Social Class, Diagnoses of Attention-Deficit/Hyperactivity Disorder, and Child Well-Being

Jayanti Owens

Abstract
Attention-deficit/hyperactivity disorder (ADHD) is the most commonly diagnosed mental health disorder among U.S. children. Diagnosis can bring positives, like proper treatment, extra testing time, and social support, but may also trigger negatives, like stigmatization. Although rates of diagnosis are high across socioeconomic status (SES) groups, the balance of positive and negative consequences of diagnosis may differ by SES. In high-SES communities, mental health diagnoses are less stigmatized and parents have greater ability to connect children to support resources, suggesting greater positive effects of diagnosis for high-SES children. Alternatively, the greater academic pressure present in high-SES communities may amplify the negative effects of mental health stigma, suggesting larger negative diagnostic effects. Using the Early Childhood Longitudinal Study—Kindergarten Cohort of 1998–1999, I found that diagnosed and medicated high-SES but not low-SES children exhibit significantly poorer future self-competence and teacher-rated school behaviors than undiagnosed matches. Findings suggest that diagnosis may not always be a net positive.

Keywords
ADHD, children, education, inequality, well-being

Childhood diagnoses of attention-deficit/hyperactivity disorder (ADHD) have increased 41% in the United States over the past decade alone, with 6.4 million (11%) American children ages 4 to 17 having been diagnosed as of 2016 (Xu et al. 2018). ADHD is today’s most commonly diagnosed childhood mental health disorder, surpassing anxiety, depression, oppositional defiant disorder, conduct disorder, and autism spectrum disorders (Centers for Disease Control and Prevention 2019). Without proper treatment, ADHD can lead to more behavior problems, poorer social relationships, and lower academic performance (Hinshaw and Scheffler 2014).

Increasing medicalization through ADHD diagnoses may partly reflect parents’ and educators’ awareness of the importance of behavioral/noncognitive skills for long-term success (Conrad 1975). An ADHD diagnosis can connect children to positive resources like proper treatment that effectively manages inattention and hyperactivity/impulsivity (Molina et al. 2009; Swanson, Baler, and Volkow 2010) and to educational accommodations in schools like extra testing time (Gius 2007).

However, the effect of an ADHD diagnosis may not be uniformly positive (Owens and Jackson 2017). Situating ADHD within the broader literature on negative stereotypes surrounding children with disabilities (Pescosolido et al. 2008), diagnosed children may experience negative feelings of being unlike their peers (Hinshaw 2005) and increased scrutiny and lower expectations from teachers (Eisenberg and Schneider 2007). Depending on how

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these positives and negatives balance out, processes like labeling and stigma can produce negative perceived self-competence and ultimately, higher levels of the school behavior problems diagnosis is intended to address.

Rates of childhood ADHD diagnoses are high across social class groups, ranging from 13% among children from families earning below the federal poverty level to 10% of those earning 1 to 3.9 times the poverty level and 9% of those earning at least 4 times the poverty level (Xu et al. 2018). In spite of relatively high rates of diagnosis across social class groups, our understanding of the relationship between social class privilege and diagnosed children’s well-being remains limited.

Variation across social class contexts can lead to differences in the effects of a diagnosis on child socioemotional well-being (i.e., children’s exposure to the positive or negative consequences of diagnosis noted previously). On one hand, research in the tradition of Lareau (1989) would suggest that high-socioeconomic-status (SES) parents’ ability to activate social capital and other resources for educational intervention is predominantly beneficial for children. For children with disabilities, high-SES parents likewise may be better at navigating schools and the health care system to connect their child to proper treatment and other supports while also systematically avoiding negative exposures, like stigma (Blum 2015; Lareau 1989). For example, high-SES families benefit from less mental health stigma in high-SES communities compared to less advantaged communities, including many communities of color (Blum 2015; Gary 2005). High-SES children may also experience earlier detection and greater medication treatment and adherence, strategic medication use, and educational accommodations like extra testing time compared to low-SES children (King, Jennings, and Fletcher 2014). As such, one prediction is that high-SES children will exhibit greater positive effects of diagnosis than their less advantaged peers.

On the other hand, the negatives associated with an ADHD diagnosis may be larger for high-SES than low-SES children. High-SES children might suffer from the negative effects of mental health stigma associated with ADHD diagnosis even if overall levels of such stigma are lower in high-SES than less advantaged communities (Francis 2012). For example, whereas low-SES children are more likely to experience multiple other negative stigmas (e.g., from school suspension or family instability), the stigma associated with an ADHD diagnosis may be one of the few stigmas experienced by high-SES children. Additionally, if high-SES families are better able to access or adhere to medication treatment for ADHD, any negative side effects of treatment combined with the rise of polypharmacy might also disproportionately negatively affect high-SES children (Bussing and Winterstein 2012; Comer, Olfson, and Mojtabai 2010). Thus, a competing prediction is that the marginal negative effect of diagnosis may actually be larger for high-SES than low-SES children even if overall levels of stigma are lower in high-SES than less advantaged communities (Francis 2012).

Whether and under what conditions a childhood ADHD diagnosis is associated with better or worse behavioral outcomes remains an open empirical question. This study helps reconcile these conflicting expectations by investigating the following questions:

Research Question 1: How does ADHD diagnosis affect future perceived self-competence and ultimately, teacher-rated social and academic behaviors at school?

Research Question 2: Does an ADHD diagnosis affect future perceived self-competence and school behaviors differently for children from high-SES as opposed to low-SES backgrounds?

The increase in diagnoses of many childhood mental health disorders is motivated by the belief that positive consequences, like proper treatment that effectively manages symptoms, outweigh negative consequences, like social stigma. However, empirically testing this belief requires disentangling the implicated social, psychological, and medical processes. This study introduces a generalized framework for contextualizing these potentially positive and negative influences on children’s well-being and how they might differ by social class. I then apply this framework to the case of childhood diagnoses of ADHD. Using matching techniques among children in the Early Childhood Longitudinal Study–Kindergarten Cohort of 1998–1999, I find that diagnosed and medicated middle- and upper-SES—but not lower-SES—children exhibit significantly poorer future self-competence and teacher-rated school behaviors than undiagnosed matches. Findings carry important implications for the reproduction of privilege within the larger process of the medicalization of childhood behaviors.
BACKGROUND

Theoretical Framework: Disentangling Social, Psychological, and Medical Influences on Children’s Well-Being

I interpret the effects of ADHD diagnosis on children’s socioemotional well-being in the context of a framework that encompasses broader interconnected social, psychological, and medical factors. In the following, I note how these factors can unfold in families and schools in ways that have both positive and negative influences on diagnosed children and how these may differ by social class.

Positive social, educational, and medical processes for diagnosed children compared to similar undiagnosed children. Children may experience benefits from a mental health diagnosis compared to their similar undiagnosed counterparts. Diagnosis can bring access to appropriate medications that help control behaviors, reduce anxiety, and improve mood. In schools, diagnosis may also bring positive educational and social supports, such as extra testing time through a 504 Plan, or connection to peers who have similar mental health challenges, through an Individualized Education Program (IEP) and special education classes (Gius 2007). That is, diagnosis can help “level the playing field” compared to otherwise similar undiagnosed children.

The education and disability literatures help to explain why these positive effects may be larger for children from high-SES families. High-SES parents are more able to mobilize social capital and other resources to successfully navigate school and medical bureaucracies in order to connect their child to positive resources at the first signs of difficulty (Lareau 1989). For children with disabilities, Ong-Dean (2009:4) argued that “it is precisely because schools often try to manage students with disabilities in the easiest, cheapest ways that parents’ advocacy is so important,” but “parents’ resources affect how far they can shoulder this burden of being involved in identifying and accommodating their children’s disabilities” (p. 4). For example, Liu, King, and Bearman (2010) show that residential proximity to other children diagnosed with autism shapes a child’s own subsequent diagnosis due to the spread of information about how to secure diagnoses and the benefits of doing so. Blum (2015) also shows that social capital is one resource that helps high-SES parents connect children to the best teachers and proper treatments and educational accommodations. Finally, mental health conditions are also less stigmatized in high-SES than low-SES communities, which can lead to better medication adherence (Ohan et al. 2013; Pescosolido et al. 2008).

In addition to being better positioned to intervene at school, high-SES parents have greater knowledge of the behaviors and skills rewarded in schools and are more likely to support development of these skills through a style of parenting at home known as “concerted cultivation” (Lareau 2003). Concerted cultivation is oriented around fostering children’s talents and ability to navigate social institutions through participation in organized activities, including education-enhancing activities like tutoring. Together, early detection, greater medication adherence and social support, and less stigma in high-SES compared to low-SES communities may lead to even greater positive effects of diagnosis for children from more advantaged than less advantaged backgrounds.

Negative social and psychological processes for diagnosed children compared to similar undiagnosed children. Mental health diagnoses can also instigate negative social and psychological processes. Literature focusing especially on labeling and stigma helps to explain potential negative consequences associated with diagnosis (Goffman 1963; Scheff 1974). Negative social feedback from teachers and peers may even further exacerbate negative diagnostic effects on the child, especially when future school behaviors are rated by teachers (Rist 1977). The child may experience a sense of inadequacy or low self-esteem based in beliefs that they have less academic ability than their peers, or that their teachers and parents do not believe they can succeed at a high level (Eisenberg and Schneider 2007). Moreover, if children internalize this shift in self-competence as a result of exposure to negative societal stereotypes about individuals with disabilities, stigma can instigate a self-fulfilling prophecy even in cases where teachers and peers do not know about the child’s diagnosis, resulting in poorer behavioral and socioemotional outcomes (Link et al. 1989).

Diagnosis may also have a larger negative effect on high-SES than low-SES children. In the case of learning disabilities (LD), Hale (2011) argues that disabilities are socially constructed in that “the more contextual structures demand academic skills and dispositions, the more children with learning impairments become “learning disabled”” (p. 4). In high-SES contexts where parents activate social capital for school intervention (Lareau 1987) and reflect school values in their home environment (Lareau 2003), academic excellence is often not
only expected, but expected to come easily (Mueller and Abrutyn 2016).

Moreover, Francis (2012) found that children with “invisible disabilities,” like ADHD and LD, experienced higher levels of stigma than those with “visible disabilities,” like intellectual disability, because their communities tended to accept invisible diagnoses as legitimate while holding diagnosed children and their families accountable to the same high expectations of normally functioning children. With the academic demands present in high-SES contexts, even subtle negative feedback from teachers, peers, or family, may lead diagnosed high-SES children to believe that they fail to meet academic expectations. Given that high-SES children are also less likely to have as many other negative exposures as low-SES children, the marginal effect of a mental health label may loom even larger for high-SES than low-SES children. High-SES children might believe themselves to be even more “learning disabled” than their low-SES counterparts (Hale 2011) while also being more likely to tie their sense of self-worth to their school performance (Conner and Pope 2013).

In sum, through the label that accompanies their diagnosis, high-SES children might experience larger negative effects of stigma, even though absolute levels of mental health stigma are lower than in low-SES communities. As a result, diagnosed children may experience even poorer self-competence and, through a self-fulfilling prophecy, poorer school behaviors, than diagnosed low-SES children.

The Case of Childhood ADHD Diagnosis and Child Well-being

Most prior research on children with ADHD has examined the consequences associated with having ADHD versus not having ADHD based on a comparison of outcomes of children with versus without high levels of behavioral problems prior to a diagnosis (path a of Figure 1). This prior work finds that having high levels of behavior problems is associated with a range of poorer social, educational, and well-being outcomes (Charach et al. 2013; Currie and Stabile 2006). By contrast, only one prior study known to the author isolates the role of the ADHD diagnosis (path d of Figure 1), as opposed to that of the underlying behavior problems (path a) or other factors (paths b–c). In that study, Owens and Jackson (2017) compare diagnosed and undiagnosed children who had the same underlying pre-diagnosis behavioral problems. They find that, even among diagnosed and medicated children who had mild behavior problems prior to diagnosis, an early elementary school ADHD diagnosis is associated with roughly .30 standard deviation (SD) lower math and reading scores in 8th grade. Owens and Jackson (2017) focus on long-term academic outcomes and as such are unable to shed light on the implicated social and psychological outcomes in addition to medical processes.

The present study builds upon that prior work to apply the theoretical framework elaborated above to the case of childhood ADHD diagnosis. I disentangle

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**Figure 1.** Framework for Assessing the Relationship between Social Class, ADHD Diagnosis, Medication Treatment, and Children’s Future Socioemotional Well-being.
implicated social, psychological, and medical processes and examine potentially heterogeneous diagnostic effects on children’s subsequent perceived self-competence and teacher-rated school behaviors by social class.

**Social Class Differences in the Positive Effects of Diagnosis Compared to Similar Undiagnosed Children.** For all children, an ADHD diagnosis can lead to the social and educational supports discussed above (Gius 2007). Moreover, in high-SES families, parents are more likely to believe that an ADHD diagnosis will be beneficial. Combined with the fact that high-SES families are more able to activate their social capital to intervene in schools and the medical system, high-SES families are consequently more inclined and able to seek out diagnosis at the early signs of behavioral difficulties. Thus:

Even **without medication**, diagnosis is associated with positive effects on future self-competence and school behaviors. Moreover, diagnosed and **unmedicated** children from high-SES backgrounds on average exhibit better future self-competence and school behaviors than diagnosed and unmedicated children from low-SES backgrounds, each relative to their undiagnosed counterparts (hypothesis 1).

In terms of medical processes, the stimulant medications commonly prescribed for ADHD (e.g., Ritalin and Adderall) have been shown to effectively reduce inattention and hyperactivity in children (Molina et al. 2009; Swanson et al. 2010). Greater parental social capital and economic resources combined with lesser stigma surrounding diagnosis may mean greater medication access, adherence, and strategic use among high-SES children (Hinshaw and Scheffler 2014). Indeed, research shows that children from higher-SES backgrounds are more likely than children from lower-SES backgrounds to increase the use of the stimulant medications to improve attention and concentration during months with high levels of academic pressure, such as during finals periods, and limit use during holiday breaks (King et al. 2014). Thus:

Diagnosed and **medicated** children from high-SES backgrounds on average exhibit even better future self-competence and school behaviors than diagnosed and medicated children from low-SES backgrounds (hypothesis 2).

**Social Class Differences in the Negative Effects of Diagnosis Compared to Similar Undiagnosed Children.** The rise in ADHD diagnoses is driven by an assumption about diagnosis’ positive behavioral effects, but an ADHD diagnosis might instead instigate negative social feedback from teachers and peers. Its status as an “invisible disability” may lead diagnosed children and family members to internalize a sense of culpability for the child’s difficulties, which is consistent with experiences of labeling and stigma. For children from high-SES backgrounds in particular, parents’ ability to activate social capital for school intervention (Lareau 1987) and reflect school values in their home environment (Lareau 2003) combined with fewer other negative exposures may further magnify diagnosed children’s sense of being “disabled” and unable to meet high academic expectations. Thus:

**Without medication**, diagnosis has negative effects on future self-competence and school behaviors. Moreover, diagnosed and **unmedicated** children from high-SES backgrounds on average exhibit worse future self-competence and school behaviors than diagnosed and unmedicated children from low-SES backgrounds, each relative to their undiagnosed counterparts (hypothesis 3).

The benefits of proper medication discussed previously may help effectively manage symptoms, and children from high-SES families may have greater medication access or adherence. However, greater medication access and adherence may also lead high-SES children to be more likely to experience negative side-effects of treatment or polypharmacy. Thus:

Diagnosed and **medicated** children from high-SES backgrounds on average exhibit comparable future self-competence and school behaviors as diagnosed and medicated children from low-SES backgrounds (hypothesis 4).

These hypotheses are summarized in Figure 2. The y-axis displays expected differences in the future school behaviors of diagnosed vs. otherwise comparable undiagnosed children. Positive bars represent better future teacher-rated school behaviors among diagnosed compared to undiagnosed children, while negative bars represent poorer future behaviors, and the dotted line represents no difference between diagnosed and undiagnosed children.
DATA AND METHODS

Research Design: Disentangling the Effects of Behavior, Diagnosis, and Medication

Data and sample. To estimate differences between the teacher-rated school behaviors and perceived self-competence outcomes of diagnosed and undiagnosed children, this study draws on the restricted-use Early Childhood Longitudinal Study-Kindergarten Cohort of 1998 (ECLS-K), an initially nationally representative sample of kindergarteners followed through middle school. The analytic sample used here consisted of the 7,330 children who remained in the study through 5th grade, were not missing data on either the outcomes or ADHD diagnosis, and were either diagnosed ($N=380$) or plausible undiagnosed matches who had comparable levels of early ADHD-related behavioral problems in spite of not having been diagnosed ($N=6,950$). Details on the longitudinal sample, attrition, and trimming are detailed in the Online Appendix; cell sizes were rounded to the nearest 10 per the restricted-use data agreement.

These data offered several substantial strengths for isolating the net “marginal effect” of an ADHD diagnosis (path d of Figure 1)—defined as the average difference between the outcomes of diagnosed and otherwise comparable undiagnosed children who had the same observed pre-diagnosis behavioral problems, cognitive skills, family/demographic contexts and overall propensities to be diagnosed even though one child was diagnosed and the other was not. First, given that ADHD diagnoses require functional impairment from inattention and/or hyperactivity/impulsivity in at least two settings (American Psychiatric Association 2013), both teachers and parents rated children’s behaviors. Moreover, ratings occurred in children’s naturalistic settings (school and home), independent of diagnostic evaluation and less subject to reporting bias.

Second, to directly measure the core behaviors of ADHD, access to certain individual-level behavior items were made available through copyright approval from the publisher, allowing diagnosed and undiagnosed children to be matched on the individual subscales of inattention and hyperactivity/impulsivity. Although imperfect, these reports resemble those used in ADHD screeners such as the Connor’s, SNAP-IV, and DSM-IV (limitations are discussed in the Discussion section) (Currie and Stabile 2006; Swanson et al. 2010). Moreover, to address potential confounding from conduct/oppositional defiance disorder and depression, the two most common co-morbid conditions of ADHD (Hinshaw and Scheffler 2014), I also matched on relevant pre-diagnosis anti-social behaviors and internalizing behaviors in addition to inattention and hyperactivity. Third, ratings were for all sample children, including the roughly 95% of children with developmentally normal behaviors who are never diagnosed, thus providing a wide range of suitable undiagnosed comparison cases, or “matches.”

Fourth, behavior ratings were collected in the wave prior to diagnosis with ADHD, offering a substantial strength over measuring pre-diagnosis behaviors in a static period. For example, exclusively measuring behaviors in kindergarten would understate behavior problems for children whose

![Figure 2. Hypothesized Differences in the Future Self-concept and Behavior of Diagnosed vs. Undiagnosed Children, by Social Class and Whether Receiving Medication](image-url)
problems increase after school entry and before diagnosis. Conversely, drawing exclusively on third grade measures (the end of the diagnostic observation period) could introduce reverse causality issues if diagnosis prompts behavior change. For undiagnosed children, behavior problems come from first grade, the near mid-point of the Kindergarten through third grade diagnostic observation period. Since behavior problems typically decrease with age, the use of kindergarten behaviors for undiagnosed children would likely overstate problems, while third grade measures would understate them.

Treatment of missing data. Of the working analytic sample of 7,330 children, 15.4% \((N = 1,130)\) lacked complete information on matching variables. Item-missingness on these covariates was more common among boys, African-Americans, and children of mothers with less than a college degree.

Multiple imputation of twenty datasets was used to address item-missingness on matching variables. ADHD diagnosis and the outcomes are included in the imputation equation but children originally missing on these outcomes are excluded from all analyses, per Von Hippel (2007).

Analytic Strategy: Matching for Sample Balance

Because ADHD diagnosis is not randomly assigned, there are a number of potential child, family, and classroom/school confounders that may influence both diagnosis and outcomes. These include ADHD-related behaviors prior to diagnosis, cognitive skills, sex, age-for-grade (whether they are older or younger than their classmates) (Layton et al. 2018), internalizing behavior problems score (a common co-morbidity of ADHD), insurance coverage status, race/ethnicity (Morgan et al. 2013), parents’ concerted cultivation parenting styles, type of kindergarten classroom, and average classroom behavior based on teacher ratings on a scale from zero (“students are typically extremely poorly behaved”) to four (“students are typically extremely well behaved”), which might help shape reference group effects. If unobserved, these factors may lead to biased estimates of the marginal effect of diagnosis.

To help address some of these potential confounders, standard multiple regression techniques would introduce controls to adjust for consequential observable differences between diagnosed and undiagnosed children. However, standard controls within OLS regressions may not be adequate if there is insufficient overlap, or balance, in the distributions of characteristics between diagnosed and undiagnosed children (Imbens and Rubin 2015).

Researchers have turned to matching techniques to help achieve sample balance on key variables for which OLS models may yield estimates that lack sample support/balance (Gangl 2010). This study used two types of matching to obtain estimates that are “doubly robust” to confounding between diagnosed and undiagnosed children: coarsened exact matching (CEM) and propensity score matching (PSM) (Stuart et al. 2009). First, I use CEM to preprocess the data and ensure sample balance on three key factors that shape both diagnosis and the outcomes: family social class group (given the study’s theoretical motivation), severity quartile of prediagnosis behavioral problems (a key confounder of diagnostic effects), and child sex (since sex differences in children’s presentation of ADHD-related behaviors could produce improper matches given greater diagnosis of the hyperactive subtype among boys).

The advantages of CEM include that it is not a method of estimation but, rather, a way to preprocess a data set. As a result, estimation based on the matched data set will be less model-dependent (i.e., less a function of indefensible modeling decisions) than when based on the original full data set (Iacus, King, and Porro 2011). Because the degree of model dependence is bounded \textit{ex ante} by the researcher, estimates are less vulnerable to misspecification of functional form. Second, CEM balances the nonlinearities and interactions between variables that exist in the data. Third, CEM restricts the matched data to areas of common empirical support, helping to ensure that the researchers are not extrapolating beyond the data. Finally, the trimming described earlier leads to lower bias during subsequent estimation, and (by removing heterogeneity) increased efficiency (Iacus et al. 2011). Once the CEM samples have been generated, subsequent data analysis resumes use of the original values of all covariates (King et al. 2010).

Nonetheless, CEM is limited by the number of exact matching dimensions it can accommodate. Even after CEM, still there may be additional observable child, family, and classroom/school differences between diagnosed and undiagnosed children even \textit{within} coarsened groups (Imbens and Rubin 2015). Thus, PSM was used second, after CEM, to help address additional possible confounding by ensuring that diagnosed and undiagnosed children were comparable, or balanced, on 37 potential child, family, and classroom matching variables included in the PSM equation: all six
teacher- and parent-rated behavioral dimensions and 31 other variables mentioned above and detailed in Table 1 and the Online Appendix.

Altogether, matching allowed me to isolate the marginal effects of diagnosis by comparing diagnosed and undiagnosed children with comparable underlying pre-diagnosis behavior problems, cognitive skills, sex, and other child, family, and classroom characteristics. I examined variation by family social class. Finally, I examined the sensitivity of results to modeling approach (see the Online Appendix).

**Models**

First, differences by family social class in the marginal effects of diagnosis were estimated overall and then separately by whether or not the child subsequently received medication following diagnosis. In the latter analyses, diagnosed children were further classified as those who “additional receive medication” and those who “do not receive medication,” both relative to undiagnosed children. This moderation analysis (first by family social class and then also by medication status) occurred after CEM but before PSM (Stuart et al. 2009). To guard against reverse-causality issues, sensitivity analyses relied on medication receipt reported only in third grade; resulting estimates remained substantively unchanged. Baseline models pooling across social class are shown in Appendix Table A.1.

The CEM package in Stata 14 was used to independently and ex ante ensure that diagnosed and undiagnosed children were “exact matches” on three characteristics on which there are well-established differences in diagnosis and future behaviors: (1) family social class (3 groups); (2) quartile of pre-diagnosis behavioral problems based on parent- and teacher-rated subscales for inattentive or hyperactive/impulsive behavioral type (16 groups); and (3) child sex (2 groups). The continuous variables for social class and pre-diagnosis ADHD-related behaviors were first temporarily “coarsened” into the above categories so that matching occurred within the 96 broad groups above (3 × 16 × 2 = 96). All 380 diagnosed children were successfully matched to otherwise comparable undiagnosed children. By contrast, 340 (.5% of) undiagnosed children were pruned for reasons of achieving balance described in the Online Appendix.

For the pre-diagnosis ADHD-related behaviors mentioned above, there was substantial overlap in the distributions of both diagnosed and undiagnosed children: for both groups, pre-diagnosis behavioral ratings spanned the full range from “never” to “almost always.” As mentioned earlier, with 5.2% of sample children ages 4 to 10 diagnosed with ADHD, nearly 95% of children are not diagnosed, offering a large number of potential matches who were not diagnosed but nonetheless had the same propensity to be.

PSM occurred after the CEM and is detailed in the Online Appendix (balance statistics are in Appendix Table A.2). This approach does not remove the risk of bias from omitted variables and measurement error. The term marginal “effect” is used with this important caveat.

**Key Measures**

Table 1 displays all variables used in the analyses.

- **Dependent variables:** child perceived self-competence and teacher-rated school behaviors in fifth grade. Teacher-rated “positive approaches to learning”—or attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization—and teacher-rated “externalizing behavior problems”—or social problems like the frequency of arguing, fighting, getting angry, acting impulsively, and disturbing ongoing activities—were subscales from the Social Rating Scale; the child-rated outcome was from the Self-Description Questionnaire (Tourangeau et al. 2009). Each scale averaged across items for behavioral frequency that ranged from $0 = \text{rarely}$ to $3 = \text{always}$.

I focused on fifth grade behavioral outcomes, first, because I anticipated the largest diagnostic effects here and, second, because I believed there was a reciprocal relationship between perceived self-competence and teacher-rated school behaviors. Although student self-reported measures were available in eighth grade, teacher ratings of school behaviors were not. Relying on the eighth grade measures would have introduced a (false) assumed causal ordering to the outcomes.

- **Primary independent variables.** ADHD diagnosis between kindergarten and third grade (“treatment”) was identified based on when the parent answered “yes” to all three of the following questions in a given wave: (1) “Has the child been evaluated by a professional in response to a problem in paying attention, learning, behaving, or in activity level?” (2) “Has the child received a diagnosis by this professional?” and (3) “Was the diagnosis for ADHD, ADD, or hyperactivity?” (see Morgan et al. [2013] and Tourangeau et al. [2009] for advantages
Table 1. Means and Standard Deviations (or Proportions) for Variables Used in the Main Text (N = 7,330).

<table>
<thead>
<tr>
<th></th>
<th>Upper SES (N = 1,850)</th>
<th>Middle SES (N = 3,630)</th>
<th>Lower SES (N = 1,850)</th>
<th>Overall Min</th>
<th>Overall Max</th>
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<tbody>
<tr>
<td>Outcomes (5th Grade)</td>
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<tr>
<td>Positive approaches to learning behaviors score (teacher report)–5th grade</td>
<td>2.29b .69</td>
<td>2.10b .75</td>
<td>1.91a .76</td>
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<td>3</td>
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<tr>
<td>Negative externalizing behavior problems score (teacher report)–5th Grade</td>
<td>.42b .57</td>
<td>.56a,b .65</td>
<td>.63a .69</td>
<td>0</td>
<td>3</td>
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<tr>
<td>Perceived self-competence score–5th grade (child report)</td>
<td>2.19b .77</td>
<td>2.05a,b .80</td>
<td>2.01a .81</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>ADHD Diagnosis (K–3rd Grades) and Possible Medication Receipt (3rd–5th Grades)</td>
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<td>Diagnosed with ADHD</td>
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<td>.05</td>
<td>.04</td>
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<td>Receiving medication in 3rd–5th Grades (of those diagnosed)</td>
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<td>.80</td>
<td>.75</td>
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<td>Pre-diagnosis ADHD-related and Co-occurring Behaviors (Measured in the Wave Prior to Diagnosis or 1st Grade for Undiagnosed)</td>
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<td>Inattentive behaviors score (teacher report)</td>
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<td>–.01a .86</td>
<td>.18a,b .90</td>
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<td>.07a,b .74</td>
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<td>–.01a .66</td>
<td>.09a,b .68</td>
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<td>2</td>
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<td>–.01a .61</td>
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<td>–.01a .65</td>
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<td>–.04a .46</td>
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<td>Early Cognitive Development (Kindergarten)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average reading achievement scores (std.)</td>
<td>.50b .97</td>
<td>–.06a,b .91</td>
<td>–.68a .89</td>
<td>-3</td>
<td>4</td>
</tr>
<tr>
<td>Average math achievement scores (std.)</td>
<td>.54b .89</td>
<td>.04a,b .87</td>
<td>–.65a .91</td>
<td>-3</td>
<td>4</td>
</tr>
<tr>
<td>Fine motor skills score</td>
<td>6.45b 1.75</td>
<td>6.10a,b 1.94</td>
<td>5.37a 2.14</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Early School Context (Kindergarten)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average behavior of students in kindergarten class (teacher report)</td>
<td>2.60b .75</td>
<td>2.47a .80</td>
<td>2.33a .80</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Child received any special education services in kindergarten</td>
<td>.08b</td>
<td>.10b</td>
<td>.11</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>School in state with consequential educational accountability standards</td>
<td>.70</td>
<td>.68a</td>
<td>.73a</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Early “Concerted Cultivation” at Home and Parental Involvement in Education/Schooling (Kindergarten)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental participation in educational institutions</td>
<td>4.87b 1.28</td>
<td>4.20a,b 1.50</td>
<td>2.96a 1.59</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Child activities and leisure time</td>
<td>3.76b 1.83</td>
<td>2.76a,b 1.70</td>
<td>1.71a 1.53</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Parent perceptions of responsibilities towards child cognitive and social development</td>
<td>11.05b 2.71</td>
<td>10.41a,b 2.95</td>
<td>9.45a 3.43</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Number of books at home</td>
<td>109.31b 58.25</td>
<td>82.15a,b 56.76</td>
<td>41.82a 45.09</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>Parent educational expectations for child</td>
<td>1.93b .30</td>
<td>1.69a,b .58</td>
<td>1.44a .78</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Child age (months) at kindergarten entry</td>
<td>65.49 4.24</td>
<td>65.65a 4.34</td>
<td>65.28a 4.44</td>
<td>37</td>
<td>81</td>
</tr>
<tr>
<td>Family Demographic and Other Child Characteristics (Kindergarten)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of social mother</td>
<td>36.68b 4.97</td>
<td>33.72a,b 5.94</td>
<td>31.87a 7.42</td>
<td>18</td>
<td>80</td>
</tr>
<tr>
<td>Mother has CES-D Score &gt;9 (clinically depressive symptoms)</td>
<td>.10b</td>
<td>.17a,b</td>
<td>.25a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Child born weighing less than 5.5 lbs (low birthweight)</td>
<td>.06b</td>
<td>.08a,b</td>
<td>.10a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Child not covered by insurance</td>
<td>.15</td>
<td>.15a</td>
<td>.20a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of other children in household</td>
<td>1.51b .97</td>
<td>1.44a,b 1.06</td>
<td>1.79a 1.32</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Child been in childcare outside home</td>
<td>.53</td>
<td>.53a</td>
<td>.44a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>.52</td>
<td>.51</td>
<td>.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>.03b</td>
<td>.10a,b</td>
<td>.20a</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

(continued)
of this conservative approach to identifying diagnosed children). Children whose parents answered “no” to any of these questions were coded as “not diagnosed with ADHD” between respective waves. Diagnosis during the kindergarten through third grade diagnostic observation period was confirmed using parent report of “year of first [ADD/ADHD] diagnosis.” The 14% of diagnosed children who were diagnosed by kindergarten were retained and coded “1” (diagnosed), but sensitivity analyses excluding these children for whom measurement of ADHD-related behaviors did not precede diagnosis yielded consistent substantive results. Children first diagnosed with ADHD after third grade were also retained but were coded “0” (undiagnosed). Their inclusion as potential “undiagnosed matches” yielded conservative (lower-bound) estimates of the effect of diagnosis as they may have had undiagnosed ADHD during the kindergarten through third grade diagnostic observation period.

Medication treatment receipt between 3rd and 5th grades (“treatment moderator”) was ascertained based on parent report of whether the child was “taking medication to control his/her behavior” in third or fifth grade. In fifth grade, parents were asked to name these medications. 90% of the children “receiving medication” were taking one of three medications frequently prescribed for ADHD: Ritalin, Adderall, or Concerta. Of the 50 children diagnosed by kindergarten, 40 (80%) were receiving medication by fifth grade. Of the 210 additional children first diagnosed after third grade, 150 (71%) were taking medication in fifth grade.

Family social class background in kindergarten (“predictor/moderator”) was categorized, following Cheadle (2008), using a composite, standardized scale consisting of mother/female guardian’s and father/male guardian’s educational attainment, household income, and parental occupational prestige (see chapter 7, pages 8–11 of Tourangeau et al. [2009]) and conceptualized the bottom quartile as “lower SES,” the middle two quartiles as “middle SES,” and the top quartile as “upper SES”. There are, of course, multiple approaches for measuring social class. The composite gives precedence to family income, although I note that the results were similar when using maternal educational level (mom has a bachelor’s degree or higher versus mom has less than a bachelor’s degree).

Other variables in the PSM equation. To help ensure that diagnosed and undiagnosed children were as comparable as possible on observable characteristics, a number of other key measures, including pre-diagnosis ADHD-related behaviors and commonly co-occurring (“comorbid”) behaviors, were included as PSM variables and are described in the Online Appendix.

Table 1. (continued)

<table>
<thead>
<tr>
<th></th>
<th>Upper SES (N = 1,850)</th>
<th>Middle SES (N = 3,630)</th>
<th>Lower SES (N = 1,850)</th>
<th>Overall Min</th>
<th>Overall Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Hispanic</td>
<td>.07a</td>
<td>.13ab</td>
<td>.36a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>White</td>
<td>.79a</td>
<td>.67ab</td>
<td>.32a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other race/ethnicity</td>
<td>.11</td>
<td>.10</td>
<td>.12</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Single parent household</td>
<td>.07a</td>
<td>.14ab</td>
<td>.29a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Social father present in household</td>
<td>.01b</td>
<td>.07b</td>
<td>.07</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other family type in household</td>
<td>.04b</td>
<td>.05b</td>
<td>.08a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Two biological parents in household</td>
<td>.88b</td>
<td>.75b</td>
<td>.56a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lives in Midwest</td>
<td>.31</td>
<td>.32a</td>
<td>.18a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lives in West</td>
<td>.20a</td>
<td>.18ab</td>
<td>.27a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lives in Northeast</td>
<td>.22a</td>
<td>.19ab</td>
<td>.13a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lives in South</td>
<td>.26a</td>
<td>.30ab</td>
<td>.40a</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: ADHD = attention-deficit/hyperactivity disorder; CD = compulsive disorder; ODD = oppositional defiant disorder; SD = standard deviation; SES = socioeconomic status.
*aSignificant difference between lower SES and middle SES at p < .05. All significant/non-significant differences between lower SES and middle SES also apply to the difference between lower SES and upper SES (except child age, which is not significant between lower SES and upper SES).

*bSignificant difference between middle SES and upper SES at p < .05.
RESULTS

The primary goals of this analysis are to: (1) determine whether differences in the future perceived self-competence and teacher-rated school behaviors of diagnosed and undiagnosed children are located among those from middle- or upper-SES rather than lower-SES backgrounds; (2) examine whether any social class differences hold even for students who receive medication treatment following diagnosis, and; (3) explore variation in these relationships by child sex.

Descriptive Differences by Family Social Class

To understand the differing contexts within which a childhood ADHD diagnosis occurs in this sample, Table 1 displays descriptive statistics for analyzed variables by family social class. There is a statistically significant social class gradient on all three outcomes: lower-SES children exhibit the poorest positive approaches to learning, perceived self-competence, and negative externalizing problems, followed by middle- and then upper-SES children.

However, on diagnosis and medication use as well as many predictors, middle-SES and upper-SES children are quite similar. Consistent with national statistics interpolated for children ages five to nine, roughly 4% to 5% of lower-SES, middle-SES, and upper-SES children are each diagnosed with ADHD (see Appendix Table A.3 for counts) (Xu et al. 2018). 80% of both diagnosed middle- and upper-SES children receive medication following diagnosis, compared to 75% of diagnosed children from lower-SES families. Additional descriptive differences are discussed in the Online Appendix.

Social Class Differences in the “Marginal Effect” of an ADHD Diagnosis

Given this study’s theoretical emphasis on moderating differences by family social class, Table 2 presents estimates of differences in outcomes between diagnosed children and their undiagnosed matches of the same social class group. For clarity, results are presented sequentially for each social class group before making explicit comparisons across social class groups.

Overall, results are consistent with hypothesis 3 and inconsistent with hypotheses 1 and 2: an ADHD diagnosis has a negative “marginal effect” on future child self-competence and teacher-rated school behaviors, but only among children from middle- and upper-SES families (Table 2). Both diagnosed children from upper-SES and middle-SES backgrounds exhibit .36 points (or .36 / .69 = .52 SD) statistically significantly lower future positive learning-related behaviors in fifth grade compared to their undiagnosed counterparts who had similar propensities for diagnosis but were not diagnosed.
Diagnosed upper-SES children also exhibit .25 points (.25 / .57 = .44 SD) statistically significantly higher externalizing problems in fifth grade than their undiagnosed counterparts (Model 4). Diagnosed middle-SES children likewise exhibit statistically significant .18 points (.18 / .65 = .28 SD) higher externalizing problems than their undiagnosed counterparts (Model 5). Finally, diagnosed upper-SES children report statistically significantly lower perceived self-competence by .25 points (.25 / .80 = .31 SD) statistically significantly lower perceived self-competence relative to undiagnosed matches who had a similar propensity to be diagnosed (Models 7–8). Consistent with prior qualitative work (Lareau 2003), differences in outcomes between diagnosed and undiagnosed middle- versus upper-SES children are not statistically significant from one another.

One explanation for the poorer future school behaviors and perceived self-competence of diagnosed middle- and upper-SES (but not lower-SES) children is that diagnosis triggers a social process that objectively leads to poorer behaviors in diagnosed middle- and upper-SES children versus their undiagnosed matches. Alternatively, teachers may also have biased reports, for example from awareness of a child’s diagnosis. Although this study is unable to distinguish between these processes, even subjectively rated behaviors have important consequences for self-fulfilling prophecies as discussed previously.

Moreover, the lower perceived self-competence of diagnosed middle- and upper-SES children but not diagnosed lower-SES children points to the salience of an internalized psychological process consistent with labeling. Internalization may be one key mechanism underlying poorer future school behaviors, as explored in the Online Appendix.

Results in Table 3 differentiate between diagnosed upper-SES children who did versus did not receive medication following diagnosis. Results are consistent with hypothesis 3 on two of the three outcomes and run counter to hypothesis 4. Among diagnosed upper-SES children, ADHD diagnosis is associated with poorer approaches to learning and externalizing problems irrespective of medication use, but is only significantly tied to poorer academic self-competence for those who are receiving medication. Among middle-SES children, diagnosis is tied to poorer outcomes on all three measures irrespective of medication receipt. Specifically, both “diagnosed and medicated” and “diagnosed and unmedicated” upper-SES children respectively exhibit .46 points (.67 SD) and .30 points (.43 SD) significantly poorer positive approaches to learning in fifth grade than their undiagnosed counterparts (model 1). They also respectively exhibit .18 points (.32 SD) and .38 points (.67 SD) significantly poorer externalizing problems in fifth grade (model 4). Similarly, both “diagnosed and medicated” and “diagnosed and unmedicated” middle-SES children respectively exhibit .31 points (.41 SD) and .42 points (.56 SD) significantly poorer positive approaches to learning (model 2) and .17 points (.26 SD) and .20 (.31 SD) significantly worse externalizing problems than their undiagnosed matches (model 5).

When it comes to perceived self-competence, both “diagnosed and medicated” and “diagnosed and unmedicated” middle-SES children again score significantly worse than their undiagnosed matches, by .22 points (.28 SD) and .36 points (.45 SD), respectively (model 8). However, among upper-SES children, only those who are diagnosed and medicated score significantly worse than their undiagnosed matches, by .41 points (.53 SD) (model 7). For diagnosed upper-SES children not receiving medication, the relationship between diagnosis and perceived self-competence is directionally similar and statistically non-significantly smaller (−.24 points or .31 SD) compared to upper-SES children receiving medication (−.41 points) (model 7). But this .24 points poorer reported self-competence is not itself statistically significantly different from 0. Likewise, none of the other differences between “diagnosed and medicated” and “diagnosed and unmedicated” children are significantly different within social class groups either.2

By contrast, for children in lower-SES families, ADHD diagnosis is not significantly tied to any of the outcome variables. That is, diagnosed lower-SES children have statistically indistinguishable levels of the fifth grade outcomes as their undiagnosed counterparts (Models 3, 6, and 9 of Table 2). Substantively, the estimated effects of diagnosis are at least 50% to 66% smaller for lower-SES compared to middle- and/or upper-SES children. On perceived self-competence and positive approaches to learning, differences are statistically significantly smaller among lower-SES compared to both middle-SES and upper-SES children (model 3 vs. 1 and 2, and model 9 vs. 7 and 8 of Table 2). On future teacher-rated externalizing problems, the differences between lower SES and middle SES or upper SES are not statistically significant but follow in the expected direction (model 6 vs. 4 and 5).

Medication receipt does not further moderate differences in the marginal effects of diagnosis for
Table 3. Average Marginal Relationships between an ADHD Diagnosis and Future Social and Academic Behaviors and Child’s Perceived Self-competence, by Family Social Class and Medication Treatment Status ($N = 7,330$).

<table>
<thead>
<tr>
<th></th>
<th>Positive Approaches to Learning (Teacher Report) – 5th Grade</th>
<th>Externalizing Behavior Problems (Teacher Report) – 5th Grade</th>
<th>Perceived Self-competence (Child Report) – 5th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>Upper SES ($N = 1,850$)</td>
<td>Middle SES ($N = 3,630$)</td>
<td>Lower SES ($N = 1,850$)</td>
</tr>
<tr>
<td>Diagnosed with ADD/ADHD, receiving medication</td>
<td>$-0.46^{***a}$</td>
<td>$-0.31^{***}$</td>
<td>$-0.18^*$</td>
</tr>
<tr>
<td></td>
<td>(.10)</td>
<td>(.08)</td>
<td>(.10)</td>
</tr>
<tr>
<td>Diagnosed with ADD/ADHD, not receiving medication</td>
<td>$-0.30^{***}$</td>
<td>$-0.42^{***}$</td>
<td>$-0.06$</td>
</tr>
<tr>
<td></td>
<td>(.04)</td>
<td>(.11)</td>
<td>(.20)</td>
</tr>
</tbody>
</table>


Note: Displaying propensity score matching estimates of the “average marginal effect” of ADHD diagnosis with subsequent medication treatment/non-treatment (each compared to undiagnosed children) with coarsened exact matching to preprocess the data (see text). Standard errors in parentheses. ADD = attention deficit disorder; ADHD = attention-deficit/hyperactivity disorder, SES = socioeconomic status.

*aSignificant difference between lower SES and upper SES at $p < .05$.
*bSignificant difference between lower SES and middle SES at $p < .05$.
*cSignificant difference between middle SES and upper SES at $p < .05$.

None of the within-model (i.e., internal moderation) differences by medication treatment/non-treatment status reach statistical significance at $p < .05$.

*p < .05, **p < .01, ***p < .001 (two-tailed t-tests).
lower-SES children (Table 3). The magnitudes of the differences in outcomes between “diagnosed and medicated” and undiagnosed lower-SES children are likewise much smaller than the analogous differences for middle- and upper-class children and, in fact, are statistically significantly smaller on future positive approaches to learning and perceived self-competence compared to upper-SES children (model 3 vs. 1 and model 9 vs. 7 of Table 3). Without medication receipt, “diagnosed and unmedicated” children from lower-SES backgrounds report significantly better future perceived self-competence than middle-SES children (.16 vs. –.36) and exhibit significantly better future teacher-rated school externalizing problems than upper-SES children (.11 vs. .38), each relative to their undiagnosed counterparts. Between “diagnosed and unmedicated” lower-SES vs. higher-SES children, however, neither differences in self-competence (.16 vs. –.24) nor positive approaches to learning (e.g., –.06 vs. –.42) differ significantly, though each follows the expected pattern. This may be due to cell size limitations for “diagnosed and unmedicated” children, per endnote 3. Together, overall results indicate that diagnosed and medicated upper-SES and middle-SES children—but not diagnosed and medicated lower-SES children—experience significantly worse future outcomes, each relative to their otherwise comparable undiagnosed counterparts.

**The Overall Winners and Losers: An Examination of Predicted Scores**

Figure 3 displays predicted outcome scores for diagnosed and undiagnosed children by family social class and medication treatment status. For undiagnosed children on all three outcomes (panels a through c), there is a social class gradient that most advantages the upper SES (white bars), followed by middle SES (grey bars), then lower SES (black bars).

The most important finding from Figure 3 is that, on all three outcomes, “diagnosed and medicated” upper-SES and middle-SES children fare comparably to undiagnosed lower-SES children. “Diagnosed and medicated” upper- and middle-SES children also fare slightly worse than their “diagnosed and unmedicated” counterparts on future positive approaches to learning and perceived self-competence. The opposite is true for future externalizing problems.

That “diagnosed and medicated” middle- and upper-SES children fare comparably to undiagnosed lower-SES children is surprising. One interpretation is that medication more effectively improves the hyperactivity/impulsivity that largely comprises externalizing problems than it does the inattention that partly constitutes approaches to learning. Alternatively, medication may have larger negative side effects for attention and concentration than hyperactivity, as is indicated for depression medications.

A third possibility is that medications may effectively act on the nervous system to improve both inattention and hyperactivity/impulsivity, as designed, but that there may be an additional psychological mechanism in addition to the biologic ones. Even if fully effective at their stated aim, medications are not designed to interrupt the psychological effects of feeling “marked,” which may have their own independent effects on children’s perceived self-competence and school behaviors. Medication may even slightly increase a child’s awareness of being “marked,” or affect the way she or he is treated by others.

Finally, on future perceived self-competence (panel c), “diagnosed and unmedicated” lower-SES children are predicted to fare as well as undiagnosed upper-SES children and slightly higher than undiagnosed middle-SES children. For these lower-SES children, diagnosis may provide a “legitimate” (i.e., medical) explanation for the child’s difficulties and ease some of the burden posed by other structural barriers to school success. The lack of medication treatment may diminish any effects of stigma experienced by the child or family. Together, the result may be the high subjective levels of perceived self-competence observed.

**Robustness Checks**

The lower perceived self-competence and poorer school-related behaviors of “diagnosed and medicated” children from middle-SES and upper-SES backgrounds appears robust and systematic. Nonetheless, I additionally examine whether results are driven by differential selection into: evaluation, diagnosis by age, medication treatment, schools, and remission of symptoms between the third and fifth grades. Results discussed in the Online Appendix and displayed in Appendix Tables A.4 through A.8 lend confidence that selection along these dimensions does not drive results. Moreover, estimates would need to be biased by more than 57% in order to invalidate findings.

For example, if the lower medication rate among diagnosed lower-SES than higher-SES children reflects under-medication rather than less severe clinical
symptoms (for example due to financial barriers or lack of insurance coverage), “diagnosed and unmedicated” lower-SES children actually may be more similar to “diagnosed and medicated” lower-SES children than is the case among higher-SES children. This similarity could lead to an underestimate of the moderating effect

Figure 3. Predicted Future School Behaviors and Perceived Self-competence Between ‘Undiagnosed,’ ‘Diagnosed and Medicated,’ and ‘Diagnosed and Unmedicated’ Children, by Family Social Class.
of medication status among lower-SES children. However, I calculate that the difference between “diagnosed and medicated” and “diagnosed and medicated” lower-SES children would have to be at a minimum 2.05 times (105%) greater (for perceived self-competence) and 3.67 times (267%) greater (for positive approaches to learning) for there to be a significant difference between “diagnosed and unmedicated” and “diagnosed and medicated” lower-SES children at $p < .05$ (two-sided t-test).

I also investigate whether results are driven by boys or external visibility of the diagnosis by teachers/peers (rather than internalized stigma by the child). Results discussed in the Online Appendix are inconsistent with both claims.

**DISCUSSION**

This study shifts our understanding of the relationship between social class privilege, including the ability of high-SES parents to activate the types of social capital rewarded by schools, and children’s well-being and educational outcomes. Using the case of childhood ADHD diagnoses, this study offers a conceptual framework for disentangling the conditions under which the interrelated social, psychological, and medical factors associated with a childhood mental health diagnosis can trigger positive, neutral, or negative effects on children’s later well-being and school behaviors. The use of matching strategies helps to disentangle the effects of high levels of behavior problems from those of the diagnosis itself or the social class factors that may drive differential diagnosis.

This study uncovers three major findings. First, ADHD diagnosis is tied to worse approaches to learning, more behavior problems, and poorer academic self-competence in fifth grade, but only for children in upper- and middle-SES families. Second, for children in low-SES families, ADHD diagnosis is not significantly tied to any of the outcomes considered here. Third, when differentiating between diagnosed upper-SES children who are versus are not receiving medication following diagnosis, ADHD diagnosis is significantly tied to poorer learning approaches and greater externalizing problems regardless of medication receipt. By contrast, ADHD diagnosis is only significantly tied to academic self-competence for those upper-SES children who are receiving medication.

When it comes to the relationship between social class privilege and children’s well-being, work in the tradition of Lareau (1989) may be taken to assume that high-SES parents’ activation of social capital and other resources for school intervention is predominantly beneficial to their children. However, the present findings indicate that there is also a need to consider that there could be a negative side to the consequences of this social capital and privilege in schools through children’s increased susceptibility to negative social labeling. The ability of parents to convert social capital may be highly influenced by the ways in which broader social structures (e.g., schools) differentiate and stigmatize disability differently among high-SES and low-SES families. For example, the blame assigned to parents and children with disability may be heightened in the high-SES schools attended by many high-SES children.

The findings also contribute to our understanding of social labeling processes. While key literatures in sociology of education and medical sociology have highlighted potential negatives associated with labeling (Link et al. 1989; Rist 1977), the present study extends this work by showing how parental social capital (e.g., school and medical intervention) can have negative consequences for children’s well-being.

Although this study cannot be certain of the mechanisms, one interpretation is that in the high-pressure environments of many middle- and upper-SES children, negative stereotypes applied to members of advantaged groups may elicit even greater self-stigma, perhaps due to the greater academic demands and expectations in their local contexts. This internalization can produce poorer subjective ratings of self-competence, as observed. Even subtle negative feedback from teachers and peers may exacerbate this effect. As with internalized stigma, lower perceived self-competence may result in a self-fulfilling prophecy that leads to poorer school-related behaviors, instigating a reciprocal process (Mueller and Abrutyn 2016). Crucially, this interpretation would suggest that ADHD diagnoses would continue to have a large negative effect even if diagnoses become more common and normalized in high-SES communities.

Finally, this study shows that the observed poorer outcomes of diagnosed middle- and upper-SES children can manifest at an earlier age than previously documented. Here, patterns of negative effects of diagnosis appear similar for both middle- and upper-SES children, and quite distinct from lower-SES children, consistent with the patterns of “concerted cultivation” Lareau (2003) observed among middle- and upper-SES parents. Altogether, for medical sociology, education, and social stratification scholars, these findings add nuance to a large
body of evidence finding that social stigmas have greater effects among disadvantaged populations, such as the mark of a criminal record and hiring (Pager 2003) or a school suspension (Owens and McLanahan Forthcoming).

At first glance, one might think that the results could be an artifact of class-specific reference group effects: perhaps middle- and upper-SES children have better-behaved classmates than low-SES children such that slight deviations in behavior may lead to artificially inflated teacher and child ratings of problem behaviors. However, these results appear robust and systematic even among teachers who similarly rate the average behavior of students in their classrooms and when using fifth grade teacher ratings or an average across elementary school.

Additionally, descriptive patterns suggest that results are not driven by differences in the schools attended by diagnosed and undiagnosed children: mean levels of the outcomes are similar across diagnosed and undiagnosed children in the same schools. To help address the possibility that ADHD-related behavior problems may have worsened leading up to diagnosis, pre-diagnosis behavior measures come from the wave just prior to diagnosis, offering a substantial advantage over measuring pre-diagnosis behaviors at a static time point, such as kindergarten entry.

This study also has a number of limitations and possible extensions. The ADHD-related behavioral scales (and co-morbid internalizing and oppositional defiant behavioral scales) used here measure frequency of behaviors, not other relevant factors like their intensity or duration, and also do not perfectly map on to DSM criteria. These unobserved clinical factors, if correlated with both diagnosis and outcomes, could lead to omitted variables bias. Given the null results among low-SES children, there would have to be differential omitted variables between diagnosed and undiagnosed children by family social class in order to yield biased estimates among the middle- and upper-SES children for whom negative effects are estimated. Additionally, the sample balance achieved on key concerted cultivation measures, early parental education expectations, and child cognitive skills, helps protect against such class-specific omitted variables. Nonetheless, measurement error in pre-diagnosis behavioral problems may be larger for children from lower-SES than higher-SES families; adjusting for parenting styles may not entirely address this issue. Depending on the outcome, estimated diagnostic effects would have had to be 9% to 566% larger among lower-SES children in order for there to have been statistically significant diagnostic effects among lower-SES children. Given this range, an alternative interpretation of results is that, rather than self-stigma concentrated among higher-SES children, the diagnosis and clinical care of ADHD among lower-SES children may be less consistent and reflective of actual symptoms.

These data also lack a direct measure of stigma and/or internalized shame, as mentioned above. However, prior work finds that children diagnosed with ADHD experience substantial labeling and stigma (Pescosolido et al. 2008). This prior work suggests that stigma may be a reasonable mechanism underlying observed relationships. Future experimental or qualitative work should directly examine this possible mechanism. Finally, this study is limited by the small sample of unmedicated diagnosed children (100 children total).

This study also carries practical implications. It might caution against parents, educators, and medical providers considering an ADHD diagnosis for middle- and upper-SES children at the first signs of behavioral difficulties. For example, prior research points to potential negative diagnostic effects on later school behaviors and academic achievement among children who had only mild pre-diagnosis behavioral problems (Owens 2020; Owens and Jackson 2017). Further research is needed to understand diagnostic effects on academic outcomes among high-SES children, but these studies together suggest that both potential positive and potential negative consequences of diagnosis should be considered. Findings should not dissuade ADHD diagnosis for high-SES children who have a clear-cut need for diagnosis.

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SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

NOTES

1. The data provided only averaged scales in 5th grade, preventing standardization of summed indexes. Regardless, standardizing was less preferred because it unreasonably assumes that teachers follow a stable logic across contexts when rating behaviors.

2. The lack of significant internal moderation by medication status may reflect small sample sizes and large standard errors among “diagnosed and unmedicated” children. Replication analyses for the two available outcomes using the more recent ECLS-K:2010–11, which includes more “diagnosed and unmedicated” children (n = 70 for upper-SES and n = 80 for lower-SES children, up from n = 20 and n = 30, respectively, in the ECLS-K: 1998–99 cohort), reveal descriptively (and in some cases, significantly) larger negative effects of diagnosis for middle- and upper-SES children and “diagnosed and unmedicated” lower-SES children, but not for “diagnosed and medicated” lower-SES children.

3. While stereotype threat faced by students of color or of women in STEM may seem like counter-examples, these negative stereotypic “marks” only target structurally disadvantaged groups.

REFERENCES


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