Working Papers

FEDERAL RESERVE BANK OF BOSTON™

No. 23-7

The Impact of Learning Disabilities on Children and Parental Outcomes: Evidence from the Panel Study of Income Dynamics

Rachel Cummings and María José Luengo-Prado

Abstract:
We document the characteristics of children and young adults identified in the Panel Study of Income Dynamics as having a learning disability and study whether legislative changes in diagnosis criteria have had a noticeable effect determining who receives a diagnosis. We further document that children and young adults identified as a having a learning disability experience less desirable outcomes early in life, including trouble with the police, drug use, violent behavior, incarceration, self-reported low levels of well-being, lower educational attainment, and less favorable labor market outcomes. We also find that the mothers of children diagnosed with learning disabilities are less likely than other mothers to participate in the labor market.

JEL Classifications: J24, I24
Keywords: learning disabilities, young adult outcomes, labor market outcomes

---

Rachel Cummings (rachel.cummings.econ@gmail.com) was a senior research assistant in the Federal Reserve Bank of Boston Research Department when she coauthored this paper. María José Luengo-Prado (maria@luengoprado.net) is a senior economist and policy advisor in Federal Reserve Bank of Boston Research Department.

The authors thank Daniel Cooper for helpful suggestions.

This version: July 2023 **https://doi.org/10.29412/res.wp.2023.07**

1 Introduction

Using the Panel Study of Income Dynamics (PSID), this paper studies the effects of learning disabilities on several childhood, adolescence, and early adulthood outcomes, including employment and labor force participation. The paper also documents how the presence of children with learning disabilities in the household affects their parents' labor market outcomes. While previous research has studied many of the associations between learning disabilities and childhood outcomes identified in this paper (for example, individuals diagnosed with learning disabilities are more likely to report lower levels of emotional well-being and are also more likely to run into trouble with the law), the effects on parents, to our knowledge, are not well documented. We find that the mothers of children diagnosed with learning disabilities are less likely than other mothers to participate in the labor market, even after we control for mothers' own learning disabilities and an array of other factors known to affect labor force participation and employment.

One goal of this paper is to raise awareness among economists of an area that has received much more attention in other disciplines. While significant progress has been made in understanding and supporting children with learning disabilities, proper cost-benefit analysis and a better understanding of the causal effects and scalability of various interventions are in order. The National Center for Learning Disabilities (NCLD) estimates that 20 percent of children in the United States have learning and attention problems (see Horowitz, Rawe, and Whittaker 2017). At a time when the labor supply has been stunted, tapping the neurodiverse population is more important than ever. A second goal of this paper is to highlight the PSID as a potential resource for researchers in other fields who want to track individuals diagnosed with learning disabilities as well as their children (the PSID allows for the linkage of various generations). Researchers can set up partnerships with the PSID and take advantage of the wealth of information that the survey has collected about the participants.

About 50 years ago, following an advisory committee recommendation, the US federal government recognized specific learning disabilities (LDs) as potentially disabling conditions that interfere with performance in school and beyond.[1] The Education for All Handicapped Children Act (EHA), enacted in 1975 as Public Law 94–142, required all public schools accepting federal funds to provide equal access to education for children with physical and mental disabilities. The EHA was revised and renamed the Individuals with Disabilities Education Act (IDEA) in 1990. The version of the law that is currently in effect was revised and reauthorized in 2004 (IDEA 2004). It mandates that individuals aged 3 to 21 with disabilities, including specific LDs, be provided a free and appropriate public school education in the least restricted environment possible.[2] Specific LDs comprise the largest disability category among the disorders recognized by the law; roughly 37.2 percent of the 6.1 million school-aged children served under the IDEA (in the 50 states and Washington, DC) in the 2020–21 school year were categorized as having a specific LD.

Grigorenko et al. (2020) provide a succinct but comprehensive summary of the 50 years of science and practice aimed at supporting children with specific LDs—a must read for anyone interested in this topic.[3] As the authors explain, the original definition of specific LDs as a heterogeneous set of academic-skill disorders remains in place. The American Psychiatric Association (APA) came to acknowledge the heterogeneity of LDs and the need for differentiated interventions over time, as reflected in the volumes of its *Diagnostic and Statistical Manual* (*DSM*). The distinction between skill disorders and attention deficit hyperactive disorders (ADHD) was introduced in the 1980 *DSM*-3.[4] Early on, regulatory and clinical definitions of LDs relied on the

[1] Throughout the rest of the paper, we refer to specific learning disabilities simply as learning disabilities or learning disorders.

[2] A brief description of the IDEA 2004 can be found at https://sites.ed.gov/idea/about-idea. In addition to specific LDs, the IDEA 2004 covers several other disability categories: autism, deafness and blindness, developmental delay, hearing impairment, intellectual disability, multiple disabilities, orthopedic impairment, other health impairment, speech or language impairment, traumatic brain injury, and visual impairment.

[3] This summary represents a consensus statement by researchers in the Learning Disabilities Research Centers Consortium (LDRC) and the Learning Disabilities Innovation Hubs (LD Hubs) supported by the National Institute of Child Health and Human Development (NICHD).

[4] The APA's manuals have been updated over the years, sometimes in unexpected directions. The 1952 *DSM*-1 refers to "chronic brain syndromes of unknown cause" and focuses mainly on behavioral presentations. The 1968 *DSM*-2 references "minimal brain dysfunction" in "children of near average, average, or above average general intelligence with certain learning and behavioral disabilities." The 1980 *DSM*-3 separates skills disorders from attention deficits. The 1994 *DSM*-4 differentiates reading, mathematics, and written-expression learning disorders. The 2013 *DSM*-5 reverses the split by skill area but maintains the distinction from ADHD, recognizing the comorbidity of LDs and ADHD. The (*DSM*-5 defines an LD as a neurodevelopmental disorder that impedes

discrepancy between IQ and academic achievement,[5] but the IDEA 2004 and the 2013 *DSM*-5 moved away from this requirement because evidence of a strong correlation between IQ and LDs was lacking (children of all IQ levels can have LDs; see Siegel 1989). The IDEA 2004 introduced an alternative inclusion factor for diagnosis based on a child's response to intervention (RTI): LDs would present as a persistent lack of response to effective instruction or treatment efforts.

Currently, there are no laboratory tests for LDs.[6] When diagnosing LDs, neuropsychologists and others look for a child to demonstrate unexpected underachievement along with uneven patterns of academic strengths and weaknesses and no broad intellectual disability. Children are identified by school specialists and in the clinical setting. These children will not meet approved age- or grade-level standards in one or various academic skills, a failure that cannot be explained by other factors. The skills considered include oral expression, listening comprehension, basic reading skills, reading fluency, reading comprehension, written expression, mathematics calculations, and mathematics problem solving. Word-reading disabilities (WRD), which typically present with phonological processing deficits, are the most studied (dyslexia[7] is included in this category).[8] Estimates of the prevalence of LDs in the general population vary from 5 to 20 percent, with WRD appearing most frequently. Co-occurrence of various LDs with other LDs and/or with ADHD is not atypical,[9] and it appears LDs can present in various degrees (from mild to severe).

Given the broad definition of specific LDs and the lack of laboratory tests, identification is

the ability to learn or use specific academic skills.) Neuropsychologists diagnosing children will typically write extensive reports with specific recommendations based on their understanding of the learning areas most affected in each child, but not all children will be diagnosed by a neuropsychologist, and neuropsychologists may disagree on the diagnosis of a given child.

[5]US Office of Education 1977.

[6]As cognitive science advances, the environment will change from its current state. Neurobiological differences in the brains of children with an increased risk for a reading disability can be seen early on, and there is also evidence that neural processes can normalize with intervention. There have been similar findings with respect to math-related disabilities. Genetics likely play a role, too, and candidate genes are being studied. See Fletcher and Grigorenko (2017) for a summary of current research.

[7]See Shaywitz and Shaywitz (2020) for a comprehensive overview of dyslexia and reading problems.

[8]By contrast, written-expression disabilities are the least studied. Reading-comprehension disabilities and math disabilities are near the middle in terms of how much they have been studied.

[9]The literature discussing the comorbidity of LDs with other LDs and/or with ADHD is extensive. See, for example, Ashkenazi et al. (2013); Martinez-Lincoln et al. (2023); Langer et al. (2019); Willcutt et al. (2019).

complex and sometimes subjective, and very much depends on the regulatory setting (which can vary by state). Because diagnosis typically comes after underachievement at school, children with LDs are diagnosed relatively late compared with other disability categories. With the introduction of RTI, schools can screen for indicators of LDs early on and monitor at-risk children. If these children do not respond to adequate classroom instruction (Tier 1), they can move on to supplemental intervention (Tier 2), typically in small groups. More individualized, intensive intervention or special education is the next step (Tier 3).[10] While RTI is promising in theory because it could lead to early intervention, implementing and assessing RTI in practice is challenging in terms of determining, for example, when and how to identify children and what constitutes an adequate intervention. Sometimes interventions are not effective, and valuable time is wasted. In fact, the stated goals of several state-level dyslexia laws passed in recent years focus on moving toward early universal screening of students and the implementation of evidence-based interventions right away.[11] To obfuscate the picture further, research indicates that the methods that have been used to teach reading in US classrooms for several decades now seem inadequate for many, if not most, children, and especially for those with phonemic and phonological deficits.[12] Advancing more effective reading methods that would help the majority of children might eventually free up resources to serve students with more complex learning disorders (and similarly for other academic skills).

Not all children identified by school systems meet the clinical diagnosis of an LD or qualify for special education, and many children are identified outside of school systems, opening the door for disputes between parents and educators. As documented by Zirkel (2020), special education is a leading sector of litigation in the K–12 public school context, with identification issues and

[10]Typical tiered instruction starts with high-quality instruction for all students (Tier 1) followed by targeted interventions beyond core instruction for students showing deficits (Tier 2). Interventions can become more intensive or last longer for students who require additional supports (Tier 3), including referrals for special education.

[11]Progress is being made in the development of simple tools rooted in neuroscience research that pediatricians could use to assess early markers of reading disabilities/dyslexia in young children (see Tridas et al. 2022 for information about a dyslexia tool that is being tested).

[12]For an introduction to the science of reading, see Seidenberg (2017). *Sold a Story*, a podcast by Emily Hanford, discusses how balanced literacy and its similar predecessor, the whole-language approach, have failed many children (https://features.apmreports.org/sold-a-story).

eligibility being the main reasons for disagreements.[13] Many well-informed parents do not favor a wait-and-see approach. Parents with resources fight for expedited, evidence-based services for their children, unilaterally place their children in private (sometimes specialized) schools hoping to get reimbursed (with varying degrees of success), or pay for services themselves outside the school system. Children with less informed parents or parents with fewer resources face a higher probability of being left behind, if they receive a diagnosis at all.

In this paper, we document the characteristics of children and young adults identified in the PSID as having an LD (as reported by the respondents themselves, their caregivers, and/or their teachers) and study whether changes in the criteria introduced by the IDEA 2004 for learning disability diagnosis have had a noticeable effect determining who receives a diagnosis. Indeed, the changes made a difference to some extent in that significant discrepancies between various skills mattered less for diagnosis. Consistent with previous studies, we further document that children and young adults identified in the PSID as having an LD exhibit poor outcomes early in life, including trouble with the police, drug use, violent behavior, incarceration, self-reported low levels of well-being, lower educational attainment, and less favorable labor market outcomes. Unlike previous LD studies, which focus on one or two outcomes at once, this paper is able to look at multiple life dimensions due to the richness of the PSID data. Finally, we provide quantitative estimates of the large effects children with LDs have on the labor force participation and employment opportunities of their mothers.

The rest of the paper is organized as follows. Section 2 briefly discusses related literature. Section 3 presents data on the academic achievement of US children with disabilities and those without disabilities in reading and math over time, as measured by the National Assessment of Educational Progress. This section also provides information on the number of children being served by the IDEA and on how many of those children are classified as having specific LDs.

[13] According to a recent *New Yorker* article by Jessica Winter, about $1 of every $40 spent by the US Department of Education is related to disputes between parents and schools regarding special education (see Jessica Winter, "The Parents Who Fight the City for a Free Appropriate Public Education," *The New Yorker*, May 11, 2023). As quantified by Karanxha and Zirkel (2014) and Frisch and Zirkel (2023), parents of children with special needs continue to use the courts to seek appropriate education for their children even after efforts have been made to reduce litigation.

Section 4 introduces the PSID and the variables used in our analysis. Section 5 documents the determinants of LD diagnosis for PSID respondents and presents our estimates of the impact of LDs on childhood, adolescence, and labor market outcomes. Section 6 discusses the effect of children's learning disabilities on their parents' labor market outcomes. Section 7 concludes.

2 Related Literature

Our paper is related to, among other studies, the work of Alexander-Passe (2006), who documents that individuals with learning disabilities tend to have significantly low self-esteem and high levels of anxiety, and to the work of McNamara and Willoughby (2010), who study the risk-taking behavior of adolescents with LDs compared with their peers. Goodman (2014) studies the impact of being left-handed on adult outcomes, finding overall worse outcomes and noting that left-handed individuals are more likely to have LDs such as dyslexia. McGee (2011) finds that learning-disabled youth in the child and young adult samples of the 1979 National Longitudinal Survey of Youth were more likely to graduate from high school but only because of the lower standards applied to them. In fact, they were less likely to be employed or to have continued on to college, and they earned less than their observationally equivalent non-learning-disabled peers. Deuchert et al. (2017) address LD discrimination in higher education in an audit study involving fictitious high school graduates requesting information on admission processes and special accommodations. Our paper is also related to literature that documents large effects of childhood ADHD/ADD diagnosis on labor market outcomes in adulthood; see Fletcher (2014); Rajah, Mattock, and Martin (2023).

Economists have studied the effects of special education on academic attainment. For example, Schwartz, Hopkins, and Stiefel (2021) find that general special education in New York City improved academic performance. Similarly, Hurwitz et al. (2020) document that the test scores of students with disabilities improved after the students were enrolled in special education. Albeck Nielsen (2021) uses Danish administrative data to evaluate the efficacy of special education for dyslexic students, finding significant reductions in reading gaps (33 percent) and well-being gaps (80 percent) relative to non-dyslexic students. Ballis and Heath (2021) find significant declines in educational attainment in Texas following reduced access to special education in that state, and Hanushek, Kain, and Rivkin (2002) find that the average special education program significantly boosted special education students' mathematics achievement scores. By contrast, Setren (2021) finds that students who lost specialized services after enrolling at a charter school achieved large academic gains in general classrooms, and Reynolds and Wolfe (1999) find that children with learning disabilities benefited less from special education services compared with children with other disabilities. All these studies employ credible identification strategies, and the somewhat conflicting results likely speak to the importance of the quality of the instruction received (regardless of where it was received) as well as to the difficulty of separating a true learning disability from poor instruction. This line of research continues to be important because the recent trend has been to keep students with disabilities in general education classrooms as much as possible to meet the "the least restrictive environment possible" mandate of the IDEA 2004.[14] As Gilmour (2018) suggests, a better understanding of this evolving pattern in the experiences of children with disabilities, their peers, and their teachers is needed.[15] Using the PSID data, we find that children who receive special education at some point have overall worse outcomes compared with other students, but we do not have the exogenous variation that would enable us to interpret these results as causal (see appendix tables).

[14]This shift can be seen in the US Department of Education's number and percentage of students ages 5 (in kindergarten) through 21 served under the IDEA, Part B, by educational environment and state (https://data.ed.gov/dataset/idea-section-618-data-products-static-tables-part-b-count-environ-tables13/resources?resource=2666fac2-6d37-4e5b-ac97-377f0c828cd0).

[15]Using data from the Los Angeles Unified School District, Wood et al. (2022) study whether teachers are differentially effective at producing academic gains for students with disabilities versus for those without disabilities. They find that teachers who are effective at teaching non-disabled students are not necessarily best able to support disabled children. Therefore, specific teacher training likely matters

3 Disabilities, Academic Achievement, and Children Served by the IDEA

This section provides some context on the current state of the academic achievement of students with disabilities, on the funds available for special education, and on the number of children served by the IDEA.

Disabilities and academic achievement

The National Assessment of Educational Progress (NAEP) report card, mandated by Congress, provides "the largest nationally representative and continuing assessment of what America's students know and can do in various subject areas," including reading and mathematics. NAEP assessment results are reported as average scores on a 0-to-500 scale (scales are not necessarily comparable across subjects and grades) and as percentages of students performing at or above three NAEP achievement levels (basic, proficient, and advanced).[16] While schools are encouraged to have students with disabilities participate in the assessment whenever possible (with accommodations if granted by students' individual education plans), school staff make the final decision. Inclusion rates of students with disabilities in the assessment have varied over the years, but a new policy was adopted in 2010 to maximize participation rates. In 2019, about 90 percent of students with disabilities were included in the NAEP. Publicly available NAEP data do not break down scores by type of disability, but about half of the fourth-grade students with disabilities who took the test and more than half of the eight-grade students with disabilities who took the test were reported as having a specific learning disability in the 2017 assessment.

The NAEP reading assessment measures mostly reading comprehension. Students read three different texts and then answer questions about them. The math assessment measures students' mathematical and problem-solving skills. They are tested on number properties and operations, measurement, geometry, algebra, and data analysis, statistics, and probability. We plot available

[16] For a description of each level, refer to the NAEP documentation (https://nces.ed.gov/nationsreportcard/tdw/analysis/describing_achiev.aspx).

data for the years 1996, 1998, 2000, 2002, biennially from 2003 through 2019, and for 2022.[17] The top panels of Figure 1 depict average scale scores of fourth- and eighth-grade students in reading and math by disability status at the national level. The bottom panels plot the percentage of students who scored below basic in these assessments.

Reading scores for fourth graders without disabilities have not changed much since 1998, but a reduction in the percentage of students scoring below basic was observed early on in the period. In math, scores increased in the mid-2000s and leveled off afterward. Average scores (percentage below basic) were lower (higher) in 2022 than in 2019, likely due to remote learning during the early part of the COVID-19 pandemic. Students with disabilities scored significantly below those without disabilities in both subjects and grades during the whole period, and a significantly higher percentage of students with disabilities were marked "below basic." For example, roughly 20 percent of students without disabilities were reading "below basic" in Grade 8 compared with 60 percent of students with disabilities. In reading, the gaps between students with disabilities and those without disabilities did not increase significantly from Grade 4 to Grade 8, but they did not close either. In math, the gaps widened from Grade 4 to Grade 8.

Education finance background

Data from the US Census Bureau's Annual Survey of School System Finances provide information on the resources available for education. The left panel of Figure 2 plots the amount of money (revenues) for education: the total amount and the amount marked for special education. The right panel depicts the total amount of money received for education per enrolled student as well as the amount of money for special education per child with a disability. The total and the per-pupil amounts of money for education (blue lines) increased over time, except during the Great Recession (GR)—local sources of education funding were particularly eroded during the GR due to house-price declines. Comparing the beginning and end of the plotted data shows that total funding in the 2019–20 school year was approximately $771 billion (in 2019 dollars)

[17] Data by disability status in early years are inconsistent, with some scores missing for certain grades and subjects.

compared with $485 billion in the 1995–96 school year ($13,341 compared with $8,814 in per capita terms). The total amount of money received for special education (both the total amount and the amount per student with a disability) increased until about 2003 and leveled off afterward (except for a significant increase in 2009 from a stimulus package). Together with the test score data, these figures illustrate that despite the introduction of new legislation, the revenue for special education has stagnated, and the average test scores and percentages of students with a disability who score below basic have changed little since 2004.

Children served by the IDEA

Federal legislation requires a yearly report to Congress with detailed counts on the number of children served by the IDEA 2004 (and similarly for the act's predecessors).[18] The report splits these counts into two age groups (3- to 5-year-olds and 6- to 21-year-olds) and classifies children into different disability categories. These categories are specific learning disorders (the focus of our paper), speech/language impairment, hearing impairment, visual impairment, orthopedic impairment, other health impairment, autism, intellectual disability, serious emotional disturbance, developmental delay, deaf-blindness, traumatic brain injury, and multiple disabilities.

Over the years, the total number of children served by the IDEA (in the 50 states and Washington, DC) has increased from roughly 5.5 million in the 1995–96 school year to 6.6 million in the 2020–21 school year. During the COVID-19 pandemic, the number of children 3 to 5 years old served by the IDEA fell dramatically from roughly 800,000 to fewer than 500,000, which could have implications down the road. Figure 3 shows that the overall percentage of children classified as having a disability had been growing over time for both age groups, albeit at different times and rates, until the pandemic hit. The percentage of children diagnosed with a disability in the 3–5 age group declined significantly in the 2019–20 and 2020–21 school years, likely because schools and evaluation centers were not fully open, so evaluations were less likely

[18] Section 664(d) of the IDEA Act requires an annual report to Congress. The 2021 report can be found at https://sites.ed.gov/idea/files/43rd-arc-for-idea.pdf.

to occur.

Figure 4 shows how the distribution of disability diagnoses has changed over time. For the 6–21 age group, the percentage of children in certain categories has decreased (including specific learning disabilities), while the percentage of children in other categories has increased (for example, other health impairments, the category into which ADHD falls; autism; and developmental delays). Specific LDs currently comprise the largest category for this age group, but the decline in this category is concerning because students without this classification might not have access to specialized instruction for learning disabilities. For the 3–5 age group, the largest disability categories are speech/language impairment and developmental delay. Barely any children in this age group are classified as having a specific LD, most likely due to current practices in the diagnosis of specific LDs.

4 The PSID and Variables for Our Analysis

The data for our analysis come from the Panel Study of Income Dynamics (PSID), a longitudinal survey conducted by the University of Michigan. The PSID began in 1968 with more than 18,000 individuals living in 5,000 households in the United States. Over the years, more than 82,000 individuals have participated in the PSID. Information on household composition, income, wealth, employment, health, and several other topics is collected via family interviews (annual until 1996 and biennial since 1997), thereby creating a panel data set that allows researchers to follow these families over time. The family interviews, however, collect information mainly on household heads and their spouses.

Prior to 1997, the PSID collected limited information on children and young adults. In 1997, the PSID introduced the Child Development Supplement (CDS) to gather information on children. The 1997 CDS-I was administered to 2,394 PSID families and 3,563 children. As many as two children between the ages of 2 and 12 in each family were interviewed, along with their caregivers. The same cohort of children was surveyed in 2002 (CDS-II), when the children were 5 to 17 years old, and again in 2007 (CDS-III), when the cohort members who were still children were between the ages of 10 and 18. In 2014, the CDS began surveying all children aged 17 and younger in all PSID families on a regular basis. Data were collected on 4,333 children in 2014 and on 4,629 children in 2019.

The CDS follows PSID children only until they are 18 and have completed their high school experience (either graduated or dropped out). The biennial Transition to Adulthood Supplement (TAS) was launched in 2005 to collect information on young adults before they form their own households. The first TAS collected information on the initial CDS cohort, starting with members when they reached the age of 18 and ending when they formed their own households or turned 28. In 2017, the scope of the supplement was expanded to include all PSID individuals when they turn 18, not just the original CDS cohort. The biennial TAS asks questions that are more age-appropriate for young adults, including questions about college completion and labor force status.

Learning disabilities and ADHD/ADD in the PSID

To study how certain outcomes early in life are influenced by learning disabilities, we make use of the CDS, TAS, and PSID family files.[19] Questions about being diagnosed with a learning disability/disorder can vary from one PSID data file to another. The 1997 CDS asks the primary caregiver, "Has your doctor or health professional ever said that (child) had a learning disability?" In later CDS waves, the phrasing of this question is different. The primary caregiver is asked, "Has (child's) doctor or health professional ever said that (child) had developmental problems, such as developmental delay or learning disability?" Additionally, a question in the 1997 CDS that is not included in later waves asks the child's elementary or middle school teacher the following: "Does the target child have any physical, emotional or mental condition which interferes with or limits his/her ability to do regular school work at grade level?" As a follow-up, the teacher is asked what this condition is, and "a learning disability" is one of the responses that the teacher can select. In the 2015, 2017, and 2019 waves of the TAS, respondents are

[19] We used all waves available to us at the time of our analysis, except the CDS-2020. The CDS-2020 and the TAS-2019 were the last waves available at the time of our analysis. We omit the CDS-2020 to focus on the pre-pandemic experience.

asked, “Has a doctor or other health professional ever told you that you have or had a learning disorder?” The respondents are asked about themselves in this question, unlike the CDS questions, which are directed to primary caregivers and teachers. In the family files, starting in 1999, heads and their spouses are asked about having a learning disorder. They are asked, “Has a doctor ever told you that you have or had a learning disorder?”[20]

We construct a “learning disability/disorder” dummy to flag individuals who were *ever* diagnosed with a learning disability/disorder based on the questions above.[21] Depending on how respondents interpret these questions, we could be missing individuals who might have been diagnosed with a learning disorder but not by a doctor or a health professional (perhaps in the school setting). It is also possible that some individuals were diagnosed with learning disabilities but were never told due to a fear of the associated stigma or because there was no follow-up after the initial assessment. Also, we cannot determine when exactly respondents in the PSID were diagnosed with an LD.[22]

Because comorbidities between learning disabilities and ADHD/ADD are not uncommon, we also collect information on this disorder. We make use of questions in the CDS and TAS about being diagnosed with ADHD/ADD. In each CDS wave, the primary caregiver is asked, “Has (childs’s) doctor or health professional ever said that (child) had hyperactivity, ADHD, or ADD?” In the 2011 TAS and in each subsequent wave, the respondent is asked, “Has a doctor or other health professional ever told you that you have or had any emotional, nervous, or psychiatric problems?” As a follow-up question, they are asked if the diagnosis was ADHD/ADD. To our knowledge, there are no questions on ADHD/ADD in the family interviews.

Assessment tests

We also make use of well-established tests of reading and mathematical skills that are admin-

[20]The PSID seems to use “learning disability” and “learning disorder” interchangeably. We also use the terms interchangeably in this paper.

[21]When we exclude the questions from the CDS that lump together developmental delays and learning disorders, we lose most of the respondents from the 2014 and 2019 CDS waves. However, our results are qualitatively similar.

[22]Although some questions related to the individual’s age or grade when they were diagnosed are listed in the PSID documentation, the information for many respondents is missing from the data.

istered to CDS children. In the CDS-I, children 3 and older were assessed via the Woodcock-Johnson Revised Tests of Achievement (WJ-R), which measure different aspects of academic achievement.[23] The younger children (aged 3 to 5) were assessed on the two subscales, called Letter-Word Identification (symbolic learning, reading identification skills) and Applied Problems (skill in analyzing and solving practical problems in math). Older children (6 to 12) were additionally tested in two other subscales, Passage Comprehension (comprehension and vocabulary) and Calculation (mathematical calculations and quantitative ability). The subscales can be used separately or together to create Broad Reading and Broad Math scales.[24] The CDS-II and CDS-III did not administer the Calculation test. The CDS-2014 was mainly a telephone interview, but 50 percent of families were selected for in-home visits. Children in these randomly selected families were assessed in math and reading using the WJ-R Letter-Word, Passage Comprehension, and Applied Problems tests. In the CDS-2019, all children were eligible for in-home visits and testing, but the assessment was updated to the Woodcock-Johnson IV Tests of Achievement (Letter-Word, Passage Comprehension, and Applied Problems were administered).

The original CDS cohort was also assessed using the Memory for Digit Span test from the Wechsler Intelligence Scale for Children (WISC-III). In this test, the interviewer recites a list of numbers, and the child is asked to repeat the list in the same order. Then, the child is asked to repeat the list in reverse order. The test continues with the sequence of numbers growing longer each time until the child can no longer repeat it correctly. The WISC Digit Span test measures the ability to process information, and it directly measures auditory short-term working memory.

Using the various assessments, we create what we call "discrepancy" measures: indicator variables for the difference between various test scores being abnormally large. Since discrepancies between skills originally were a factor taken into account when diagnosing learning disabilities, we want to explore whether these indicators have predictive power for LD diagnosis in the PSID sample. Because of the variation in the tests given over the years, the discrepancy measures

[23]See the CDS User Guide on Achievement Tests for more details (https://psidonline.isr.umich.edu/Publications/Papers/tsp/2014-02_Achievement.pdf).

[24]A Spanish version of the test was used for children whose primary language is Spanish.

we can construct also differ over time. For respondents in the CDS-I–III cohort, our baseline measure is the discrepancy between Letter-Word and Total Digit scores. For those whose test score data come from the 2014 or 2019 CDS waves, we use Letter-Word and Applied Problems as a baseline. Additionally, we create consistent (across waves) discrepancy measures based on Letter-Word and Applied Problems for all respondents, or we compute all possible discrepancy measures that can be created for a given child and flag children whenever a large discrepancy (of any kind) exists. When more than one set of scores of the same test are available for a given child in the CDS, we use the scores from when the child was closest to age 10. All the discrepancy indicators we construct measure whether the standardized tests scores in two different tests differ by more than 1.5 standard deviations or a different magnitude of our choice.

Outcomes

We document how several outcomes that are measured in the CDS and TAS correlate with learning disabilities. The set of outcomes we consider is not exhaustive and was selected to include a range of measures that other studies consider independently depending on their access to data.[25] All outcomes are constructed as indicator variables and are negatively defined (1 for a worse outcome). We consider the following outcomes: having trouble with the *police* (CDS and TAS); using *drugs* (CDS and TAS); engaging in *violence* (CDS and TAS); having been in *prison* (TAS only); ever being in the bottom quartile of emotional, social, or psychological *well-being* scales (TAS only); being a *high school dropout* (not having finished high school by age 19); and *not having a college degree* (by age 25). Details on each outcome are provided in the appendix.

We also explore the labor market experiences of these PSID respondents, in particular, being *employed* and *out of the labor force* (OLF). Taking advantage of the inter-generational nature of the PSID, we similarly create indicators for the parents of these respondents for all periods after a CDS child is born until the child turns age 23. We use these dummies in our regressions that explore the effect of having a child with an LD on parental labor market outcomes. In many

[25]More outcomes could be easily explored in the future; we assure the reader that we did not cherry-pick the outcomes for this study.

specifications, we use controls that measure characteristics of the parents of these children/young adults, which we obtain mostly from the family files. We also take into account the race and gender of the CDS/TAS respondents, as reported by the respondents' caregivers (CDS) or the respondents themselves (TAS). (Definitions are provided in the appendix.)

Summary statistics

Table 1 presents summary statistics for children's outcomes and regression controls. Note that these statistics are unweighted to match our later regressions. The PSID over-samples low-income families, which explains the high percentage of Black children. The mean birth year in our sample is 1996, with respondents born between 1983 and 2013. Remember that the 1997, 2002, and 2007 CDS waves follow the same cohort (aged 0 to 12 in 1997), while the 2014 and 2019 CDS waves survey all children aged 0 to 18 in PSID families. In the 2014 and 2019 CDS, the children were born between 1997 and 2013 and between 2002 and 2018, respectively, but some were too young to answer questions regarding the outcomes we will focus on (only children 12 or older are asked certain questions). Roughly 13 percent of our sample is flagged as having an LD, and 13 percent of those individuals are flagged as having ADHD/ADD—we compare these percentages with the IDEA numbers in Section 5.1. The low number of observations for educational outcomes, in particular the number of respondents not having a college degree, is due to some respondents being younger than 25 at the time of their last interview.

5 Analysis and Results

5.1 Who is diagnosed with a learning disability?

First, we look at the characteristics of the individuals in the PSID who have been diagnosed with a learning disability. The diagnosis of a learning disability typically follows academic underachievement. Also, before the IDEA 2004, an unevenness or discrepancy between different skills was among the factors evaluators considered. Family history, parental resources, and demographics likely also play a role in diagnoses (wealthier families might be more inclined to pay for evaluations outside of school), and family history is considered in many clinical diagnoses. Based on our priors, we estimate linear probability models of the type:

$$\text{LD}_i = \alpha + \beta \text{ Test Scores}_i + \gamma \text{ Discrepancy}_i + \lambda X_i + \text{BirthYear}_i + \rho_s + \epsilon_i,$$

where LD_i is a dummy variable equal to one if the respondent was flagged as having ever been diagnosed with a learning disorder (as identified via all PSID questions on LDs). For achievement, we use standardized measures of the reading and math tests that PSID respondents took. We consider both overall scores and thresholds, such as being below the 25th percentile.[26] Discrepancy_i is a dummy variable equal to one if the difference between two test measures (Applied Problems/Digit Span and Letter Word) is unusually large (more than 1.5 standard deviations to begin with). In some specifications, we allow for the effect of this variable to vary over time to determine whether the implementation the IDEA-2004 made a difference for the diagnoses of learning disabilities related to uneven skills—recall that the law introduced RTI. X_i includes demographics and socioeconomic controls (gender, race, family resources). Part of the process of diagnosing a learning disability is eliminating other possible causes for academic underachievement, so unconscious biases might also play a role in diagnoses. For example, an evaluator might view a girl with low socioeconomic stratum as being less likely to have a reading disability because the evaluator believes females are less likely to have learning disabilities to begin with and/or because the evaluator assumes the child has fewer books at home compared with more affluent children. Our specifications also include state fixed effects (from when the respondent's age was closest to 10), ρ_s, and the birth year of the respondent. These controls account for local factors that may play a role in an LD diagnosis as well as the fact that original CDS respondents will be older in our data set and will have had a longer time span in which they could have been diagnosed.

Table 2 summarizes our results. The only difference between columns (1) through (4) and

[26]Schools and neuropsychologists likely have more information on academic achievement than we do, and they likely run more comprehensive tests. However, this is the best we can do with our data.

columns (5) through (8) is how we compute our discrepancy measure. In the first four columns, the measure is not consistent across CDS waves in the sense that we compare Letter-Word and Digit Span scores for the early CDS waves, whereas we compare Letter-Word and Applied Problems scores for the later waves (these children were not given the Digit Span test). In the last four columns, the discrepancy measure is consistent across waves and based on Letter-Word/Applied Problems comparisons.[27]

Not surprisingly, higher (standardized) test scores decrease the likelihood of an LD diagnosis. The estimated effects for Applied Problems/Digit Span and Letter-Word scores are similar, ranging from 3.0 to 3.7 percentage points (pp) for a one standard deviation (SD) higher score. Thresholds seem to matter as well, because a child with a Letter-Word score below the 25th percentile is 10.4 to 11.6 pp more likely to be diagnosed with an LD. For the Applied Problems/Digit Span scores below the 25th percentile, the estimated effect is smaller, ranging from 6.3 to 6.8 pp, perhaps because math disabilities are believed to be less common. Our discrepancy measures have explanatory power as well. In column (1), a child with a discrepancy between Applied Problems/Digit Span and Letter-Word scores of more than 1.5 SDs is 3.9 pp more likely to be diagnosed, while the estimate for the alternative discrepancy measure in column (5) is 5.0 pp. When comparing Digit Span scores to Letter-Word scores, it seems that the larger the discrepancy, the higher the probability of diagnosis (compare columns 1 and 3). This does not seem to be the case when comparing Applied Problems scores to Letter-Word scores, as the effect is greater for a discrepancy of 1.5 to 2 SDs than it is for a larger discrepancy (more than 2 SDs)—see column (7).[28] The interactions between discrepancy and turning 10 after 2004 are generally negative and large, which suggests that legislative changes indeed had an effect on LD diagnosis practices. Parental income and having a parent with an LD are positively correlated with diagnosis, and girls, Black children, and Hispanic children are less likely to have been diagnosed. Doubling income increases the probability of diagnosis close to 2 pp, while parental

[27] We prefer Digit Span scores because researchers find them to be linearly related to general intelligence; see Gignac and Weiss (2015). We tried many other combinations of tests, including using Broad Reading scores instead of Letter-Word scores, and the results were very similar. They are not reported for brevity.

[28] We cannot read too much into this difference other than that solving math problems likely measures different skills than the Digit Span test does, and that there might be different child distributions in the two tests.

diagnosis increases child diagnosis by 14.3 to 14.4 pp, the largest estimated effects. Girls are about 6 pp less likely to have been diagnosed than boys. Black children and Hispanic children are about 8.5 and 3.9 pp less likely to have been diagnosed, respectively, compared with white children. Children in public schools are more likely to have been diagnosed compared with children in private schools—2.3 and 2.5 pp more likely, pointing to the important role public schools play in screening children.

While the overall explanatory power of our regressions is not small, about 0.17, it leaves a lot of room for other factors to determine diagnosis. What these factors might be, other than more thorough testing and school history, is not so obvious. However, our analysis highlights that there is likely a "random" element to diagnosis as well as bias or misunderstanding of learning disabilities. Some agreement on common standards might help to better identify children from all backgrounds. The educational experiences of these children will also likely differ depending on their location, economic circumstances, and even luck. As noted above, of the 5,236 children in our regression sample, about 13 percent (695) were flagged as having an LD. According to their school records as documented by the PSID, 52 percent of the children flagged as having an LD attended special education programs at some point. Those children represent close to 65 percent of all the children in the PSID who attended these programs. There are many possible explanations for why not all LD-diagnosed children went through special education programs. Some individuals might have been diagnosed with an LD later in life, after they left school. Others might not have been eligible for such programs because their disabilities were considered mild or their parents preferred to keep them in traditional classrooms or in private programs. Proportionally more children are classified as having a learning disability in the PSID than in the IDEA reports (see Table 3). The share in the PSID (13 percent) is closer to the overall share for all disabilities in the IDEA reports (11 percent) than to the share for specific learning disabilities (4 percent). The discrepancy might be due to the conceptual differences between the two measures. While the PSID number is a stock variable (children ever diagnosed), the IDEA number is closer to a flow measure (children with an individualized education program [IEP] at a point in time). The large differences, however, should be investigated further in future research.

Another interesting aspect of the PSID data that does not match the IDEA reports is the relative fractions of minority children identified as having a learning disability. In the PSID data, Black and Hispanic children are overall less likely than white children to be identified as having an LD, while the opposite is true in the IDEA reports. It is possible that Black and Hispanic children are not specifically told they might have learning disabilities, even if they are given IEPs, but our findings are consistent with Elder et al. (2019), who report under-identification of Black and Hispanic students relative to observationally similar white students in Florida schools.[29] By contrast, the gender gap in diagnoses (more males being diagnosed) observed in the PSID data matches the gap in the IDEA reports.

5.2 Learning disabilities and selected childhood and young-adult outcomes

In this section, we document how learning disabilities correlate with outcomes that can be measured in the CDS and TAS. As detailed above, these outcomes include trouble with the police (both CDS and TAS), using drugs (both CDS and TAS), having violent tendencies (both CDS and TAS), being incarcerated, dropping out of high school, not having a college degree, and being at the lower end of emotional, social, and psychological well-being scales. Previous studies suggest a positive correlation between these (negatively defined) outcomes and learning disabilities. We understand this analysis cannot speak to the direction of causality. Given that LD diagnosis is not an exact science, it is possible that some individuals are diagnosed with learning disabilities after exhibiting negative behaviors or poor outcomes. However, the most likely direction of causation is from LD to poor outcomes.

We estimate linear probability models of the type:

$$Y_i = \alpha + \beta \, \mathrm{LD}_i + \gamma \, \mathrm{ADHD}_i + \lambda \, X_i + \mathrm{BirthYear}_i + \rho_s + \epsilon_i,$$

where Y_i is one of the outcomes considered for individual i, LD_i indicates a learning disability, and

[29] Elder et al. (2019) also report that Black and Hispanic students are over-identified in schools with relatively small shares of minorities and substantially under-identified in schools with large minority shares. We could not replicate this result in our relatively smaller sample.

ADHD$_i$ indicates a hyperactivity/ADHD/ADD diagnosis. ADHD$_i$ is included as an additional control because this disorder can also affect the outcomes we measure and because of its co-morbidity with learning disorders. X_i includes demographic and socioeconomic characteristics, and ρ_s is a state fixed effect. We also include birth-year fixed effects to account for age differences among respondents. All specifications are estimated using robust standard errors.

Results are reported in Table 4. The number of observations varies across outcomes, with the "not a college graduate by age 25" having the smallest number of observations because respondents have to be 25 and older given the way we construct this outcome, and only some of the original CDS children had reached that age at the time of our analysis. Note that the respondents in the different columns are not necessarily the same. Some CDS children in the later waves might not be old enough to have aged into the TAS, while some TAS respondents might not have been part of the CDS initially.[30]

Overall, learning disabilities correlate significantly with all the outcomes we consider except drug use among CDS respondents, with effects ranging from 12.9 to 2.2 pp. Quantitatively, having an LD has the largest effect for not being a college graduate—those with learning disorders are 12.9 pp more likely to report not having earned a college degree by age 25. The smallest significant effect is for having trouble with the police between the ages of 12 and 18 (CDS version), 2.2 pp. In percentage terms, the effect among CDS respondents for trouble with the police is larger because only 5 percent of CDS children reported having trouble with the police, while 67 percent of respondents do not have a college degree. For the outcomes that can be measured in both the CDS and the TAS (trouble with the police, drug use, violence), the negative effects of an LD tend to increase as respondents age, but so does the percentage of respondents reporting such outcomes.

Having ADHD/ADD has a significant effect on several of these outcomes as well, but the effects tend to be smaller compared with having an LD (except trouble with the police). According to Brown (2005), ADHD/ADD is partly a chemical problem in the brain, and medication

[30]In the appendix, we present results for a sample of respondents who had already passed through both the CDS and TAS at the time of the analysis. Results are very similar and will not be discussed in detail. See Table A.2.

treatments are safe and work in 80 to 90 percent of affected individuals who take them. Appropriate treatment could be behind the overall smaller effects. Our regressions also control for demographic and family characteristics. These controls have mostly the expected signs (more parental resources, better outcomes; worse outcomes for minorities, especially for Black individuals), and we do not comment on these controls individually any further. However, to better understand whether the effects of LDs are heterogeneous across gender, racial groups, and levels of parental resources, we run augmented regressions that interact the LD dummy with these characteristics. Results are presented in Figures 6 through 8.

Marginal linear predictions by gender (see Figure 6) show significant effects of LDs on most outcomes for both females and males and estimated effects that are larger for females in several cases (the effects on no college and social well-being are statistically significantly larger for females).[31] One reason for the larger effect for females might be that they are less likely to be diagnosed with learning disabilities to begin with. Identified females might have more severe LDs on average, which could explain the small gender differences. Similar analysis by race (see Figure 7) points to all racial groups being negatively affected by learning disabilities to some extent. Statistically significant larger effects are identified among Hispanic children for drug use in the CDS (relative to "other" groups), drug use in the TAS (relative to white individuals and other groups), and violence in the CDS (relative to white children). Statistically significant larger effects are identified among Black individuals for violence in the TAS (relative to white individuals) and for dropping out of high school among other groups (relative to white individuals). When dividing respondents into parental income quartiles (based on average family income from ages 0 to 18), we find that parental income has some protective effect on the impact of having an LD for some outcomes (for example, dropping out of high school) but not for others (for example, using drugs). Notably, the estimated marginal effects are not always monotonic in family income, and for the most part, they are not statistically significantly different from each other. In sum, learning disabilities are correlated with negative outcomes during childhood and

[31] Corresponding figures in the appendix plot marginal effects separately for females and males in the same graph, which adds information on the initial bases for the measured outcomes by the selected characteristic. See Figures A.1–A.3.

early adulthood across gender, race, and income levels.[32]

5.3 Labor market outcomes

We further document how learning disabilities correlate with labor market outcomes. We create a longitudinal data set with observations for each respondent for every survey year that they are 16 and older. We focus on employment and out-of-the-labor-force (OLF) indicators. In this case, we estimate linear probability models that take advantage of the longitudinal dimension of the data:

$$Y_{it} = \alpha + \beta\,\mathrm{LD}_i + \gamma\,\mathrm{ADHD}_i + \lambda\,X_{it} + \pi\,Y_{i,t-2} + \theta_t + \rho_s + \epsilon_{it},$$

where Y_{it} is one of the outcomes considered for individual i in year t. LD_i indicates a learning disability, ADHD_i indicates an ADHD/ADD diagnosis, and X_{it} includes demographic and socioeconomic characteristics (as reported in Table 5), including being a student and having completed college. We also control for past labor force status, age fixed effects, time fixed effects that account for the state of the business cycle (θ_t), and state fixed effects (ρ_s). In these regressions, standard errors are clustered at the individual level.

We find that having a learning disorder has an impact on the labor force participation of teenagers and young adults: Respondents with an LD are 2.6 pp more likely to be out of the labor force. Having a learning disorder has a relatively larger impact on employment, 5.4 pp—compare columns (1) and (4) of Table 5. Being diagnosed with ADHD/ADD also has a negative effect on employment (the effect is slightly smaller, 3.7 pp, and is mostly driven by male respondents). In regressions that fully interact gender, race, and family income with learning disabilities (results depicted in Figure 9), we find that the documented (negative) employment effect is larger for women and for individuals with parents in the lower half of the family-income distribution. Perhaps higher income parents employ their offspring in their own businesses (including those with LDs) or facilitate access to better job networks (note that these regressions control for educational attainment, another likely channel for the protective effect of parental income on

[32] See appendix for results when we further control for having attended special education.

the outcomes of children with learning disabilities). When we run separate regressions for males and females (columns 2, 3, 5, and 6 of Table 5), we find that the negative employment effects of LDs are most pronounced for women whose parents are in the bottom half of the family-income distribution.[33]

We also explore whether there are any differences between the occupations that individuals with LDs and those without LDs end up in. Tables 6 and 7 present mean differences on indicator variables for having held certain jobs/occupations during the time we observe these young adults in the data (separately for men and women). Young adults are likely to change their occupations over time, but it is important to have an understanding of any occupational differentials early on. Men with LDs are over-represented in several mostly manual occupations, such as construction, but they are under-represented in education and the military, to highlight a few occupations. Women with LDs are over-represented in low-skill occupations and in art- and design-related jobs. Perhaps some of the worst employment outcomes for young women relative to young men is due to women in general being under-represented in certain occupations that employ a disproportionate number of young men with LDs (for example, construction).

To further understand how parents might help children with LDs in the job market (as noted earlier, parental income seems to have more of a protective effect against poor labor market outcomes than against other outcomes), we compute whether children end up in the same occupations as their parents.[34] On average, 27 percent of all children end up in the same broad occupation category as one of their parents. This share is 2.9 percent higher if the child has an LD (p-value of 0.08). On average, male children match their fathers' occupations at a lower rate than the overall average, 23.8 percent, but relatively more if the male child has an LD (5.2 percent more likely, p-value of 0.032).

[33]Controlling for test scores at age 10 in these regressions lowers the estimated coefficients of having an LD on labor market outcomes, suggesting that the severity of an LD is likely an important determinant of labor market outcomes. See Table A.4.

[34]We use the modal occupations of parents and children during all the periods observed in our matched sample, broadly categorized into seven groups (management/professional/technical/financial/public security, administrative support/retail sales, low-skill services, precision production/craft, machine operator/assembler/inspector, transportation/construction/mechanics/mining/agricultural, and other).

6 Labor Market Outcomes: Parents

We also study the labor market outcomes of the parents of children with learning disabilities. If parents feel schools are not adequately serving their children, they might want to spend more time working with them outside of school. We investigate whether there is any evidence of this effect by constructing a matched parent-child-year data set that includes parental records of employment and labor force non-participation for each year of available parental data after the child is born through when they are 23.[35] We again estimate linear probability models, but now parental outcomes are allowed to correlate with children's characteristics as well as with parents' own traits:

$$Y_{it}^{p} = \alpha + \beta\,\mathrm{LD}_{i}^{c} + \gamma\,\mathrm{ADHD}_{i}^{c} + \lambda\,X_{it}^{p} + \pi\,Y_{i,t-1}^{p} + \theta_t + \rho_s^{p} + \epsilon_{it}^{p}.$$

Y_{it}^{p} denotes parental outcomes, and we are interested in the effect of having a child with a learning disorder, LD_{i}^{c} (and ADHD_{i}^{c} for comparison), after we control for many other factors that determine labor market outcomes. These include the parent's race, age, marital status, highest level of education, number of children, presence of children under age 6 (preschool age), having a learning disability themselves, labor force status the preceding year, their spouse's labor force status, whether the child is 14 or older, and the log of total family income in the preceding year. Standard errors are clustered by individual (parent) in all specifications. We set the value of having a learning disorder equal to zero for all children under the age of 5 to rule out a learning disorder being conflated with more serious disorders that would likely be diagnosed much earlier in the child's life.[36] For consistency, we employ a similar strategy for ADHD and set this indicator to zero for all children under the age of 5.

In Table 8, we present estimates for all parent-child pairs pooled together, as well as for

[35]These data are available only up to 2019. If a CDS parent has more than one CDS child, they will appear in the data set more than once.

[36]We follow this strategy because learning disabilities identified in the PSID cannot always be disentangled from developmental delays, as detailed in Section 4. Also, LDs typically are not diagnosed before age 5. Results are similar if we exclude parents with children diagnosed very early in life from the regressions and/or if we change the 5-years-old cutoff to an older age.

father-child pairs and for mother-child pairs (children can be any gender in both cases), separately. In the pooled regressions, we find that a child having a learning disorder makes the parent 1.5 pp more likely to be out of the labor force. The results are driven by mothers. For father-child pairs, we find that there is no effect of the child having a learning disorder on the father's probability of being out of the labor force. However, for mother-child pairs, we find a larger effect than in the pooled sample, 2.5 pp. The estimated effect is not small. For comparison, having a college degree makes a mother 4.2 pp less likely to be out of the labor force. Thus, the effect of having a child with a learning disorder is slightly more than half the magnitude of the effect of a mother having a college degree. Regarding employment, we find that having a child with a learning disorder makes the parent 2.4 pp less likely to have a job. Again, the result is driven by mothers, as seen in the separate regressions (no effects for fathers and a larger effect for mothers). Non-tabulated results with interactions of the child's LD dummy and the child's age show that the effects on mothers are larger when children are learning to read (ages 6 to 9) and when they are high school age (ages 14 to 17). Note also that parental labor market outcomes are very much affected by parents' own learning disabilities, with the estimated effects being larger than the estimates for young (CDS and TAS) adults. To a great extent, the lower employment rate for individuals with LDs is due to non-participation (and more so for women), which likely signals job-search discouragement that increases over time. Occupational choices, as discussed for our young-adults sample, likely also contribute to the differential employment rates between individuals with LDs and those without LDs.

In contrast to children with LDs, children with ADHD/ADD have no effect on their parents' employment or labor force participation. Why the difference between LDs and ADHD/ADD in parental outcomes? Without trying to minimize the difficulties individuals with ADHD/ADD face on a regular basis, many of them might be able to manage with proper medication and additional interventions. Parents might feel their children are being helped by the available treatments. At the moment, there is no magic bullet to treat learning disabilities, and the path after a child's LD diagnosis can be challenging. Many parents fight schools for adequate intervention—if they know which services might be available—and have varying degrees of success. Even parents with resources may find themselves spending money on programs that do not work, and/or they will spend time driving their children to and from various programs during hours not compatible with full-time work schedules. While it may be ill-advised to quit one's job to try to remediate learning disabilities at home (most parents will not have the expertise to manage learning disabilities on their own), some mothers may do so at one point or another out of desperation. In fact, some become true experts in the field and have been proactive and key in changing legislation.[37]

In Table 9, we report further results for mothers with interactions of having a child with an LD and having a college degree and with the family being in the lower half of the PSID family-income distribution. We find that there is no additional effect of having a child with a learning disorder and being a college graduate on a mother's labor force status. However, mothers who have a child with an LD and are in the bottom half of total family income are 9.1 pp more likely to be out of the labor force and 9.6 pp less likely to be employed. These results indicate that the estimated average effects for mothers are mostly driven by lower income families and that the effects for these mothers are quite large.

7 Summary and Concluding Remarks

There is a robust literature documenting poor outcomes for children with learning disabilities in many domains of life. We replicate these findings using a longitudinal sample of PSID children. We also find clear differences in the likelihood of diagnosis across genders and races. Diagnosis certainly opens the door to resources and interventions, but navigating the intervention landscape is no easy task. Our finding of mothers' leaving the labor force in some cases likely speaks to this difficulty. In addition, our research suggests many individuals with learning disabilities either never enter the labor force or leave the labor force at some point.

When it comes to learning disabilities, early treatment might help break the connection from

[37]For example, the grassroots movement Decoding Dyslexia, which focuses on access to educational interventions for students with dyslexia in the public education system, was started by concerned mothers.

poor academic performance to low self-esteem and potential counterproductive risky behavior. Thus, earlier diagnosis is important. Many LDs will present initially as reading difficulties. Beginning readers need instruction to gain foundational skills, so how children initially are taught to read likely matters for all children.[38] Further research could focus on gaining a better understanding of the gender and racial inequalities in diagnosis and of the trends in the IDEA reports showing overall lower percentages of students classified as having an LD over time. Additional systematic research on the most efficacious programs to remediate or improve the outcomes of children with learning disabilities, as well as their potential scalability, would be helpful to policymakers, teachers, and parents alike.

References

Albeck Nielsen, Soren. 2021. "How to Cope with Dyslexia: The Effects of Special Education on Academic Performance, Personality Traits, and Well-being." Working Paper 2021-13. Department of Economics and Business Economics, Aarhus University.

Alexander-Passe, Neil. 2006. "How Dyslexic Teenagers Cope: An Investigation of Self-Esteem, Coping and Depression." *Dyslexia* 12(4): 256–275.

Ashkenazi, Sarit, Jessica M. Black, Daniel A. Abrams, Fumiko Hoeft, and Vinod Menon. 2013. "Neurobiological Underpinnings of Math and Reading Learning Disabilities." *Journal of Learning Disabilities* 46: 549–569.

Ballis, Briana, and Katelyn Heath. 2021. "The Long-Run Impacts of Special Education." *American Economic Journal: Economic Policy* 13(4): 72–111.

Brown, Thomas E. 2005. *Attention Deficit Disorder: The Unfocused Mind in Children and Adults*. New Haven, CT: Yale University Press.

[38] To date, 31 states have passed laws or implemented policies to align instruction with the "science of reading " (see Sarah Schwartz, "Which States Have Passed 'Science of Reading' Laws? What's in Them," *Education Week*, May 9, 2023).

Deuchert, Eva, Lukas Kauer, Helge Liebert, and Carl Wuppermann. 2017. "Disability Discrimination in Higher Education: Analyzing the Quality of Counseling Services." *Education Economics* 25(6): 543–553.

Elder, Todd E., David N. Figlio, Scott A. Imberman, and Claudia L. Persico. 2019. "School Segregation and Racial Gaps in Special Education Identification." Working Paper 25829. National Bureau of Economic Research.

Fletcher, Jack M., and Elena L. Grigorenko. 2017. "Neuropsychology of Learning Disabilities: The Past and the Future." *Journal of the International Neuropsychological Society* 23: 9–10.

Fletcher, Jason M. 2014. "The Effects of Childhood ADHD on Adult Labor Market Outcomes." *Health Economics* 23(2): 159–181.

Frisch, B., and Perry A. Zirkel. 2023. "Longitudinal Trends of Judicial Rulings in K–12 Education: The Latest Look." *West's Education Law Reporter* 407(3): 409–415.

Gignac, Gilles, and Lawrence Weiss. 2015. "Digit Span Is (Mostly) Related Linearly to General Intelligence: Every Extra Bit of Span Counts." *Psychological Assessment* 27.

Gilmour, Allison F. 2018. "Has Inclusion Gone Too Far? Weighing Its Effects on Students with Disabilities, Their Peers, and Teachers." *Education Next* 18(4): 8–16.

Goodman, Joshua. 2014. "The Wages of Sinistrality: Handedness, Brain Structure, and Human Capital Accumulation." *Journal of Economic Perspectives* 28(4): 193–212.

Grigorenko, E.L., D.L. Compton, L.S. Fuchs, R.K. Wagnerand E.G. Willcutt, and J.M. Fletcher. 2020. "Understanding, Educating, and Supporting Children with Specific Learning Disabilities: 50 years of Science and Practice." *The American Psychologist* 75: 37–51.

Hanushek, Eric A., John F. Kain, and Steven G. Rivkin. 2002. "Inferring Program Effects for Special Populations: Does Special Education Raise Achievement for Students with Disabilities?" *The Review of Economics and Statistics* 84(4): 584–599.

Horowitz, S.H., J. Rawe, and M.C. Whittaker. 2017. "The State of Learning Disabilities: Understanding the 1 in 5." New York: National Center for Learning Disabilities.

Hurwitz, Sarah, Brea Perry, Emma D. Cohen, and Russell Skiba. 2020. "Special Education and Individualized Academic Growth: A Longitudinal Assessment of Outcomes for Students with Disabilities." *American Educational Research Journal* 57(2): 576–611.

Karanxha, Zorka, and Perry A. Zirkel. 2014. "Trends in Special Education Case Law: Frequency and Outcomes of Published Court Decisions 1998–2012." *Journal of Special Education Leadership* 27(2): 55–65.

Langer, Nicolas, Christopher Benjamin, Bryce L.C. Becker, and Nadine Gaab. 2019. "Comorbidity of Reading Disabilities and ADHD: Structural and Functional Brain Characteristics." *Human Brain Mapping* 40: 2677–2698.

Martinez-Lincoln, Amanda, Tess S. Fotidzis, Laurie E. Cutting, Gavin R. Price, and Laura A. Barquero. 2023. "Examination of Common and Unique Brain Regions for Atypical Reading and Math: A Meta-Analysis." *Cerebral Cortex* 33: 6959–6989.

McGee, A. 2011. "Skills, Standards, and Disabilities: How Youth with Learning Disabilities Fare in High School and Beyond." *Economics of Education Review* 30(1): 109–129.

McNamara, John K., and Teena Willoughby. 2010. "A Longitudinal Study of Risk-Taking Behavior in Adolescents with Learning Disabilities." *Learning Disabilities Research & Practice* 25(1): 11–24.

Rajah, Nasir, Richard Mattock, and Adam Martin. 2023. "How Do Childhood ADHD Symptoms Affect Labour Market Outcomes?" *Economics & Human Biology* 48: 101–189.

Reynolds, Arthur J., and Barbara Wolfe. 1999. "Special Education and School Achievement: An Exploratory Analysis with a Central-City Sample." *Educational Evaluation and Policy Analysis* 21(3): 249–269.

Schwartz, Amy Ellen, Bryant Gregory Hopkins, and Leanna Stiefel. 2021. "The Effects of Special Education on the Academic Performance of Students with Learning Disabilities." *Journal of Policy Analysis and Management* 40(2): 480–520.

Seidenberg, Mark. 2017. *Language at the Speed of Sight: How We Read, Why So Many Can't, and What Can Be Done About It.* New York, NY: Basic Books.

Setren, Elizabeth. 2021. "Targeted vs. General Education Investments: Evidence from Special Education and English Language Learners in Boston Charter Schools." *Journal of Human Resources* 56(4): 1073–1112.

Shaywitz, Sally, and Jonathan Shaywitz. 2020. *Overcoming Dyslexia.* Second edition. New York, NY: Vintage Books. Penguin Random House.

Siegel, Linda S. 1989. "IQ Is Irrelevant to the Definition of Learning Disabilities." *Journal of Learning Disabilities* 22(8): 469–478.

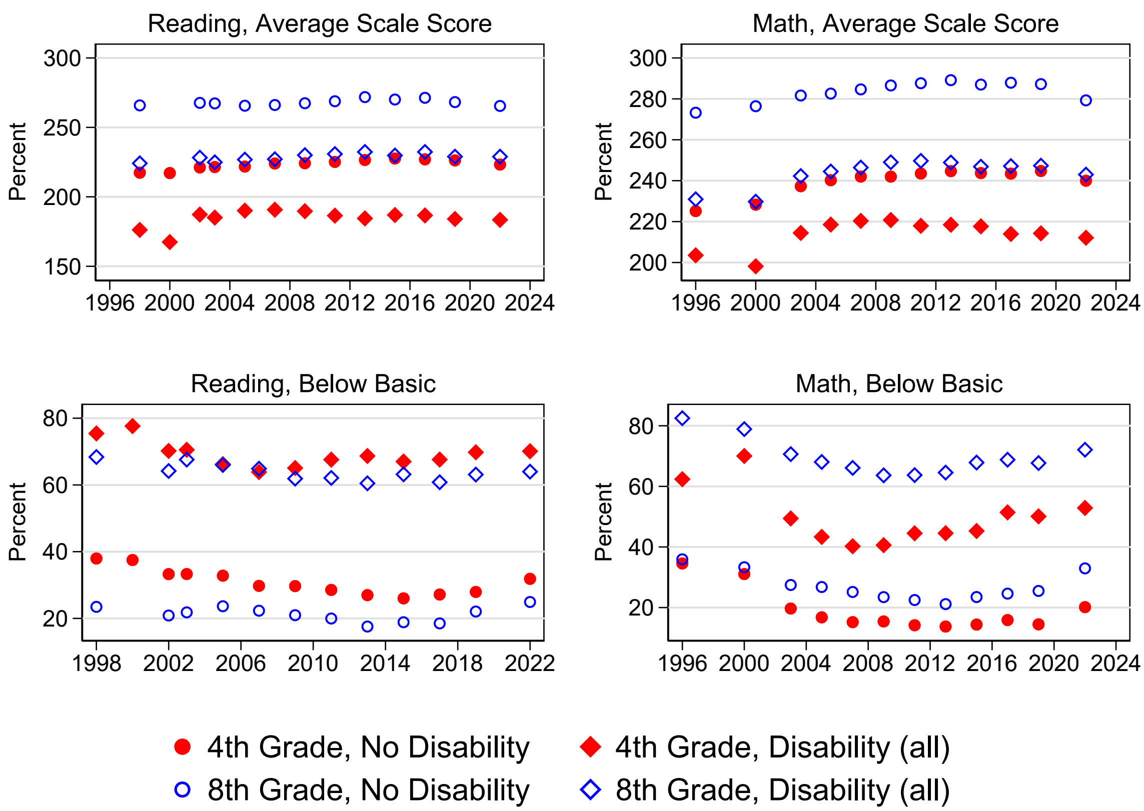
Tridas, Eric Q., Yaacov Petscher, Christopher Stanley, Joseph Sanfilippo, and Nadine Gaab. 2022. "Pediatric Early Analysis of Risk for Literacy Problems: Draft (PEARL-D)."

Willcutt, Erik G., Lauren M. McGrath, Burce Pennington, Janice M. Keenan, John C. DeFries, Richard K. Olson, and Sally J. Wadsworth. 2019. "Understanding Comorbidity Between Specific Learning Disabilities." *New Directions for Child and Adolescent Development* 2019: 91–109.

Wood, Jesse w., Ijun Lai, Neil R. Filosa, Scott A. Imberman, Nathan D. Jones, and Katharine O. Strunk. 2022. "Are Effective Teachers for Students with Disabilities Effective Teachers for All?" Working Paper 30212. National Bureau of Economic Research.

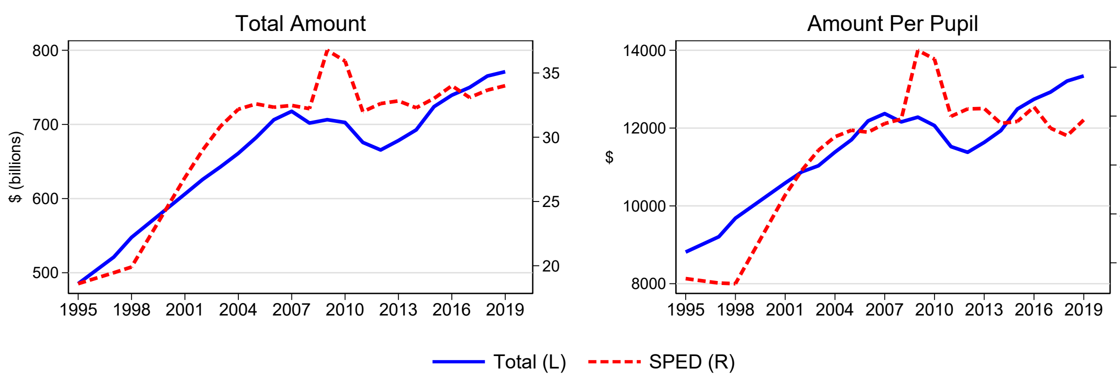
Zirkel, Perry A. 2020. "Through a Glass Darkly: Eligibility under the IDEA—The Blurry Boundary of the Special Education Need Prong." *Journal of Law and Education* 49(2): 149–169.

Figure 1. NAEP Test Scores by Disability Status



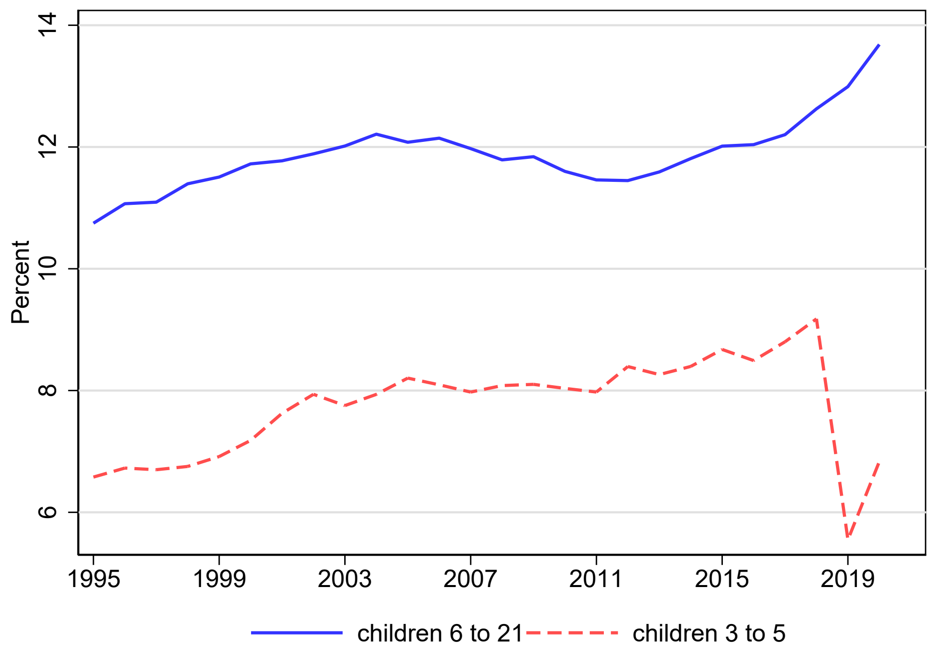
Notes: In the top panels, the red (blue) circles (diamonds) plot the average scale score of students without (with) a disability in reading/math for fourth (eighth) graders. The scale for all tests is 0 to 500, but scores are not comparable across disciplines or grades. The bottom panels of the figure plot corresponding percentages of students marked as below basic in the various assessments by grade and disability status. Test score data come from National Assessment of Educational Progress (NAEP). The data are updated through 2022.

Figure 2. Public Elementary–Secondary Education Finance Data



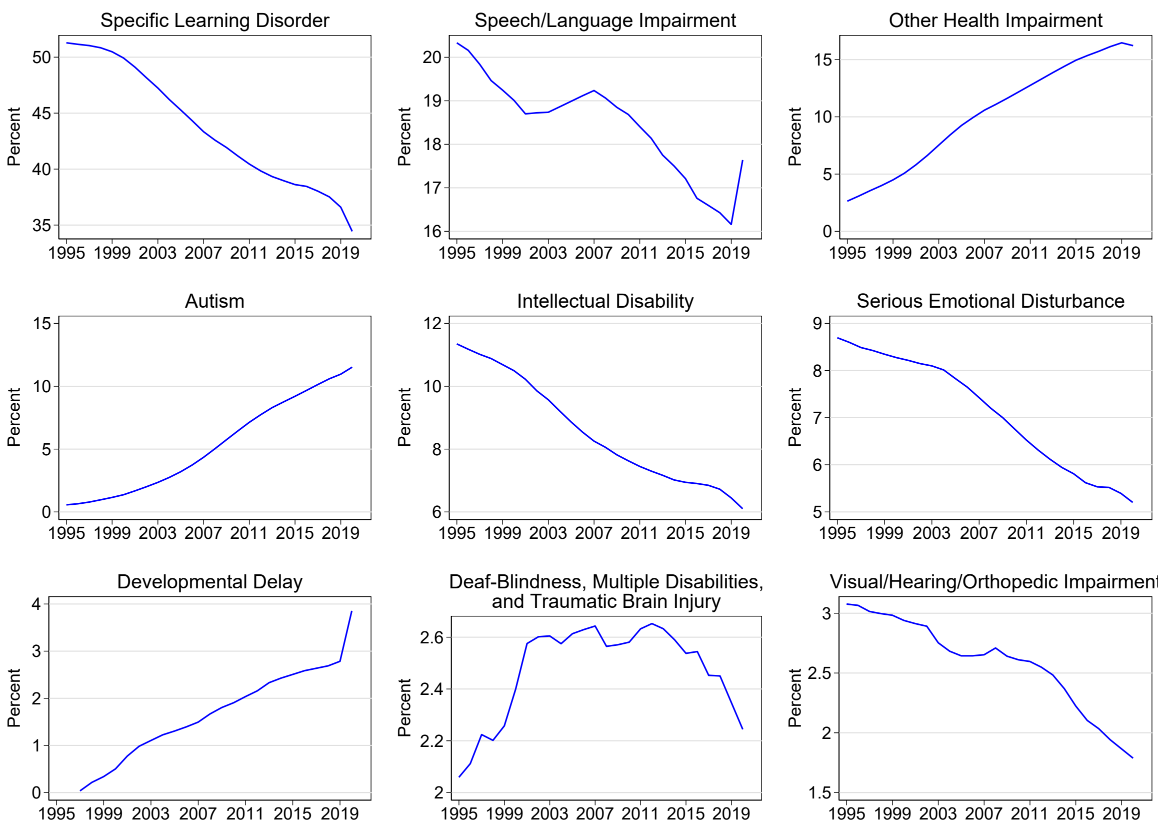
Notes: In the left panel, the blue solid line plots total revenue (federal + state + local) going to public elementary and secondary education programs (in billions of dollars); the red dashed line plots special education revenue (federal + state) for public elementary to secondary education programs (in millions of dollars). In the right panel, the series are normalized by the number of enrolled students (aged 3 to 21), total for total revenue and students with disabilities for special education revenue. Revenue data come from the Census Annual Survey of School System Finances (Table 1, column C for total; Tables 3 and 4, column F for SPED). Counts of children with disabilities come from the Department of Education's "Annual Reports to Congress on the Implementation of IDEA." School enrollment data come from the Census Bureau. Amounts are adjusted for inflation and in 2019 dollars. The data are updated through the 2019–20 fiscal year. The X-axis lists the first year in each fiscal year.

Figure 3. Percentage of Children Identified as Having a Disability



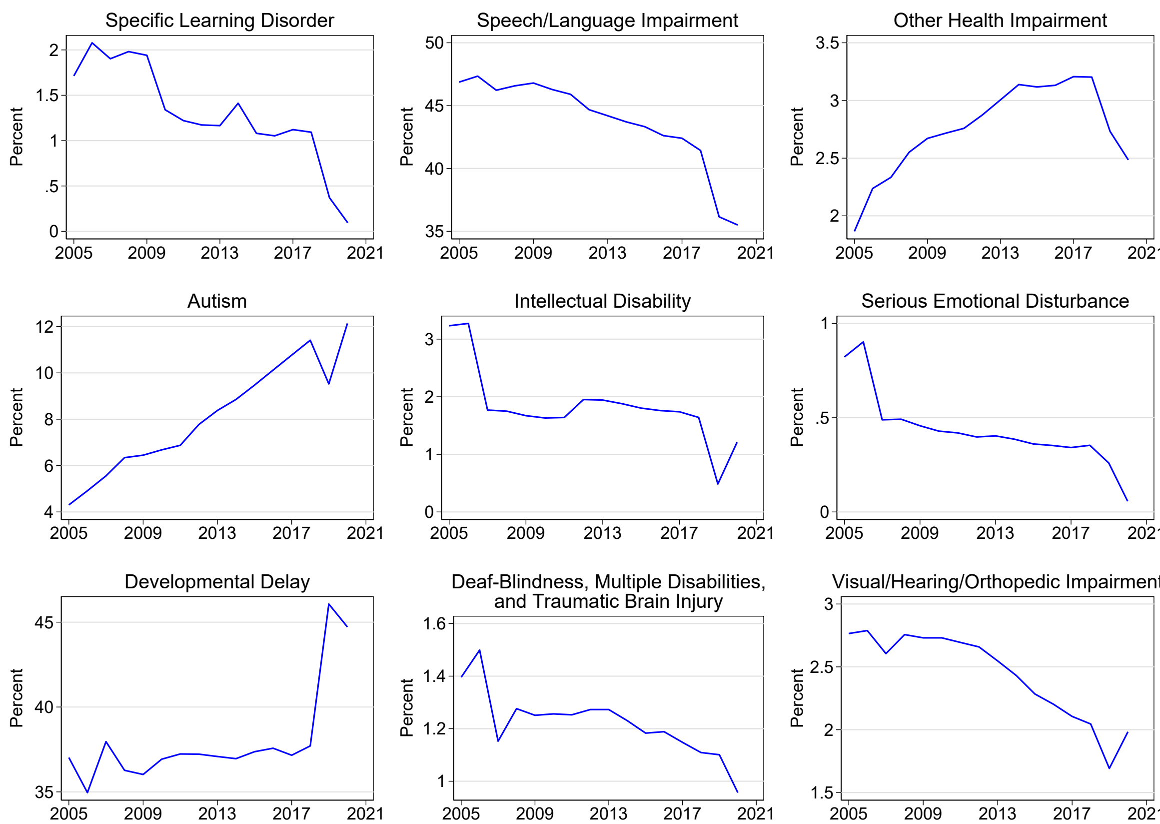
Notes: The blue solid line plots the percentage of students aged 6 to 21 reported to have a disability as a share of total school enrollment. The red dashed line plots the percentage of children aged 3 to 5 with a disability. The children with disabilities counts come from the Department of Education's "Annual Reports to Congress on the Implementation of IDEA." School enrollment data (public + private schools) come from the Census Bureau. The data are updated through the 2020–2021 school year. The X-axis lists the first year in each school year.

Figure 4. Disability Types as a Percentage of All Disabilities, Ages 6 to 21



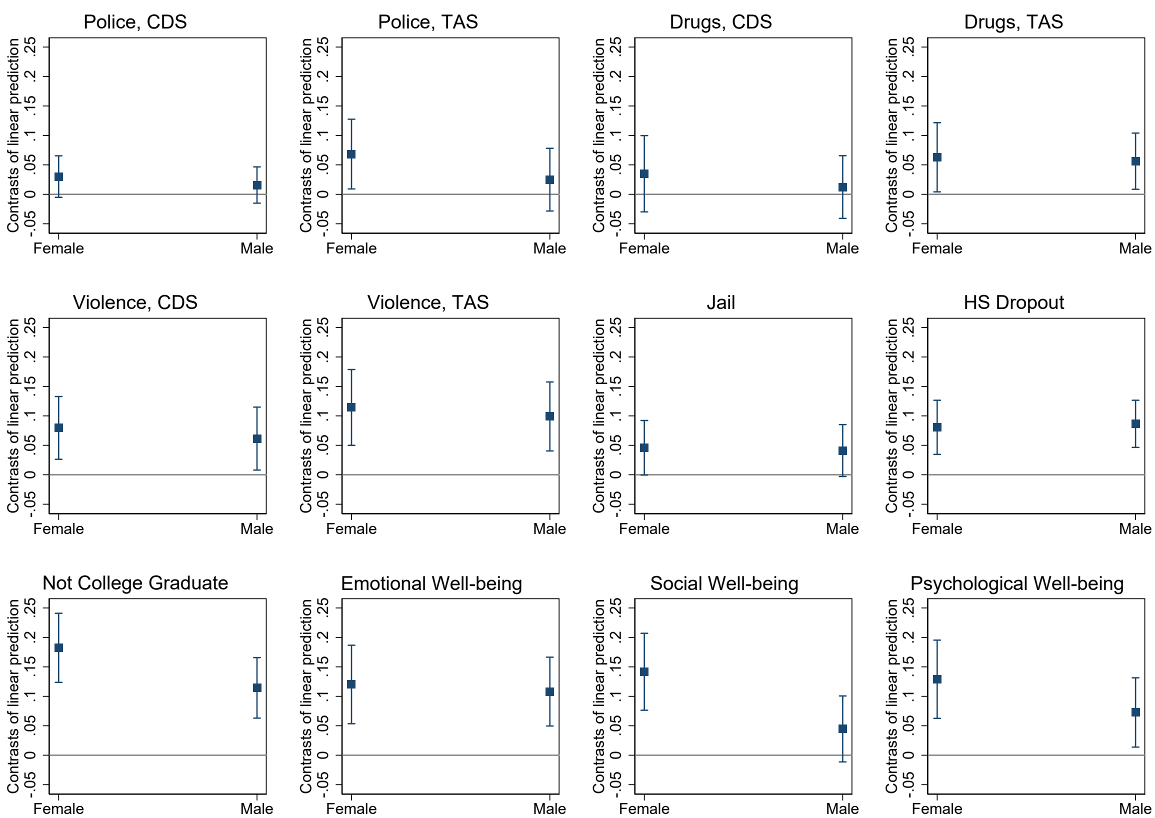
Notes: Each panel plots the percentage of children (aged 6 to 21) with the disability specified in the title as a share of all children with a disability in that age group. The counts of children with disabilities come from the Department of Education's "Annual Reports to Congress on the Implementation of IDEA." The data are updated through the 2020–21 school year. The X-axis lists the first year in each school year.

Figure 5. Disability Types as a Percentage of All Disabilities, Ages 3 to 5



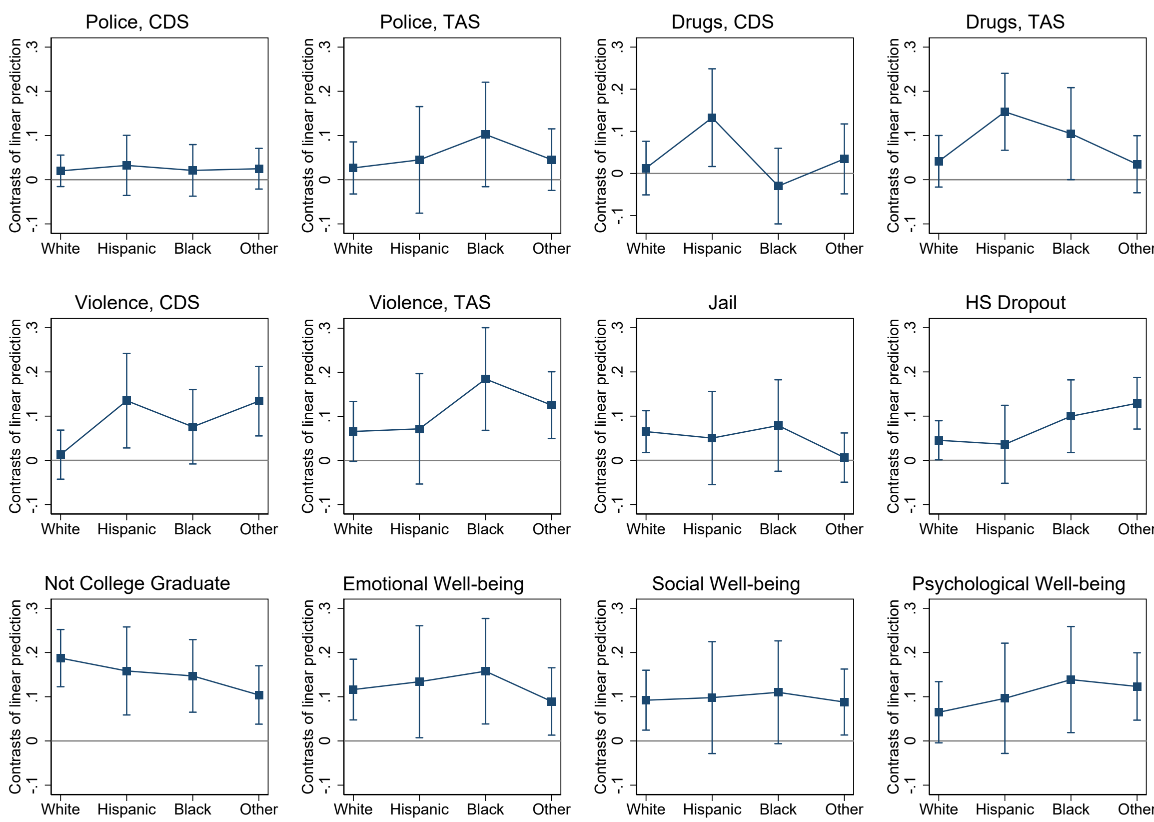
Notes: Each panel plots the percentage of children (aged 3 to 5) with the disability specified in the title as a share of all children with a disability in that age group. The counts of children with disabilities come from the Department of Education's "Annual Reports to Congress on the Implementation of IDEA." The data are updated through the 2020–21 school year. The X-axis lists the first year in each school year.

Figure 6. Effects of Learning Disabilities on CDS and TAS Outcomes by Child's Gender



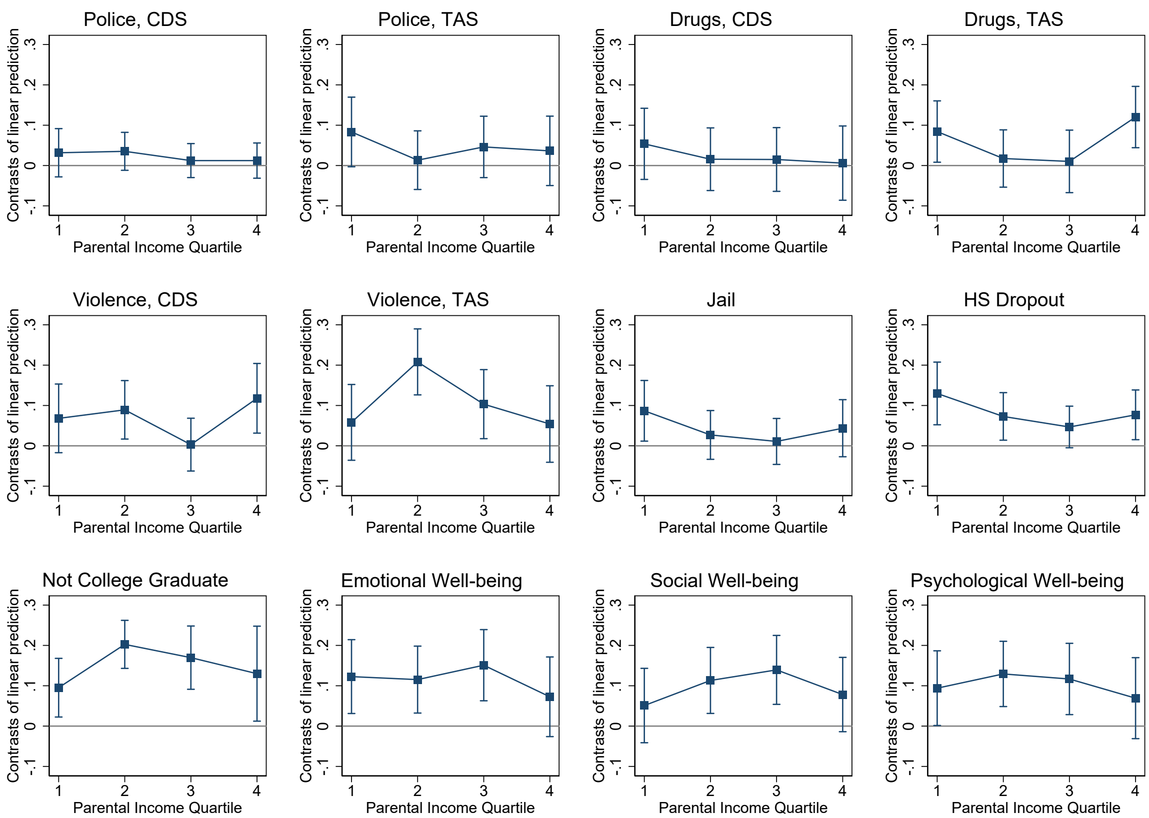
Notes: Authors' calculations using PSID data. Differences in predicted outcomes between individuals with and individuals without learning disabilities.

Figure 7. Effects of Learning Disabilities on CDS and TAS Outcomes by Child's Race



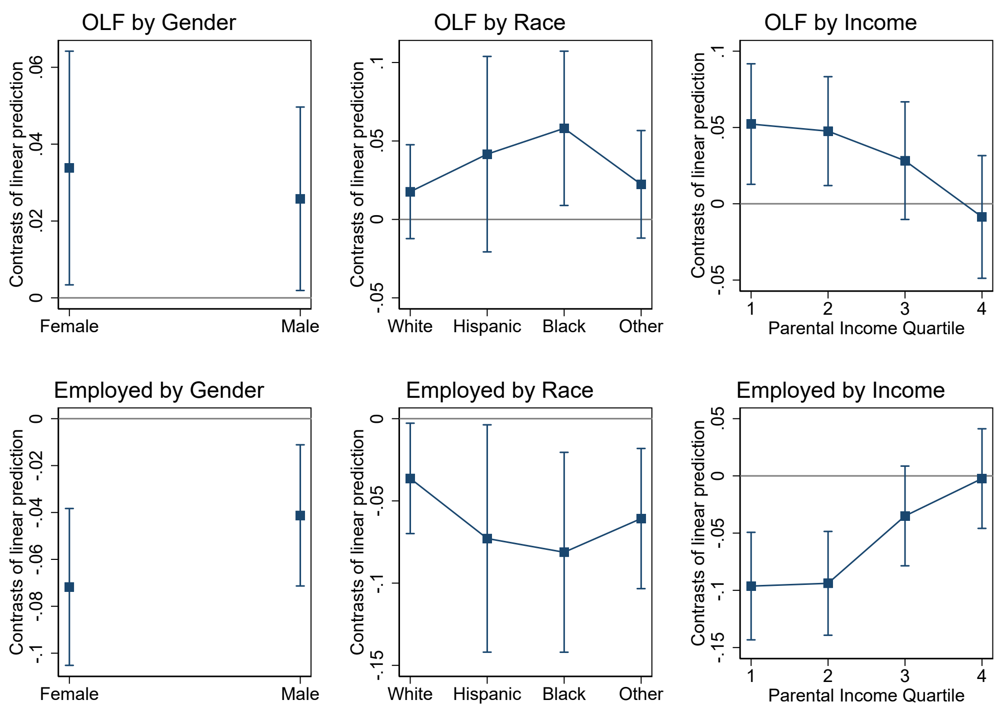
Notes: Authors' calculations using PSID data. Differences in predicted outcomes between individuals with and individuals without learning disabilities.

Figure 8. Effects of Learning Disabilities on CDS and TAS Outcomes by Parental Income Quartile



Notes: Authors' calculations using PSID data. Differences in predicted outcomes between individuals with and individuals without learning disabilities.

Figure 9. Effects of Learning Disabilities on Labor Market Outcomes by Selected Attributes



Notes: Authors' calculations using PSID data. Differences in predicted outcomes between individuals with and individuals without learning disabilities.

Table 1. Summary Statistics. PSID Children, Unweighted

	Mean	SD	Min	Max	N
Trouble with Police, CDS	0.05	0.23	0	1	4,736
Trouble with Police, TAS	0.26	0.44	0	1	4,671
Drug Use, CDS	0.32	0.47	0	1	4,499
Drug Use, TAS	0.71	0.45	0	1	4,676
Violence, CDS	0.19	0.39	0	1	4,744
Violence, TAS	0.33	0.47	0	1	4,630
HS Dropout	0.10	0.30	0	1	4,580
Not College Graduate by 25	0.67	0.47	0	1	2,751
Ever Lowest Emotional Well-being Quartile	0.34	0.47	0	1	4,699
Ever Lowest Social Well-being Quartile	0.31	0.46	0	1	4,690
Ever Lowest Psychological Well-being Quartile	0.33	0.47	0	1	4,699
Ever in Jail	0.11	0.31	0	1	4,702
Male	0.50	0.50	0	1	5,236
Hispanic	0.13	0.33	0	1	5,236
Black, non-Hispanic	0.44	0.50	0	1	5,236
Other race, non-Hispanic	0.20	0.40	0	1	5,236
White, non-Hispanic	0.45	0.50	0	1	5,236
Parent with College Degree	0.35	0.48	0	1	5,236
Learning Disorder	0.13	0.34	0	1	5,236
Parental Learning Disorder	0.08	0.28	0	1	5,064
ADHD/ADD	0.13	0.33	0	1	5,236
Letter-Word Score	103.30	17.84	14	197	5,236
Total Digit Span Score	13.44	4.19	0	29	3,180
Applied Problems Score	102.13	17.89	1	171	5,236
Discrepancy (> 1.5 SD)	0.07	0.25	0	1	4,948
Child Age 10 after 2004	0.48	0.50	0	1	5,236
CDS 2014 Test Data	0.25	0.43	0	1	5,236
CDS 2019 Test Data	0.22	0.42	0	1	5,236
Birth Year	1996	9	1983	2013	5,236
Avg. Parental Income/10,000, $2019	8	7	0	106	5,236
Avg. Parental Wealth/10,000, $2019	17	60	–27	3,079	5,230

Source: Authors' calculations based on PSID data.

Table 2. Learning Disability Diagnosis in the PSID Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Digit/Math vs. Letter-Word				Math vs. Letter-Word			
Std. Letter-Word Score	–0.034***	–0.034***	–0.037***	–0.037***	–0.033***	–0.033***	–0.034***	–0.033***
	(–5.70)	(–5.71)	(–6.12)	(–6.14)	(–5.73)	(–5.70)	(–5.63)	(–5.50)
Std. Math Score	–0.032***	–0.032***	–0.030***	–0.031***	–0.032***	–0.033***	–0.032***	–0.033***
	(–5.07)	(–5.19)	(–4.69)	(–4.87)	(–5.20)	(–5.35)	(–5.11)	(–5.26)
Letter-Word below 25pct	0.111***	0.108***	0.107***	0.104***	0.116***	0.115***	0.115***	0.115***
	(6.29)	(6.09)	(6.06)	(5.84)	(6.63)	(6.57)	(6.60)	(6.57)
Math below 25pct	0.066***	0.067***	0.067***	0.068***	0.064***	0.064***	0.064***	0.063***
	(3.95)	(4.00)	(3.99)	(4.05)	(3.78)	(3.79)	(3.78)	(3.76)
Discrepancy	0.039***	0.058***	0.007	0.011	0.050***	0.069***	0.047***	0.078***
	(2.98)	(3.28)	(0.45)	(0.54)	(3.53)	(3.47)	(2.74)	(3.02)
Discrepancy > 2 SD			0.084***	0.119***			0.055**	0.056*
			(4.17)	(4.50)			(2.48)	(1.94)
Age 10 after 2004 × Discr.		–0.044*		–0.009		–0.041		–0.065**
		(–1.82)		(–0.30)		(–1.56)		(–1.96)
Age 10 after 2004 × Discr. > 2 SD				–0.085**				–0.004
				(–2.33)				(–0.09)
Parent Diagnosed with LD	0.143***	0.143***	0.144***	0.143***	0.143***	0.144***	0.143***	0.144***
	(6.68)	(6.68)	(6.68)	(6.68)	(6.68)	(6.69)	(6.68)	(6.70)
Log of Parental Income	0.018**	0.018**	0.018**	0.018**	0.017**	0.017**	0.017**	0.017**
	(2.43)	(2.45)	(2.48)	(2.52)	(2.39)	(2.39)	(2.39)	(2.38)
Male	0.061***	0.061***	0.060***	0.060***	0.061***	0.061***	0.060***	0.061***
	(6.88)	(6.92)	(6.75)	(6.76)	(6.87)	(6.90)	(6.86)	(6.88)
Black, non-Hispanic	–0.085***	–0.085***	–0.084***	–0.084***	–0.085***	–0.085***	–0.085***	–0.084***
	(–6.40)	(–6.37)	(–6.29)	(–6.26)	(–6.39)	(–6.36)	(–6.39)	(–6.34)
Hispanic	–0.039**	–0.039**	–0.039**	–0.038**	–0.039**	–0.039**	–0.039**	–0.038**
	(–2.36)	(–2.35)	(–2.35)	(–2.32)	(–2.35)	(–2.33)	(–2.35)	(–2.32)
Other race, non-Hispanic	0.022	0.021	0.023*	0.023	0.021	0.021	0.021	0.021
	(1.57)	(1.54)	(1.66)	(1.64)	(1.54)	(1.50)	(1.54)	(1.52)
Public School	0.023*	0.024*	0.025**	0.025**	0.023*	0.023*	0.023*	0.023*
	(1.93)	(1.95)	(2.02)	(2.03)	(1.90)	(1.91)	(1.91)	(1.90)
LD Mean	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Min Birth Year	1983	1983	1983	1983	1983	1983	1983	1983
Max Birth Year	2013	2013	2013	2013	2013	2013	2013	2013
R^2	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Observations	5236	5236	5236	5236	5236	5236	5236	5236

Notes: Linear probability models based on PSID data. All specifications include state and birth-year fixed effects. Discrepancy refers to a difference of 1.5 standard deviations or more in the two tests being compared. In columns (3) and (4) and (7) and (8), this discrepancy is split into two segments: 1.5 to 2 and more than 2. In columns (1) through (4), the discrepancy is based on Letter-Word versus Digit Span (applied math) scores for the original (other) CDS respondents. In columns (5) through (8), the discrepancy is consistently based on Letter-Word and applied math comparisons for all respondents. When multiple tests are available for a given child, we use the scores when the child was closest to age 10. Public school attendance is measured at the same age as the testing time. The log of income is the log of average total family income for every available year when the child is between the ages of 0 and 18. Robust standard errors.

Table 3. Percentage of Children with a Disability, IDEA and PSID

	White	Black	Native	Asian	Hispanic	Male	Female	All
IDEA, All Disabilities	0.08	0.14	0.10	0.06	0.10	0.14	0.08	0.11
IDEA, Specific Learning Disorder	0.03	0.06	0.05	0.02	0.05	0.04	0.03	0.04
PSID Learning Disorder (Unweighted)	0.15	0.12	0.16	0.16	0.13	0.17	0.10	0.13
PSID Learning Disorder (Weighted)	0.15	0.14	0.20	0.15	0.13	0.18	0.11	0.14

Notes: IDEA data span the 2005–06 to the 2019–20 school years. Data are not split by gender until the 2012–13 school year. IDEA percentages are calculated using the corresponding group population of children aged 6 to 18 from the US Census.

Table 4. Learning Disabilities and Childhood and Young Adulthood Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Police		Drugs		Violence		Prison	Education		Well-being		
	CDS	TAS	CDS	TAS	CDS	TAS	TAS	HS Dropout	No College	Emotional	Social	Psychological
Learning Disorder	0.022*	0.037*	0.013	0.049***	0.046**	0.092***	0.043**	0.078***	0.129***	0.112***	0.074***	0.084***
	(1.79)	(1.83)	(0.60)	(2.63)	(2.35)	(4.15)	(2.57)	(5.04)	(6.50)	(5.03)	(3.38)	(3.74)
ADHD/ADD	0.032**	0.067***	0.035	0.051**	0.017	0.068***	0.041**	0.014	0.056**	0.070***	0.054**	0.063**
	(2.50)	(2.94)	(1.62)	(2.48)	(0.87)	(2.75)	(2.17)	(0.84)	(2.41)	(2.81)	(2.23)	(2.55)
Male	0.015**	0.169***	–0.029**	0.075***	0.076***	0.172***	0.091***	0.031***	0.082***	0.029**	–0.015	0.037***
	(2.34)	(14.00)	(–2.22)	(5.75)	(6.72)	(12.76)	(10.17)	(3.70)	(5.27)	(2.10)	(–1.12)	(2.71)
Hispanic	–0.002	0.050**	0.028	0.026	0.020	0.081***	0.037**	–0.014	0.016	0.089***	0.079***	0.088***
	(–0.19)	(2.13)	(1.16)	(1.07)	(0.94)	(3.14)	(2.02)	(–0.88)	(0.54)	(3.28)	(3.02)	(3.23)
Black, non-Hispanic	0.016	0.084***	0.002	0.002	0.033*	0.084***	0.041***	–0.011	0.069***	0.068***	0.081***	0.017
	(1.57)	(5.39)	(0.12)	(0.15)	(1.92)	(5.02)	(3.47)	(–0.94)	(3.58)	(3.93)	(4.82)	(1.02)
Other race, non-Hispanic	–0.002	0.020	–0.005	0.033**	0.021	0.042**	0.020*	–0.008	0.071***	0.018	0.029*	–0.015
	(–0.21)	(1.32)	(–0.26)	(2.00)	(1.28)	(2.50)	(1.78)	(–0.69)	(3.53)	(1.02)	(1.69)	(–0.84)
Log. Parental Income	–0.015**	–0.044***	0.011	0.043***	–0.018	–0.014	–0.023***	–0.073***	–0.163***	–0.013	–0.055***	0.001
	(–2.27)	(–3.82)	(0.91)	(3.52)	(–1.60)	(–1.09)	(–2.75)	(–8.64)	(–11.25)	(–1.02)	(–4.51)	(0.08)
Log. Parental Wealth	–0.001	–0.004***	–0.002	–0.003**	–0.001	0.000	–0.002**	–0.002**	–0.002	–0.005***	–0.002	–0.002**
	(–1.31)	(–3.24)	(–1.53)	(–2.56)	(–0.64)	(0.20)	(–2.26)	(–2.50)	(–1.50)	(–4.13)	(–1.53)	(–2.04)
Parent with College Degree	–0.017**	–0.048***	–0.091***	0.001	–0.002	–0.022	–0.030***	–0.038***	–0.236***	0.016	–0.034**	0.009
	(–2.33)	(–3.39)	(–5.68)	(0.07)	(–0.13)	(–1.34)	(–2.85)	(–4.32)	(–11.09)	(0.93)	(–2.12)	(0.54)
Outcome Mean	0.05	0.26	0.32	0.71	0.19	0.33	0.11	0.10	0.67	0.34	0.31	0.33
LD Mean	0.14	0.15	0.14	0.15	0.14	0.15	0.15	0.16	0.16	0.15	0.15	0.15
Min Birth Year	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983
Max Birth Year	2008	2002	2008	2002	2008	2001	2002	2000	1994	2002	2002	2002
R^2	0.05	0.17	0.15	0.09	0.06	0.12	0.10	0.13	0.30	0.07	0.11	0.07
Observations	4736	4671	4499	4676	4744	4629	4702	4580	2751	4699	4690	4699

Notes: Linear probability regressions based on PSID data with birth-year and state fixed effects. Robust standard errors.

Table 5. Learning Disabilities and Labor Force Status

	(1)	(2)	(3)	(4)	(5)	(6)
	OLF			Employed		
	All	Men	Women	All	Men	Women
LD	0.026**	0.013	–0.012	–0.054***	–0.011	0.020
	(2.42)	(0.56)	(–0.44)	(–4.49)	(–0.47)	(0.76)
ADHD/ADD	0.009	0.014	0.001	–0.037***	–0.040**	–0.031
	(0.73)	(1.01)	(0.04)	(–2.71)	(–2.42)	(–1.36)
Male	–0.045***			0.005		
	(–7.18)			(0.73)		
Minority	0.002	0.019*	–0.020	–0.042***	–0.069***	–0.006
	(0.24)	(1.84)	(–1.64)	(–4.78)	(–5.28)	(–0.43)
Log. Parental Income	0.026***	0.037***	0.031***	0.039***	0.033**	0.024**
	(4.58)	(3.33)	(2.80)	(6.45)	(2.54)	(2.14)
College Graduate	–0.066***	–0.032***	–0.085***	0.103***	0.092***	0.113***
	(–8.93)	(–3.22)	(–7.51)	(11.64)	(7.10)	(8.86)
In School	0.214***	0.261***	0.179***	–0.119***	–0.146***	–0.102***
	(22.60)	(18.17)	(14.15)	(–12.21)	(–9.86)	(–7.89)
OLF/Employed Previous Survey Year	–0.169***	–0.152***	–0.177***	0.273***	0.281***	0.252***
	(–23.70)	(–15.74)	(–17.39)	(32.05)	(22.25)	(22.03)
LD × Minority		0.028	0.034		–0.039	–0.066*
		(1.09)	(0.93)		(–1.31)	(–1.70)
LD × Bottom Half Parental Income		0.024	0.053		–0.039	–0.131***
		(0.86)	(1.45)		(–1.25)	(–3.39)
LD × College Graduate		–0.064**	–0.030		–0.014	0.035
		(–2.58)	(–0.93)		(–0.44)	(0.88)
Outcome Mean	0.22	0.20	0.24	0.62	0.61	0.62
LD Mean	0.16	0.20	0.12	0.16	0.20	0.12
Min Birth Year	1983	1984	1983	1983	1984	1983
Max Birth Year	2002	2001	2002	2002	2001	2002
R^2	0.21	0.25	0.18	0.21	0.25	0.20
Observations	19439	9389	10049	19439	9389	10049
Number of Individuals	4737	2368	2369	4737	2368	2369

Notes: Linear probability regressions based on PSID data with year, age, and state fixed effects. Standard errors clustered at the individual level. Minority defined as a nonwhite and/or Hispanic. PSID young respondents 16 and older.

Table 6. Occupation Balance Table: Men

	No LD	LD	Diff	S.E.	Obs
Food prep and serving occupations	0.165	0.205	0.040*	(0.021)	2,509
Transportation and material moving occupations	0.158	0.189	0.031	(0.020)	2,509
Office and administrative support occupations	0.151	0.162	0.011	(0.019)	2,509
Sales occupations	0.143	0.148	0.005	(0.019)	2,509
Building and grounds cleaning and maintenance occupations	0.095	0.146	0.051***	(0.018)	2,509
Production occupations	0.103	0.096	–0.007	(0.016)	2,509
Construction trades	0.092	0.135	0.042**	(0.018)	2,509
Personal care and service occupations	0.059	0.071	0.012	(0.013)	2,509
Installation, maintenance, and repair workers	0.046	0.078	0.031**	(0.014)	2,509
Arts, design, entertainment, sports, media occupations	0.044	0.037	–0.007	(0.010)	2,509
Education, training, and library occupations	0.041	0.016	–0.025***	(0.007)	2,509
Protective service occupations	0.035	0.034	–0.001	(0.010)	2,509
Management occupations	0.030	0.037	0.006	(0.010)	2,509
Military-specific occupations	0.029	0.011	–0.018***	(0.006)	2,509
Computer and mathematical occupations	0.020	0.023	0.003	(0.008)	2,509
Architecture and engineering occupations	0.018	0.016	–0.002	(0.007)	2,509
Health-care support occupations	0.014	0.023	0.009	(0.008)	2,509
Farming, fishing, and forestry occupations	0.015	0.014	–0.001	(0.006)	2,509
Financial specialists	0.014	0.016	0.002	(0.007)	2,509
Healthcare practitioners and technical occupations	0.016	0.002	–0.014***	(0.004)	2,509
Life, physical, and social science occupations	0.014	0.007	–0.008	(0.005)	2,509
Business operations specialists	0.013	0.002	–0.010***	(0.003)	2,509
Community and social services occupations	0.010	0.002	–0.008**	(0.003)	2,509
Legal occupations	0.004	0.005	0.000	(0.004)	2,509
Extraction workers	0.001	0.002	0.001	(0.002)	2,509

Notes: Authors' calculation using data for PSID young male respondents with occupation information by learning disability status. Each row corresponds to an indicator variable for whether the respondent has ever held a job in that occupation.

Table 7. Occupation Balance Table: Women

	No LD	LD	Diff	S.E.	Obs
Sales occupations	0.245	0.271	0.026	(0.029)	2,534
Office and administrative support occupations	0.236	0.225	–0.012	(0.028)	2,534
Food prep and serving occupations	0.206	0.256	0.050*	(0.029)	2,534
Personal care and service occupations	0.169	0.217	0.048*	(0.027)	2,534
Education, training, and library occupations	0.080	0.085	0.006	(0.018)	2,534
Architecture and engineering occupations	0.008	0.004	–0.004	(0.004)	2,534
Health-care support occupations	0.071	0.074	0.003	(0.017)	2,534
Production occupations	0.053	0.070	0.017	(0.017)	2,534
Building and grounds cleaning and maintenance occupations	0.040	0.085	0.045**	(0.018)	2,534
Healthcare practitioners and technical occupations	0.038	0.050	0.012	(0.014)	2,534
Transportation and material moving occupations	0.039	0.039	0.000	(0.013)	2,534
Management occupations	0.036	0.031	–0.005	(0.011)	2,534
Arts, design, entertainment, sports, media occupations	0.031	0.070	0.039**	(0.016)	2,534
Community and social services occupations	0.028	0.000	–0.028***	(0.003)	2,534
Protective service occupations	0.018	0.012	–0.006	(0.007)	2,534
Business operations specialists	0.016	0.019	0.004	(0.009)	2,534
Life, physical, and social science occupations	0.015	0.019	0.004	(0.009)	2,534
Financial specialists	0.016	0.004	–0.012***	(0.005)	2,534
Military-specific occupations	0.009	0.004	–0.005	(0.004)	2,534
Computer and mathematical occupations	0.008	0.008	–0.001	(0.006)	2,534
Construction trades	0.006	0.008	0.002	(0.006)	2,534
Legal occupations	0.006	0.004	–0.002	(0.004)	2,534
Installation, maintenance, and repair workers	0.005	0.012	0.007	(0.007)	2,534
Farming, fishing, and forestry occupations	0.004	0.000	–0.004***	(0.001)	2,534
Extraction workers	0.000	0.000	–0.000	(0.000)	2,534

Notes: Authors' calculation using data for PSID young female respondents with occupation information by learning disability status. Each row corresponds to an indicator variable for whether the respondent has ever held a job in that occupation.

Table 8. Parental Labor Market Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	OLF			Employed		
	All	Men	Women	All	Men	Women
Child LD	0.015***	0.003	0.025***	–0.024***	–0.011	–0.030***
	(3.65)	(0.73)	(3.93)	(–4.61)	(–1.54)	(–4.35)
Parent has LD	0.067***	0.052***	0.076***	–0.080***	–0.081***	–0.085***
	(8.15)	(5.44)	(6.16)	(–8.27)	(–5.41)	(–6.36)
Child has ADHD	0.003	0.001	0.002	–0.005	–0.006	–0.004
	(0.61)	(0.21)	(0.25)	(–0.99)	(–0.72)	(–0.54)
Female	0.108***			–0.136***		
	(33.63)			(–35.27)		
Parent is Hispanic	0.006	–0.011**	0.023**	0.010	0.028***	–0.010
	(0.97)	(–2.15)	(2.52)	(1.41)	(3.00)	(–0.95)
Parent is Black, non-Hispanic	–0.019***	0.006	–0.034***	–0.012**	–0.046***	0.005
	(–5.08)	(1.57)	(–5.98)	(–2.54)	(–6.82)	(0.81)
Parent is other race, non-Hispanic	0.012**	0.004	0.019**	–0.012*	–0.009	–0.015
	(2.17)	(0.79)	(2.12)	(–1.73)	(–1.02)	(–1.46)
Parent is Married	0.086***	0.009*	0.137***	0.060***	0.113***	–0.000
	(15.52)	(1.78)	(16.16)	(8.45)	(11.09)	(–0.01)
Parent is High School Dropout	0.043***	0.026***	0.061***	–0.061***	–0.050***	–0.077***
	(5.54)	(3.00)	(5.25)	(–6.58)	(–3.59)	(–6.11)
Parent has Some College	–0.005	0.002	–0.009	0.016***	0.011*	0.018***
	(–1.40)	(0.53)	(–1.45)	(3.23)	(1.69)	(2.61)
Parent is College Graduate	–0.028***	–0.006*	–0.042***	0.040***	0.020***	0.049***
	(–7.27)	(–1.71)	(–6.45)	(8.21)	(3.43)	(6.75)
Log. Total Family Income, Previous Year	–0.018***	–0.016***	–0.020***	0.043***	0.046***	0.043***
	(–10.72)	(–8.25)	(–8.30)	(21.86)	(15.02)	(16.56)
Number of Children	0.007***	0.002	0.010***	–0.015***	–0.011***	–0.017***
	(3.69)	(1.06)	(3.48)	(–6.43)	(–3.16)	(–5.31)
Children < 6	0.028***	0.005***	0.046***	–0.026***	0.001	–0.044***
	(13.64)	(2.69)	(13.75)	(–10.51)	(0.33)	(–12.42)
Child is 14+	–0.003	0.002	0.001	0.009***	0.005	0.003
	(–0.97)	(0.59)	(0.27)	(2.71)	(1.06)	(0.70)
Parent OLF/not employed Previous Survey Year	0.503***	0.575***	0.478***	0.417***	0.311***	0.442***
	(73.32)	(30.13)	(64.26)	(70.88)	(26.06)	(63.66)
Spouse OLF/not employed	–0.036***	–0.007**	–0.030**	–0.013***	0.004	0.006
	(–10.49)	(–2.30)	(–2.54)	(–3.29)	(0.88)	(0.74)
Outcome Mean	0.17	0.05	0.26	0.75	0.88	0.65
LD Mean	0.13	0.13	0.13	0.13	0.13	0.13
Min Birth Year	1925	1925	1944	1925	1925	1944
Max Birth Year	2001	1997	2001	2001	1997	2001
R^2	0.36	0.37	0.31	0.33	0.25	0.31
Observations	148534	62178	86355	148534	62178	86355
Number of Individuals	9522	4329	5193	9522	4329	5193

Notes: Linear probability regressions based on PSID data with year, age, and state fixed effects. Standard errors are clustered at the individual level.

Table 9. Mothers' Labor Market Outcomes. Interactions

	(1)	(2)	(3)	(4)
	OLF		Employed	
Child LD	0.027***	0.010	–0.029***	–0.012
	(3.52)	(1.32)	(–3.50)	(–1.44)
Parent has LD	0.076***	0.072***	–0.085***	–0.081***
	(6.15)	(5.91)	(–6.36)	(–6.13)
Child has ADHD	0.002	0.000	–0.004	–0.003
	(0.25)	(0.07)	(–0.54)	(–0.38)
Child LD × Parent College Graduate	–0.006		–0.005	
	(–0.51)		(–0.39)	
Child LD × Parent Bottom Half of Income Dist.		0.091***		–0.096***
		(7.35)		(–7.59)
Outcome Mean	0.26	0.26	0.26	0.26
LD Mean	0.13	0.13	0.13	0.13
Min Birth Year	1944	1944	1944	1944
Max Birth Year	2001	2001	2001	2001
R^2	0.31	0.31	0.31	0.32
Observations	86355	86355	86355	86355
Number of Individuals	5193	5193	5193	5193

Notes: Linear probability regressions based on PSID data with year, age, and state fixed effects. Standard errors are clustered at the individual level. Additional controls (not displayed) as in Table 8.

A Appendix

Construction of Outcomes

Police. The CDS version of having trouble with the police is an indicator of whether a respondent reports having been arrested at least once in the past six months in any of the CDS waves in which they participate. Note that in the CDS, only children 12 and older are asked these questions (and questions concerning the CDS outcomes we describe below). The TAS version of having trouble with the police indicates whether young adults report ever being arrested (regardless of their age at the time of the arrest).

Drugs. The CDS version of using drugs flags whether a CDS child acknowledges having used one of the following substances: cigarettes, chewing tobacco, marijuana, prescription drugs, inhalants, steroids, hallucinogens, amphetamines, tranquilizers, or e-cigarettes. The TAS version of using drugs flags individuals who acknowledge ever using the same substances listed in the CDS version of this variable and a few more (cocaine, barbiturates, narcotics, and heroin).[39]

Violence. The CDS version of displaying violent tendencies is an indicator of whether a child acknowledges hurting someone badly enough that they needed bandages or a doctor, using a weapon in a fight at school, bringing a weapon to school, and/or damaging school property in the past six months. The TAS version of displaying violent tendencies is a dummy variable equal to one if the individual indicated that they ever damaged public property or got into a physical fight.

Prison. A TAS outcome not available in the CDS is whether the respondent has been incarcerated at any time. The respondent is asked the following question: "Have you ever served time in jail for an offense?"

Educational outcomes. Education attainment data come from either the individual or the

[39] For questions about amphetamines, marijuana, barbiturates, steroids, tranquilizers, and pain relievers/narcotics, we make the value of the TAS drug-use variable equal to one only if the respondent did not indicate that they took the drug on doctor's orders (information that is available from an additional question in the TAS). Thus, those individuals who reported using these drugs under the advisement of a doctor would not receive a value of one.

TAS files. We collect "years of completed education" from the PSID individual files and the "grade level completed" from the TAS across all years that are available for each respondent. We take the maximum level of education attainment for a given individual and construct *high school dropout* and *not a college graduate* dummies that flag whether the respondent did not finish high school by age 19 or did not have a college degree by age 25, respectively.[40] To be considered a high school dropout, the respondent would report having fewer than 12 years of education or not having completed high school. To be considered "not a college graduate," the respondent would report having fewer than 16 years of education or not having graduated from college by age 25. Note that some of our respondents are younger than 19 or 25 at the time of our analysis and are omitted from regressions relating to these particular outcomes.

Well-being. Additionally, we examine outcomes related to self-reported well-being in the TAS. We flag individuals in the lowest quartile of various scales. The *emotional well-being* outcome is a dummy variable equal to one if the respondent was at or below the 25th percentile of a PSID-created emotional well-being scale for at least one of the TAS waves in which they participated. This scale is the average of the responses to three questions concerning, respectively, the respondent's frequency of feeling happiness in the last month, frequency of having interest in life in the last month, and frequency of feeling satisfied in the last month. The scale for these questions ranges from one for "never" to six for "every day." We similarly create a dummy for poor *social well-being*. The PSID social well-being scale averages responses to five questions concerning, respectively, the respondent's frequency of feeling that they have something to contribute to society, frequency of feeling that they belong to the community, frequency of feeling that society is getting better, frequency of feeling that people are basically good, and frequency of feeling that the way society works makes sense. Again, the scale ranges from one for "never" to six for "every day." A *psychological well-being scale*, similarly defined, averages the responses to six questions concerning, respectively, the respondent's frequency of feeling good at managing daily responsibility, frequency of having trusting relationship with others, frequency of feeling challenged to grow, frequency of feeling confident in their own ideas, frequency of feeling liked

[40]We use data from the individual files first and fill in missing data using TAS information when individual data are not available.

for their own personality, and frequency of feeling their life has direction.

Labor market outcomes. We create an *employed* dummy equal to one if a respondent 16 or older reports working at the time of a given interview. Similarly, an *out of the labor force* (OLF) dummy is created for respondents 16 or older who report keeping house or being retired, permanently disabled, a student, or other. Taking advantage of the inter-generational nature of the PSID, we similarly create dummies for the parents of these respondents for all periods after a CDS child is born until the child turns age 23. We use these dummies in our regressions that explore the effect of having a child with an LD on parental labor market outcomes.

Definitions of Control Variables

In many specifications, we use controls that measure characteristics of the parents of these children/young adults, which we obtain mostly from the family files. We also take into account the race and gender of the CDS/TAS respondents, as reported by the respondents' caregivers (CDS) or the respondents themselves (TAS).

Parental income. This control is the log of the average of total family income for every available year when a given child was between the ages of 0 and 18.[41] The data come from the family files, and given the birth years of the children in our sample, the income years range from 1984 to 2019.[42] Income values are adjusted for inflation and shown in 2019 dollars.

Parental wealth. We create parental wealth measures in a way that is similar to how we generate a family income measure. The wealth measure we consider includes the values of the respondent's farm or business, checking and savings accounts, real estate (other than their own homes), stocks, vehicles, annuities/IRAs, other assets, and home equity. This wealth measure is net of the value of debt. Wealth data availability differs from income availability to some extent (it is available for 1984, 1989, 1994, and every other year from 1999 on), and our wealth measure

[41]There are a few negative and zero values of average income. We use the following formula to generate a parental income measure so that we do not have to omit these observations: Income = sign(Avg. Income) × log(1 + abs(Avg. Income)), where Avg. Income is the average of total family income for every available year when a given child was between the ages of 0 and 18.

[42]The family files are annual until 1997 and biennial thereafter.

is also adjusted for inflation.

Parental education. We control for whether children have at least one parent with a college degree. This indicator is based on information from the individual PSID files (from 1997 through 2019). For a given parent, we take the maximum of all available data points. To be considered a college graduate, the parent had to report having 16 or more years of schooling at some point in time.

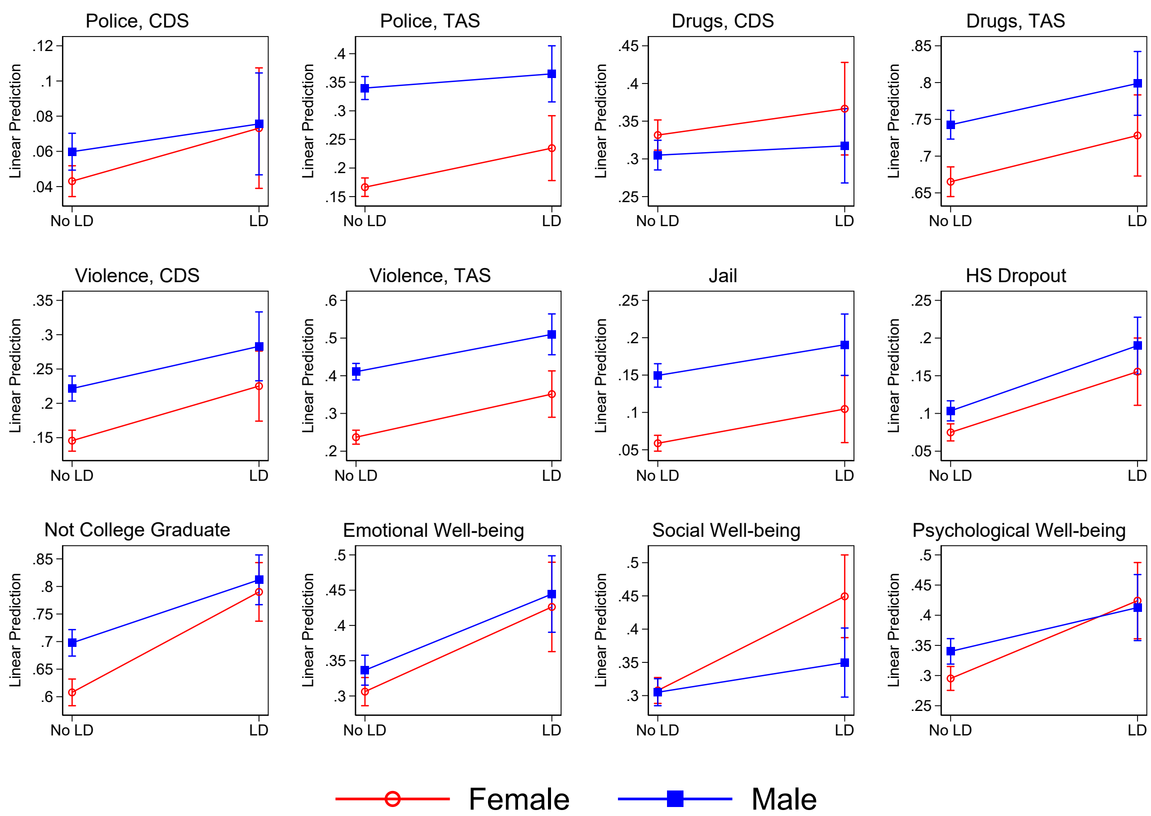
Gender and race. The data for gender come from the individual files. We create a male/female indicator using these data. The race data come from CDS and TAS questions that become more detailed over the years. From these questions, we use any mention of a particular race/ethnicity to generate indicators for white (non-Hispanic), Black (non-Hispanic), Hispanic, and some other race (non-Hispanic) to conform to the more restrictive 1997 questions.The indicator "some other race" includes those who report being American Indian, Alaskan Native, Asian, Native Hawaiian, Pacific Islander, or "other."

Special Education Results

Table A.3 presents results regarding the effect of LDs on childhood and young-adult outcomes that control for having attended special education (SPED) at some point. The correlation between the (negative) outcomes we consider and SPED tends to be positive, but it is significant for only a few outcomes (trouble with the police in the CDS, no college, and emotional and psychological well-being). Interactions of SPED and LDs tend to be negative, but they are mostly not significant. A positive correlation between SPED and negative outcomes is not necessarily surprising, as children who qualify for SPED tend to have more severe LDs and other disabilities. Table A.4 focuses on labor market outcomes. We find that individuals who attended SPED, particularly those diagnosed with an LD, are less likely to participate in the labor market and be employed. These results do not have a causal interpretation and might indicate that individuals with more severe LDs end up in special education classrooms.

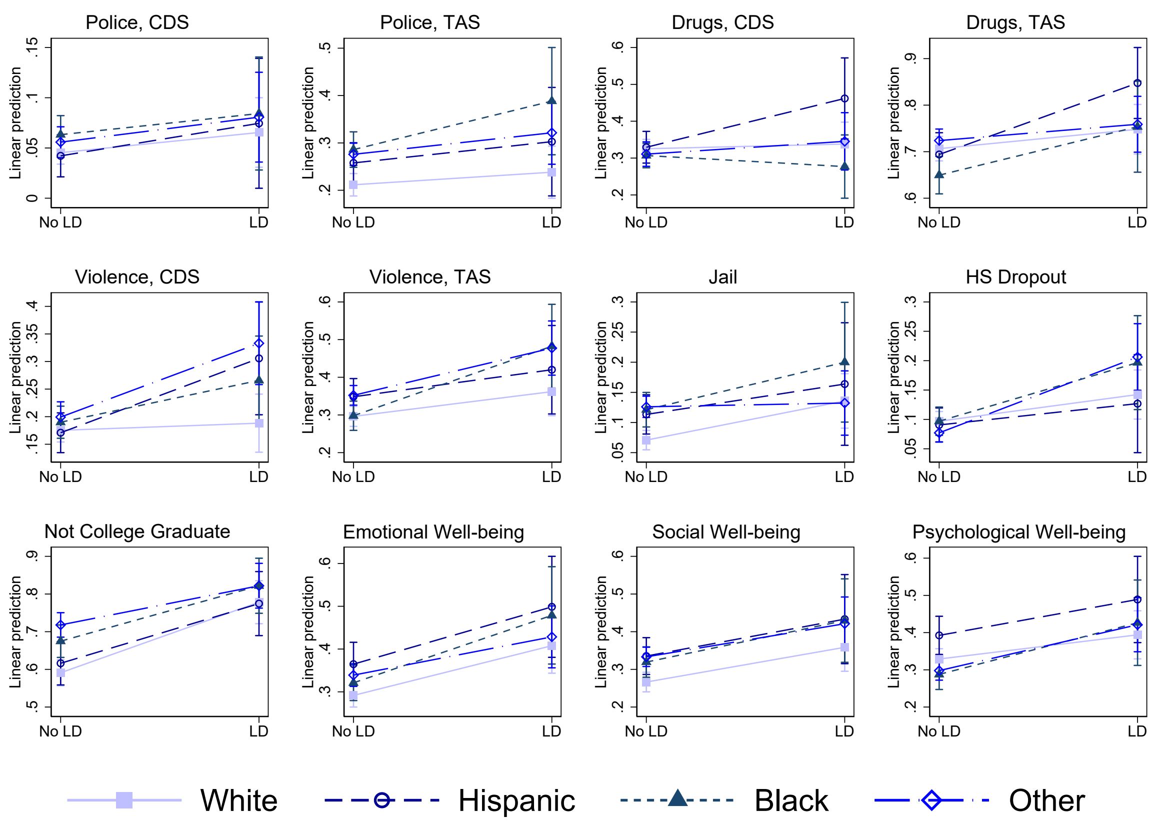
Appendix Figures and Tables

Figure A.1. Marginal Effects of Learning Disabilities on CDS and TAS Outcomes by Child's Gender



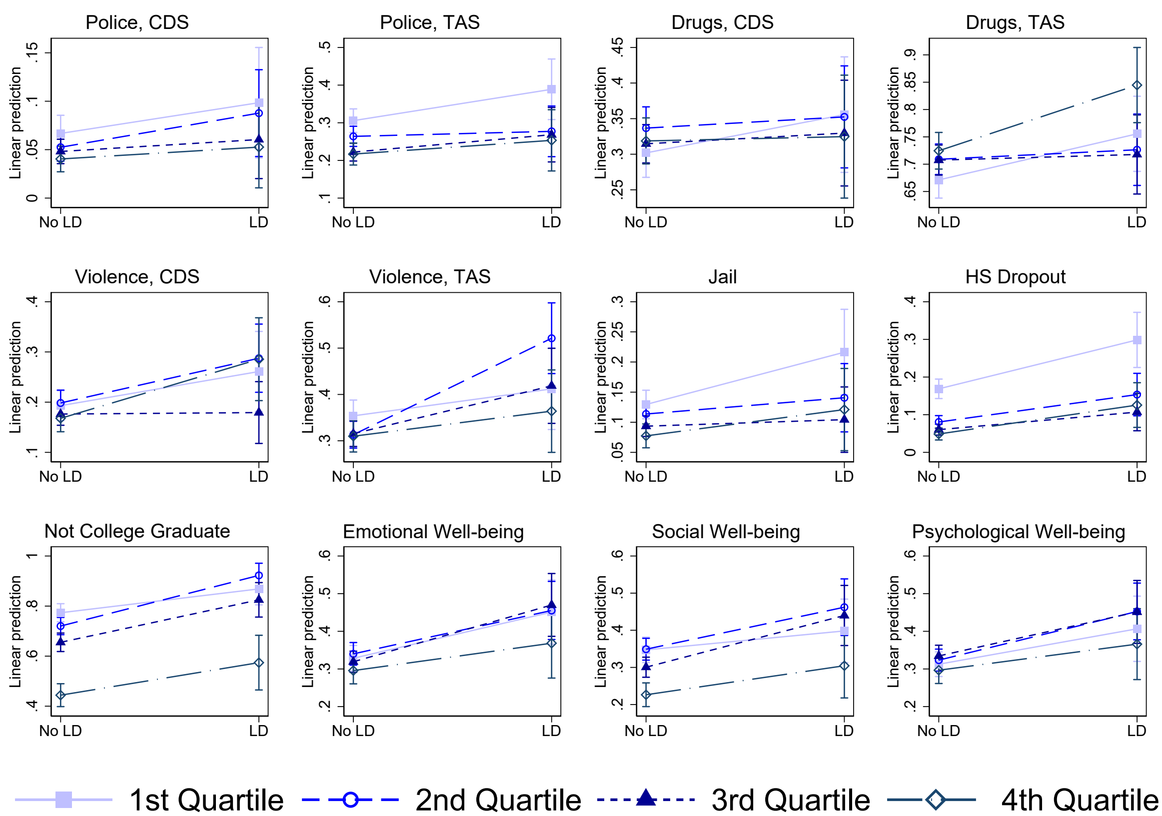
Notes: Authors' calculations using PSID data.

Figure A.2. Marginal Effects of Learning Disabilities on CDS and TAS Outcomes by Child's Race



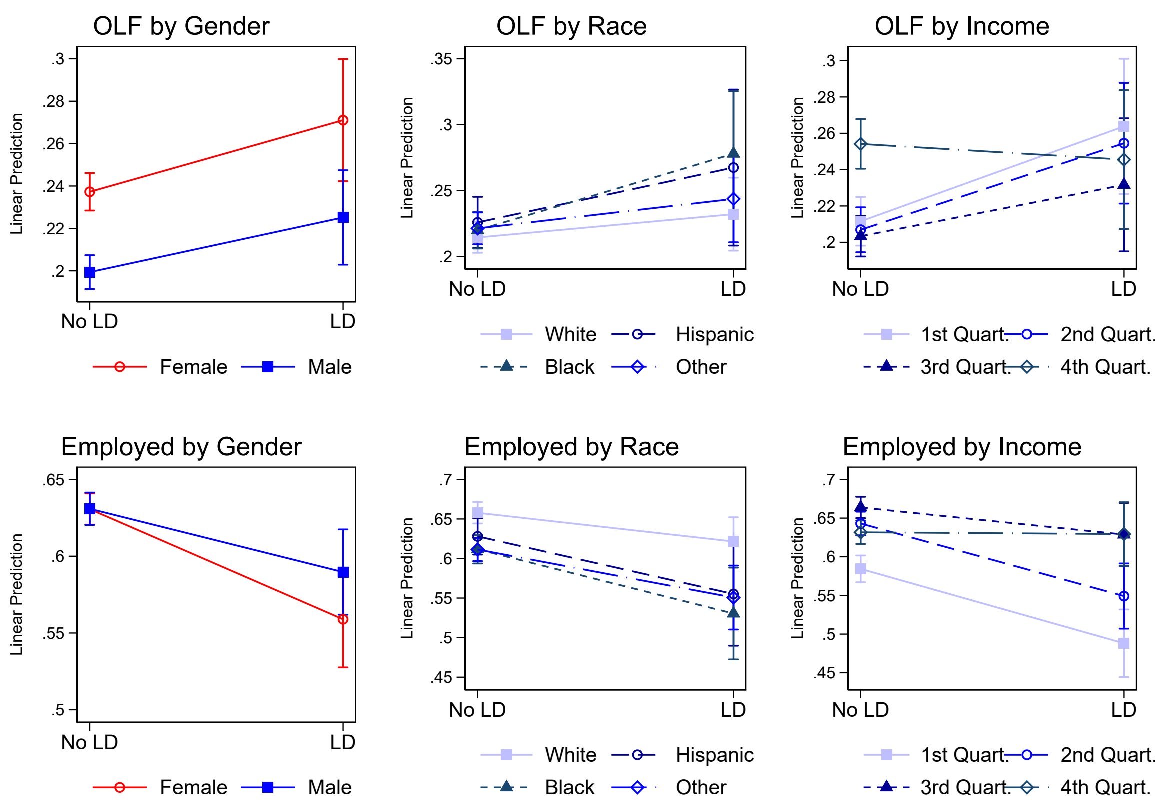
Notes: Authors' calculations using PSID data.

Figure A.3. Marginal Effects of Learning Disabilities on CDS and TAS Outcomes by Parental Income Quartile



Notes: Authors' calculations using PSID data.

Figure A.4. Marginal Effects of Learning Disabilities on Labor Market Outcomes



Notes: Authors' calculations using PSID data.

Table A.1. Summary Statistics. PSID Parents. Unweighted

	Mean	SD	Min	Max	N
Not in labor force	0.17	0.38	0	1	148,536
Parent is employed	0.75	0.43	0	1	148,536
Child LD	0.09	0.29	0	1	148,536
Child has ADHD	0.08	0.26	0	1	148,536
Parent has LD	0.06	0.24	0	1	148,536
Female	0.58	0.49	0	1	148,536
Parent is Hispanic	0.11	0.31	0	1	148,536
Parent is Black, non-Hispanic	0.36	0.48	0	1	148,536
Parent is other race, non-Hispanic	0.08	0.27	0	1	148,536
Age of parent	36.96	8.76	16	81	148,536
Parent is married	0.70	0.46	0	1	148,536
Parent is high school dropout	0.08	0.27	0	1	148,536
Parent has some college	0.30	0.46	0	1	148,536
College graduate	0.32	0.46	0	1	148,536
Number of children	2.32	1.10	1	8	148,536
Number children < 6	0.73	0.85	0	6	148,536
Child 6+	0.62	0.49	0	1	148,536
Child is 14+	0.25	0.43	0	1	148,536
Total Family Income, previous year, divided by 10,000	9	11	0	744	148,536

Source: Authors' calculations based on PSID data.

Table A.2. Learning Disabilities and Childhood and Young Adulthood Outcomes. Respondents Who Have Been through the CDS and the TAS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Police		Drugs		Violence		Prison	Education		Well-being		
	CDS	TAS	CDS	TAS	CDS	TAS	TAS	HS Dropout	No College	Emotional	Social	Psychological
Learning Disorder	0.035**	0.039	0.040	0.045*	0.093***	0.060**	0.039*	0.052***	0.114***	0.112***	0.058*	0.070**
	(2.00)	(1.41)	(1.39)	(1.78)	(3.29)	(2.05)	(1.76)	(2.81)	(4.56)	(3.72)	(1.95)	(2.30)
ADHD/ADD	0.043**	0.065**	0.013	0.047*	–0.017	0.037	0.049**	0.001	0.081***	0.069**	0.060*	0.051
	(2.23)	(2.24)	(0.42)	(1.76)	(–0.57)	(1.15)	(2.06)	(0.07)	(2.93)	(2.15)	(1.88)	(1.57)
Male	0.021**	0.175***	–0.007	0.084***	0.111***	0.212***	0.107***	0.016	0.082***	0.063***	–0.013	0.046**
	(2.39)	(10.22)	(–0.39)	(4.76)	(6.65)	(11.16)	(8.32)	(1.61)	(4.22)	(3.25)	(–0.70)	(2.37)
Hispanic	0.002	0.105***	0.049	0.067**	0.017	0.053	0.068***	0.001	0.017	0.046	0.088**	0.066*
	(0.13)	(3.32)	(1.39)	(2.23)	(0.55)	(1.55)	(2.70)	(0.04)	(0.47)	(1.28)	(2.48)	(1.79)
Black, non-Hispanic	0.013	0.136***	0.036	–0.011	0.032	0.085***	0.069***	–0.002	0.128***	0.039	0.085***	–0.086***
	(0.93)	(4.98)	(1.21)	(–0.39)	(1.21)	(2.86)	(3.44)	(–0.15)	(4.34)	(1.30)	(2.84)	(–2.81)
Other Race, non-Hispanic	0.005	0.013	–0.019	0.059**	0.028	0.046*	0.014	0.006	0.023	0.033	0.047*	0.050*
	(0.33)	(0.50)	(–0.70)	(2.30)	(1.17)	(1.66)	(0.73)	(0.40)	(0.85)	(1.18)	(1.70)	(1.78)
Log. Parental Income	–0.022**	–0.054***	–0.002	0.027	–0.042**	–0.017	–0.026**	–0.070***	–0.161***	–0.035*	–0.066***	–0.020
	(–2.33)	(–3.27)	(–0.09)	(1.59)	(–2.54)	(–0.91)	(–2.09)	(–6.34)	(–8.51)	(–1.83)	(–3.50)	(–1.02)
Log. Parental Wealth	–0.002*	–0.004**	–0.003	–0.002	–0.000	–0.000	–0.002	–0.003**	–0.003	–0.005**	–0.001	–0.002
	(–1.86)	(–2.41)	(–1.44)	(–1.27)	(–0.23)	(–0.21)	(–1.28)	(–2.21)	(–1.55)	(–2.48)	(–0.47)	(–1.27)
Parent with College Degree	–0.024**	–0.036*	–0.091***	–0.004	0.016	–0.036	–0.029*	–0.023**	–0.234***	0.025	–0.042*	0.005
	(–2.57)	(–1.81)	(–3.97)	(–0.19)	(0.82)	(–1.63)	(–1.92)	(–2.28)	(–9.02)	(1.09)	(–1.86)	(0.20)
Outcome Mean	0.05	0.28	0.42	0.74	0.22	0.38	0.12	0.07	0.64	0.38	0.37	0.39
LD Mean	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Min Birth Year	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983
Max Birth Year	2000	2000	2000	2000	2000	2000	2000	2000	1994	2000	2000	2000
R^2	0.08	0.17	0.13	0.06	0.07	0.12	0.11	0.13	0.31	0.08	0.11	0.08
Observations	2528	2528	2528	2528	2528	2528	2528	2528	1839	2528	2528	2528

Notes: Linear probability regressions based on PSID data with birth-year and state fixed effects. Robust standard errors.

Table A.3. Learning Disabilities and Childhood and Young Adulthood Outcomes. Controlling for Special Education Attendance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Police		Drugs		Violence		Prison	Education		Well-being		
	CDS	TAS	CDS	TAS	CDS	TAS	TAS	HS Dropout	No College	Emotional	Social	Psychological
Learning Disorder	–0.002	0.051**	0.029	0.068***	0.040	0.085***	0.050***	0.059***	0.115***	0.104***	0.061**	0.083***
	(–0.17)	(2.15)	(1.07)	(3.14)	(1.63)	(3.22)	(2.59)	(3.25)	(4.57)	(3.93)	(2.41)	(3.15)
Ever in SPED	0.068***	–0.022	–0.009	–0.016	0.027	0.048	0.023	0.046	0.113***	0.092**	0.056	0.133***
	(2.87)	(–0.55)	(–0.26)	(–0.40)	(0.91)	(1.12)	(0.70)	(1.54)	(2.86)	(2.01)	(1.21)	(2.91)
Child LD × Ever in SPED	–0.006	–0.020	–0.028	–0.035	–0.012	–0.022	–0.039	0.008	–0.067	–0.056	–0.014	–0.111*
	(–0.20)	(–0.38)	(–0.56)	(–0.70)	(–0.26)	(–0.38)	(–0.91)	(0.21)	(–1.33)	(–0.94)	(–0.24)	(–1.86)
ADHD/ADD	0.026**	0.068***	0.035	0.053**	0.015	0.065***	0.040**	0.011	0.049**	0.065***	0.051**	0.057**
	(2.00)	(3.02)	(1.61)	(2.56)	(0.73)	(2.62)	(2.13)	(0.65)	(2.11)	(2.60)	(2.08)	(2.29)
Male	0.013**	0.170***	–0.029**	0.076***	0.075***	0.171***	0.091***	0.030***	0.079***	0.027*	–0.016	0.034**
	(1.99)	(14.04)	(–2.16)	(5.78)	(6.62)	(12.66)	(10.12)	(3.54)	(5.05)	(1.95)	(–1.23)	(2.50)
Hispanic	–0.001	0.050**	0.028	0.026	0.020	0.081***	0.037**	–0.014	0.016	0.088***	0.079***	0.087***
	(–0.05)	(2.14)	(1.13)	(1.08)	(0.96)	(3.12)	(2.01)	(–0.86)	(0.53)	(3.24)	(3.00)	(3.17)
Black, non-Hispanic	0.017	0.085***	0.002	0.003	0.033*	0.084***	0.041***	–0.012	0.068***	0.067***	0.080***	0.016
	(1.58)	(5.44)	(0.12)	(0.20)	(1.92)	(4.97)	(3.47)	(–1.05)	(3.51)	(3.86)	(4.75)	(0.94)
Other race, non-Hispanic	–0.002	0.020	–0.005	0.033**	0.021	0.042**	0.020*	–0.007	0.071***	0.018	0.029*	–0.014
	(–0.18)	(1.31)	(–0.28)	(1.99)	(1.28)	(2.50)	(1.77)	(–0.61)	(3.54)	(1.03)	(1.71)	(–0.83)
Log of parental income	–0.013**	–0.044***	0.011	0.042***	–0.017	–0.013	–0.023***	–0.072***	–0.161***	–0.012	–0.054***	0.002
	(–2.06)	(–3.89)	(0.86)	(3.43)	(–1.56)	(–1.03)	(–2.76)	(–8.46)	(–11.13)	(–0.93)	(–4.41)	(0.17)
Log of parental wealth	–0.001	–0.004***	–0.002	–0.003***	–0.001	0.000	–0.002**	–0.002**	–0.002	–0.005***	–0.002	–0.002**
	(–1.25)	(–3.26)	(–1.54)	(–2.58)	(–0.63)	(0.21)	(–2.27)	(–2.44)	(–1.52)	(–4.10)	(–1.50)	(–2.01)
Parent with college degree	–0.016**	–0.049***	–0.092***	0.001	–0.001	–0.021	–0.030***	–0.037***	–0.235***	0.016	–0.033**	0.010
	(–2.14)	(–3.42)	(–5.70)	(0.04)	(–0.10)	(–1.31)	(–2.85)	(–4.26)	(–11.05)	(0.98)	(–2.08)	(0.59)
Outcome Mean	0.05	0.26	0.32	0.71	0.19	0.33	0.11	0.10	0.67	0.34	0.31	0.33
LD Mean	0.14	0.15	0.14	0.15	0.14	0.15	0.15	0.16	0.16	0.15	0.15	0.15
Min Birth Year	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983	1983
Max Birth Year	2008	2002	2008	2002	2008	2001	2002	2000	1994	2002	2002	2002
R^2	0.05	0.17	0.15	0.09	0.06	0.12	0.10	0.13	0.30	0.07	0.11	0.07
Observations	4736	4671	4499	4676	4744	4629	4702	4580	2751	4699	4690	4699

Notes: Linear probability regressions based on PSID data with birth-year and state fixed effects. Robust standard errors.

Table A.4. Learning Disabilities and Labor Force Status. Controlling for Special Education Attendance and Test Scores

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLF				Employed			
LD	0.026**	0.011	0.000	0.015	–0.054***	–0.032**	–0.021	–0.037***
	(2.42)	(1.03)	(0.04)	(1.29)	(–4.49)	(–2.49)	(–1.53)	(–2.65)
ADHD/ADD	0.009	0.007	0.007	0.016	–0.037***	–0.033**	–0.034**	–0.042***
	(0.73)	(0.54)	(0.60)	(1.18)	(–2.71)	(–2.44)	(–2.50)	(–2.80)
Male	–0.045***	–0.046***	–0.046***	–0.046***	0.005	0.007	0.006	0.007
	(–7.18)	(–7.38)	(–7.27)	(–6.37)	(0.73)	(0.99)	(0.91)	(0.79)
Minority	0.002	0.002	0.001	–0.003	–0.042***	–0.042***	–0.042***	–0.033***
	(0.24)	(0.21)	(0.15)	(–0.33)	(–4.78)	(–4.75)	(–4.69)	(–3.24)
Log. Parental Income	0.026***	0.027***	0.027***	0.024***	0.039***	0.037***	0.037***	0.032***
	(4.58)	(4.71)	(4.71)	(3.67)	(6.45)	(6.19)	(6.15)	(4.40)
College Graduate	–0.066***	–0.065***	–0.065***	–0.057***	0.103***	0.100***	0.100***	0.085***
	(–8.93)	(–8.74)	(–8.75)	(–6.93)	(11.64)	(11.33)	(11.33)	(8.60)
In School	0.214***	0.215***	0.215***	0.231***	–0.119***	–0.120***	–0.120***	–0.137***
	(22.60)	(22.72)	(22.73)	(21.83)	(–12.21)	(–12.34)	(–12.35)	(–12.28)
OLF/Employed Previous Survey Year	–0.169***	–0.168***	–0.168***	–0.160***	0.273***	0.271***	0.271***	0.261***
	(–23.70)	(–23.74)	(–23.73)	(–20.18)	(32.05)	(31.95)	(31.94)	(27.18)
Ever in SPED		0.039***	0.010			–0.058***	–0.031	
		(2.74)	(0.51)			(–3.69)	(–1.27)	
LD × Ever in SPED			0.049*				–0.048	
			(1.76)				(–1.51)	
Stand. Applied-Math Score				–0.003				0.012**
				(–0.64)				(2.44)
Stand. Letter-Word Score				–0.006				0.011***
				(–1.56)				(2.64)
Outcome Mean	0.22	0.22	0.22	0.21	0.62	0.62	0.62	0.64
LD Mean	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Min Birth Year	1983	1983	1983	1983	1983	1983	1983	1983
Max Birth Year	2002	2002	2002	2001	2002	2002	2002	2001
R^2	0.21	0.21	0.21	0.20	0.21	0.21	0.22	0.21
Observations	19439	19439	19439	15115	19439	19439	19439	15115
Number of Individuals	4737	4737	4737	3161	4737	4737	4737	3161

Notes: Linear probability regressions based on PSID data with year, age, and state fixed effects. Standard errors clustered at the individual level. Minority defined as a nonwhite and/or Hispanic. PSID young respondents 16 and older.