnosed peers (math: $b = .23$, $p < .05$; reading: $b = .33$, $p < .01$). Notably, with the introduction of behavioral controls, we also see a bias against female students emerge. Overall, findings indicate that subject-specific test scores, student characteristics and behavior, parental background, and school features cannot account for teachers' negative perceptions of students diagnosed with ADHD.

Next, we expand our analyses to science, writing, and oral language—the three additional academic subjects also included in the ECLS-K data. Table 3 only presents coefficients for ADHD diagnosis, as control variables operate consistently across all five subjects. Here, we see a clear pattern: ADHD children are more likely to be rated as performing below grade level in all subjects. The finding persists despite inclusion of the full array of explanatory variables. These

analyses indicate that teachers rate their diagnosed students as less capable than similarly performing non-diagnosed peers, regardless of student abilities and behaviors.

Because behavior is often related to an ADHD diagnosis, we were interested in disentangling, to the extent possible, the effect of an ADHD diagnosis from potential behavioral symptoms (or perceptions of symptoms). In supplemental analyses, we found that having an ADHD diagnosis curbs the negative effect of good behavior on below grade-level rating, across subjects. One way to interpret this is that, for ADHD children, good classroom behaviors, even when acknowledged by the teacher, do not go as far toward reducing the likelihood of receiving the lowest grade-level rating as they do for non-diagnosed students. Thus, these supplemental findings suggest teachers hold negative perceptions of ADHD-diagnosed students that influence the likelihood of receiving below grade-level ratings.

Above Grade-level Ratings

The previous section discussed teachers' negative academic perceptions, but teachers may also have different perceptions of positive academic abilities by ADHD diagnosis. Thus, in this section we ask, What is the relationship between ADHD and above grade-level teacher ratings?

Table 4 presents coefficients from models predicting teacher perceptions for above grade level versus at or below grade level for math and reading achievement. Bivariate results from Model 1 show that children diagnosed with ADHD, compared with those without this diagnosis, are less likely to be rated by teachers as above grade level in both math and reading (math: $b = -1.12$, $p < .001$; reading: $b = -1.31$, $p < .001$).

Model 2 in Table 4 adds standardized IRT test scores for math and reading. Increases in math and reading IRT test scores correspond with an increase in the likelihood of being rated as above grade level in math and reading. These results also suggest a similar pattern as in the base model: Children diagnosed with ADHD are less likely to be rated as performing above grade level in math and reading (math: $b = -.72$, $p < .001$; reading: $b = -.94$, $p < .001$). Even when controlling for demonstrated math and reading ability, teachers are rating children with ADHD as less likely to perform above grade level.

Model 3 adds student, parent, and school characteristics. Importantly, even when accounting for these potentially mediating variables, there are still significant differences in being rated above grade level by ADHD diagnosis (math: $b = -.56$, $p < .001$; reading: $b = -.74$, $p < .001$). These findings indicate that the negative effect of an ADHD diagnosis on teacher ratings of math and reading skills is not the result of other common explanatory variables.

As we see in Model 3, being female increases the likelihood of receiving a teacher rating of above grade level in reading, but this effect reverses in Model 4 with the inclusion of the behavior scale; female students are significantly less likely to be rated as above grade level in either subject. Being Asian or Hispanic increases the chance of being rated as above grade level for math. Being black decreases the likelihood of being rated as above grade level in reading, relative to white peers. (Again, supplemental analyses that include race, but not variables for parent income and education status, reveal persistent racial stereotypes.) Increasing age decreases the chances of being rated above grade level—as students in more advanced grades are less likely to be viewed as performing above the standard.

As results suggest, children with the most educated parents benefit from positive evaluations. Parental income effects are confounded by controlling for education; supplemental analyses that do not include parental education show the patterns we might expect, whereby children from the two lowest income groups are less likely than children in the highest income group to be rated above grade level. We might conclude, however, that parental education is a more crucial predictor of teacher perceptions for above grade-level rating.

Table 4. Logistic Regression Coefficients for Teachers' Above Grade-level Ratings on ADHD Diagnosis and Explanatory Variables, ECLS-K:2011, Second to Fourth Grade Waves.

	Reading (N = 26,859)																			
	Math (N = 22,562)				Model 1				Model 2				Model 3				Model 4			
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE		
ADHD	-1.12***	(.16)	-0.72***	(.13)	-0.56***	(.13)	0.04	(.13)	-1.31***	(.16)	-0.94***	(.12)	-0.74***	(.13)	-0.14	(.14)				
IRT Score			0.09***	(.00)	0.13***	(.00)	0.12***	(.00)			0.11***	(.00)	0.15***	(.00)	0.14***	(.00)				
Student Characteristics																				
Female					-0.03	(.05)	-0.49***	(.05)					.14**	(.05)	-0.28***	(.05)				
Race																				
Black			.12	(.10)			.014	(.10)							-0.07	(.09)				
Hispanic			.20**	(.07)			0.10	(.07)						.08	(.07)	-0.00	(.07)			
Asian			.46***	(.09)			0.35***	(.09)						.01	(.10)	-0.13	(.09)			
Other race			.43*	(.22)			0.29	(.21)						.19	(.22)	0.08	(.21)			
Two or more races			.11	(.12)			0.07	(.11)						.09	(.12)	0.05	(.12)			
Age			-1.10***	(.00)			-0.09***	(.00)						-0.09***	(.00)	-0.09***	(.00)			
Parent Characteristics																				
Education																				
Less than HS																				
HS																				
Some College																				
Bachelor's Degree																				
Income																				
<\$30,001																				
\$30,001-\$50,000																				
\$50,001-\$75,000																				
\$75,001-\$100,000																				
School Characteristics																				
Private School			.01	(.09)			0.11	(.09)						.10	(.08)	0.20*	(.08)			
Region																				
Midwest			.27**	(.08)			0.28***	(.08)						.60***	(.08)	0.59***	(.08)			
South			.68***	(.08)			0.69***	(.07)						.72***	(.07)	0.73***	(.07)			
West			.26**	(.08)			0.31***	(.08)						.41***	(.08)	0.45***	(.08)			
Positive Behavior																				
Constant			-1.76***				-7.23***							-9.03***		-11.45***				

Note. Omitted categories are white, advanced degree, \$100,001 or more, and Northeast. Sample size varies by missing for subject-specific outcomes and IRT scores. Robust standard errors are in parentheses. ADHD = Attention-Deficit Hyperactivity Disorder; ECLS = Early Childhood Longitudinal Study; IRT = Item Response Theory; HS = high school diploma or equivalent.

*p < .05. **p < .01. ***p < .001, two-tailed tests.

Table 5. Logistic Regression Coefficients for Teachers' Above Grade-level Ratings for All Subjects, ECLS-K:2011, Second to Fourth Grade Waves.

Above grade level				
Subject	Model 1	Model 2	Model 3	Model 4
Math	-1.12***	-0.72***	-0.56***	0.04
Reading	-1.31***	-0.94***	-0.74***	-0.14
Science	-1.17***	-0.97***	-0.85***	-0.17
Writing	-1.75***	-1.34***	-1.10***	-0.27
Oral Language	-1.07***	-0.64***	-0.51***	0.00

Note. Omitted categories are white, advanced degree, \$100,001 or more, and Northeast. Sample size varies by missing for subject-specific outcomes and IRT scores. Sample sizes are as follows: Math $N = 22,562$, Reading $N = 22,859$, Science $N = 22,466$, Writing $N = 26,833$, and Oral Language $N = 26,815$. ECLS = Early Childhood Longitudinal Study; IRT = Item Response Theory.

* $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed tests.

Returning to our primary focus, when student behavior is added in Model 4, a significant difference between ADHD-diagnosed and non-diagnosed students disappears for both math and reading. Thus, teachers' perceptions of student behavior can account for their reduced likelihood of rating ADHD students as performing above grade level. This is an interesting finding. It suggests that when it comes to assigning *positive* academic attributes, perceptions of student behavior may lead teachers to withhold above grade-level ratings, even to high-achieving ADHD children. Our analyses do not allow us to determine if this is because these children are, indeed, displaying problematic behaviors, or if teachers assume diagnosed children are problematic in the classroom, or if both conditions are true.

Patterns for above grade-level rating in science, writing, and oral language are consistent with those identified for mathematics and reading. Table 5 presents the ADHD coefficients for all five subjects. The first three models indicate that teachers are less likely to rate their ADHD-diagnosed students as performing above grade level. This finding persists despite controlling for students' performance on subject-specific tests, as well as student, parent, and school characteristics. Model 4 indicates that negative perceptions of diagnosed student behavior account for this finding; once the behavioral measure is included, significant differences by diagnosis disappear. Without the ability to control for a more objective measure of behavior, we do not know if teachers' perceptions of ADHD student behavior are always accurate. What we can say, however, is that how teachers perceive the behavior of ADHD-diagnosed students often interferes with their recognition of above grade-level performance.

To better understand the relationship between classroom behavior, ADHD diagnosis, and above grade-level rating, we conducted supplemental interactional analyses. We found that being diagnosed with ADHD mitigates the positive impact of good behavior on being rated above level. Diagnosed students, therefore, do not get as much of a boost in grade-level rating for their good classroom behavior as non-diagnosed students. These findings suggest that teachers weigh their own accounts of positive student classroom behavior differently on the basis of ADHD status. Thus, although teachers' perceptions of ADHD students' behavior can account for the above grade rating disadvantage, ADHD students are not getting the same benefits for positive behavior as non-diagnosed students.

Discussion and Conclusion

Although research on teacher perceptions has been expanding in the area of race (see Bates and Glick 2013; Cherng 2017; Downey and Pribesh 2004; Irizarry 2015a, 2015b; McGrady and

Reynolds 2012), there is very little sociological work that focuses on developmental disabilities. This is particularly problematic in the case of ADHD diagnoses, which have increased dramatically in the last 10 years. The aim of this paper was to investigate the extent to which potential ADHD bias influences teachers' grade-level ratings of students' performance, across a wide array of academic subjects.

Results provide strong support for bias in the case of below grade-level ratings. Teachers are more likely to see ADHD children as performing worse than is suggested by their subject-specific test scores, even when controlling for student, parent, and school characteristics, as well as reports of classroom behavior. This research suggests that teachers operate with a set of stereotypes about diagnosed students that influence how they perceive these students in the classroom.

Our above-grade analyses suggest that teachers often fail to acknowledge when ADHD-diagnosed students perform above grade level; however, this finding is, in large part, a function of real and/or perceived behaviors in the classroom that are informing teachers' subject-specific grade-level performance ratings. Supplemental analyses for both above and below grade levels, however, suggested that teachers weighed students' positive behaviors less favorably in making their grade-level evaluations when an ADHD diagnosis was present.

Taken as a whole, our results are consistent with the predictions of modified labeling theory. This theory indicates that a process of stigmatization begins once an individual is diagnosed as having a mental illness. The label itself becomes linked to negative cultural beliefs that people apply in interactions with the diagnosed. In this case, ADHD may be functioning as a pejorative label in the school. ADHD is a particularly stigmatized diagnosis for children (Martin et al. 2007), in part, because adults see it as a stable characteristic associated with being a troublemaker (Pescosolido et al. 2008). As modified labeling theory suggests, there are consequences for labeled students as they move through social and educational settings. Negative stereotypes associated with ADHD may set low expectations for what diagnosed youth can and cannot do, impacting their future educational success (Mannuzza et al. 1997; Rogers et al. 2009). We find that, even in elementary school, teachers' perceptions of diagnosed students' abilities are clouded by their beliefs about ADHD.

ADHD diagnosis is, therefore, a double-edged sword for children and their families. Being diagnosed with a developmental disability allows children to receive special resources and treatments while enrolled in school—for example, specialized IEP plans, one-on-one teaching, and academic and dietary accommodations (Arcia et al. 2000; Ohan et al. 2011). Parents may, thus, be told that allowing an evaluation that may lead to a diagnosis will help their children to succeed in school. Some may fight for their children to receive a diagnosis, as they may believe the ability to ask for accommodations will benefit their children. They may even seek additional evaluative services outside of the school—potentially at a high financial price—to guarantee a diagnosis that requires the school to, in theory, respond with additional supports.

Yet, these efforts may come at a cost. This research indicates that students who are diagnosed are perceived as performing worse than their peers—even when this assumption is not warranted. Teachers' inability to accurately assess the abilities of ADHD students implies that a diagnosis, in a context where it comes with stereotypes, may result in harm. Children with ADHD may be thought of as academically challenged and behaviorally problematic, without attention to how they are actually performing. Such a stereotype may limit teachers' abilities to see what students with this diagnosis are capable of achieving.

In the early 2000s, ADHD rates among white students were highest, likely due to greater access to resources necessary to procure a diagnosis. However, rates of ADHD diagnosis for black and Puerto Rican children have increased dramatically (Centers for Disease Control and Prevention 2011; Danielson et al. 2018). We suspect that this is a function of schools becoming

better equipped and more efficient in referring students for ADHD testing. School personnel may be increasingly suggesting that parents of color seek an ADHD evaluation and even setting this process in motion. There are a few ways to view this. Black and Puerto Rican students who meet diagnostic criteria may be now gaining access to settings in which they can receive a diagnosis. At the same time, it could be that teachers' racialized perceptions of students are leading them to recommend that the parents of black and Puerto Rican children seek diagnoses at disproportionately high rates.

This study has a few limitations. In particular, the data do not allow for observation of teacher behavior, making it difficult to determine if teachers actually act on their perceptions of ADHD students. As school gatekeepers, however, it is not difficult to imagine that teachers' evaluations of students' grade-level performance could be utilized for course and grade-placement purposes in ways that disadvantage ADHD-diagnosed students. Furthermore, teachers need only hold negative perceptions for negative consequences to occur. For instance, as previous research on race-based perceptions discusses, white teachers are more likely to unfavorably perceive their black students, and these unfavorable perceptions negatively influence students' abilities to perform on tests (Oates 2003; also see Cherng 2017).

Future research might extend this study by focusing on how ADHD stigma affects students. Such an analysis would enrich existing literature on mental illness and stigma within the modified labeling tradition, as most applications of the modified labeling perspective have focused on adults. Research might, for example, examine students' own awareness of negative cultural beliefs about their diagnosis and gauge stigma experienced in interactions with peers and teachers. Students' awareness of and sensitivity to ADHD stigma may impact their abilities to achieve academically and engage positively in the classroom.

Research should also examine whether or not the educational setting may impact teacher perceptions of ADHD. For example, an educational context that supports children's movement, free play, and outdoor activities, and builds in assumptions about children as naturally active, may lead teachers to perceive children with ADHD more positively than in contexts where young children are expected to be restrained and spend most of the day at a desk. Going forward, it will also be important to assess the extent to which teachers act on their perceptions, perhaps considering the relationship between ADHD diagnosis, teacher evaluations of student performance, and remedial or advanced ability group placement.

Improving the success of students diagnosed with a developmental disability may rely on early teacher intervention programs. These interventions must work to improve teachers' abilities to assess student knowledge and capabilities more objectively. However, interventions alone may not be able to combat the stereotypes surrounding developmental disabilities, specifically ADHD. Indeed, some research suggests that training around ADHD actually activates teachers' stereotypes associated with the disorder in a way that experiences working with children diagnosed with ADHD do not (Ohan et al. 2011). More scholarship is needed to understand how to effectively reduce teachers' biases surrounding developmental disorders.

This study clearly shows the value of examining teacher perceptions of developmental disabilities, such as ADHD. These patterns are consistent with research on teacher perceptions of other marginalized groups (Cherng 2017; Irizarry 2015b; Jussim et al. 1996), as well as research on stigma surrounding the ADHD label (Hoza 2007; Law et al. 2007; Martin et al. 2007) and the predictions of modified labeling theory. Our work contributes to the body of scholarship suggesting that stereotypes can work against students within the classroom, as teachers often draw on them when they interact with their students. Ironically, in the case of ADHD, parents are often eager to obtain the very diagnoses that may, in some ways, negatively impact their children's educational experiences.

Appendix

Variables Included in Analyses: ECLS-K:2011, Second to Fourth Grade Waves.

Variable	Coding schema
<i>ADHD Diagnosis</i>	Positive diagnosis of ADHD and/or ADD coded as 1
<i>Teacher Grade-Level Rating</i>	"Overall, how would you rate this child's academic skills in (science, math, reading, writing, and oral language), based on curriculum standards for his/her current grade level?" Coded as Below level (vs. at or above) and Above level (vs. at or below)
<i>Subject-Specific IRT Scores</i>	Science IRT score, Math IRT score, and Reading IRT score (also used for writing and oral language analyses)
<i>Student Characteristics</i>	
Age	Measured in months
Sex	Female = 1
Race	Coded in dummies for White (non-Hispanic; reference category), Black (non-Hispanic), Hispanic, Asian, Other race, or Two or more races
<i>Parent Characteristics</i>	
Income	Annual household income categories: \$30,000 or less, \$30,001–\$50,000, \$50,001–\$75,000, \$75,001–\$100,000, \$100,001 or more (reference category)
Education	Highest level of parental education, coded in dummies: Less than high school degree, High school diploma or equivalent, Some college or vocational program, Bachelor's degree, Advanced degree (reference category)
<i>School Characteristics</i>	
Control	Private School = 1
Region	Midwest, South, West, Northeast (reference category)
<i>Positive Classroom Behavior</i>	Mean scale of 13 items, with values ranging 1–5. A low score reflects negative behaviors and a high score reflects positive behaviors. Teachers are asked to determine, on a 5-point scale, if it is "almost always untrue" to "almost always true" that a student "Is easily distracted when listening to a story," "Can stop him/herself when s/he is told to stop," "Looks around the room when doing school work," "Can stop him/herself from doing things too quickly," "When working on an activity, has a hard time keeping his/her mind on it," "Has an easy time waiting," "Has a hard time paying attention," "Has a hard time waiting his/her turn to talk when excited," "Needs to be told to pay attention," "Gets distracted when trying to pay attention in class," "Likes to plan carefully before doing something," "Is good at following directions," and "Has a hard time slowing down when rules say to walk."

ADHD = Attention-deficit Hyperactivity Disorder; ECLS = Early Childhood Longitudinal Study; ADD = Attention Deficit Disorder; IRT = Item Response Theory.

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Notes

1. Prior research indicates that teachers hold negative perceptions of *both* medicated and non-medicated students, with a potentially greater negative bias toward the unmedicated (see Batzle et al. 2010). When we ran analyses for each of these groups separately, we found similar patterns and thus decided to combine them—especially given the small numbers of diagnosed students in the data. Similarly, patterns for diagnosed students with and without an Individualized Education Program (IEP) were consistent.
2. Item response theory is an approach to the scoring of tests and instruments measuring abilities that uses performance on particular test items to estimate a student's overall ability in the subject/skill area the items were designed to measure.
3. The "other race" category includes Native Hawaiian, other Pacific Islander, American Indian, or Alaska Native students who do not identify as Hispanic, along with students whose racial identification is recorded as "other." Numbers for these groups were too small to disaggregate in our analyses.
4. These items are adapted from the *Temperament in Middle Childhood Questionnaire* developed by Jennifer Simonds and Mary K. Rothbart (2004), which is itself adapted from the *Children's Behavior Questionnaire* (Rothbart et al. 2001).
5. There is not enough variation year to year in Attention-Deficit Hyperactivity Disorder (ADHD) diagnosis internal to each student's educational experience to warrant using fixed effects.

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