

THREE ESSAYS ON SPECIAL EDUCATION PLACEMENT  
IN EARLY CHILDHOOD AND K-12 EDUCATION

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A Dissertation

presented to

the Faculty of the Graduate School

at the University of Missouri—Columbia

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In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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By

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JULY 2017

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

THREE ESSAYS ON SPECIAL EDUCATION PLACEMENT  
IN EARLY CHILDHOOD AND K-12 EDUCATION

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## ACKNOWLEDGEMENTS

The process of completing a doctorate and writing a dissertation is long and demanding, and it is certainly not done singlehandedly. First, I would like to thank my husband and family for their support and inspiration. My husband Eric has been a tireless source of assistance and encouragement, even during the most grueling parts of writing this dissertation, when I wasn't sure if I could complete it. He has offered invaluable technical help in all stages of producing these essays, and has cheerfully stepped up to meet the challenges of my many absences from home on the weekends when I was in my office working. To my children, Eleanor, Oliver, and especially Connor, you have given me motivation and purpose to tackle research questions that I hope will make a real difference for children in school.

Next, I must thank my advisers and committee members. Colleen Heflin has steered the direction of my work by asking tough but thoughtful questions. She has required me to re-examine my assumptions and look to deeper social processes that affect children's outcomes. Her guidance has improved the quality of my writing immeasurably and moved it beyond producing a stack of tables and figures—my idea of “research” in my early days of graduate school—to developing a well-reasoned and supported argument.

I would like to thank Irma Arteaga for her practical support and training. She has sent me numerous examples of statistical programming code and correct variable names and survey weights to complete the analyses I needed. Perhaps more importantly, she has taught me how to find these items myself through reading articles, user's manuals, and

other technical resources. Her training has been invaluable in my learning of how to use our data, which has truly opened up a new world for me.

I would like to thank Claire Altman for offering vital advice about motivation, time management, and avoiding procrastination. Her leadership has also helped me to learn how to work collaboratively with other researchers. Her insistence on correct documentation and guidance on how to harmonize variables between different data sets are skills that I now rely on frequently.

I would like to thank Rajeev Darolia for sharing his methodological approaches. He never turned down my requests for feedback on my work, and carefully read drafts of my papers and posed important questions. This guidance has helped me to use stronger empirical research methods and justify my methods more authoritatively. His assistance has gone well beyond dissertation and class advising, with his willingness to help me with difficult projects and grant proposals at my job. Furthermore, his advice has been invaluable for me as I have strived to define my career path and find my place.

I would like to thank Cory Koedel for providing me with outstanding instruction in program evaluation, and for advising me in the early stages of this dissertation. He deserves thanks for drawing my attention to the issue of special education in schools. When he suggested that I write a paper on this topic during an advising meeting, I immediately realized that this brings together my interests, background in teaching, and personal experiences. This conversation brought my research goals into clear focus and reignited my drive to study education policy.

I must thank my employer, Westminster College, and in particular, Gary Stocker. He has been remarkably encouraging and has allowed me the flexibility I need in writing

and defending my dissertation this past year. I am friends with a number of PhDs who finished their degrees while working full-time, and I realize how rare and valuable it is to have a supervisor who appreciates the challenges of this endeavor. I also owe a great deal to the parents in the Natural Late Talker-MERLD community, who have shared with me countless stories that reinforce my conviction about the importance of studying special education placement. Finally, I would like to thank three of my graduate school classmates and friends: Ashley Price, Leslie Hodges, and Kate Olson. They were always willing to share their ideas and expertise, which has made us all better scholars together. Their support and commiseration throughout this journey have made our doctoral program bearable during the hard times and great fun during the good times.

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THREE ESSAYS ON SPECIAL EDUCATION PLACEMENT  
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ABSTRACT

Special education law mandates that children with disabilities be offered free appropriate public education. Under federal policy, schools are responsible for identifying children with disabilities that adversely affect their educational performance and providing services to these students to allow them to learn and thrive in school. Each of the following essays examines student placement in special education to describe how placement practices align with the goals of special education. Each uses national data and regression analysis to empirically examine the relationships between observable child characteristics, policy parameters, and special education placement. The second chapter identifies services and settings in early childhood that are associated with special education placement upon entering school. The third chapter examines processes by which children graduate out of receiving special education services. In the fourth chapter, I examine education funding parameters and their association with special education placement rates. These essays highlight the challenges of special education placement decisions.

## **CHAPTER 1: INTRODUCTION**

Former Vice-President Hubert Humphrey has stated that the moral test of government is how the government treats those who are in the dawn of life, the children; those who are in the twilight of life, the elderly; and those who are in the shadows of life, the sick, needy, and handicapped. It was this perspective that led to the creation of the Education for All Handicapped Children Act of 1975. This law mandates that children with disabilities be offered free appropriate public education, and has formed the basis for schooling policies for children with disabilities for more than 40 years. Under federal law, schools are responsible for identifying children with disabilities that adversely affect their educational performance and providing services to these students to allow them to learn and thrive in school.

Each of the following essays examines student placement in special education to describe how placement practices align with the goals of special education. Each uses national data and regression analysis to empirically examine the relationships between observable child characteristics, policy parameters, and special education placement. I define special education placement as a child having an Individualized Education Program, or IEP. In the second and fourth chapters, I examine special education placement decisions and rates. In the third chapter, I examine factors to declassify children, or remove them from special education placement.

The second chapter identifies services and settings in early childhood that are associated with special education placement upon entering school by asking: Is preschool attendance or consistent health care in early childhood associated with children being identified as having disabilities that qualify them for special education in kindergarten?

Using individual student records from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), I estimate the extent to which preschool attendance and having a consistent doctor or health care provider during the preschool years is associated with special education placement in kindergarten, after controlling for child and household demographic characteristics and developmental profile. I find that after holding constant these demographic and developmental characteristics, both preschool attendance and health care usage are independently predictive of special education placement. Holding all else constant, children who attend preschool are about 1.2 percentage points more likely to be placed in special education in kindergarten, and children with a regular physician are about 1.1 percentage points less likely to be placed in special education.

The third chapter examines processes by which children graduate out of receiving special education services. In this chapter, I identify teacher and child characteristics that are associated with special education declassification by asking the following questions: (1) To what extent do student race/ethnicity and observable teacher characteristics predict special education declassification in elementary and middle school, conditional on children's level of functioning and academic performance in school? (2) Do these predictors have differential association on special education placement at different grade levels? Using student-level records from the Early Childhood Longitudinal Study-Kindergarten Cohort of 1998 (ECLS-K), I estimate the association between special education declassification and observable teacher characteristics, child demographics, and achievement and social skills. This paper extends the emerging literature on teacher-student race/ethnicity congruence and applies it to special education. I find that among students with IEPs, black and Hispanic children and students of nonwhite teachers are

significantly more likely to be declassified from special education, after controlling for household characteristics and children's performance in school. Higher reading and mathematics achievement are predictive of declassification, and measures of social skills have mixed or null association with declassification, but findings differ substantially by grade level.

In the fourth chapter, I examine education funding parameters and their association with special education placement rates. In this essay, I analyze special education caseload dynamics by asking the following questions: (1) To what extent does education funding explain the number of students placed in special education, controlling for population characteristics including family composition, race/ethnicity, and household socioeconomic status? (2) Do these explanatory factors differ by disability designation and/or race/ethnicity of students with IEPs? Using state panel data from 2005 through 2014, I examine the association between funding dedicated to special education services and special education placement rates, controlling for overall education funding, observed disability rates, child race/ethnicity, household composition and socioeconomic status. I find that higher levels of special education funding are associated with higher IEP placement rates, but this appears to be driven by two disability designations: speech/language impairment and specific learning disability.

In examining special education placement as a function of the characteristics of children, teachers, and schools, these essays address three core issues surrounding special education placements. First, each paper highlights the challenges of how to effectively balance offering federally-mandated services to meet the needs of children with disabilities with the need for localized control and decision-making in public schools. As

part of federal regulation and oversight of public schools, compliance with special education practices is required. However, federal guidelines allow states and individual school district wide latitude in interpreting the law. Federal policy prescribes the disabilities that allow students to be eligible for extra services, while states are permitted to set their own criteria for what defines each disability. Individual school districts or examiners can exercise even more local discretion in deciding what types of assessments and testing instruments to employ in making eligibility determinations and in interpreting test scores. While this degree of localized authority may permit schools to serve the needs of their students under resource constraints, it may also lead to disparate outcomes for students from different school environments, which I discuss in these essays.

Second, each paper highlights the concerns for educational equity among children from all races and ethnicities that have plagued the special education system since its inception. A number of scholars have drawn attention to high placement rates for children from minority groups (e.g., Losen & Orfield, 2002; Harry & Klingner, 2012). This issue has come under scrutiny by the Government Accountability Office, whose investigation found that many states had troubling levels of disproportionate representation in special education (GAO, 2014). Several lawsuits have been brought by parents against school districts in which disproportionately high rates of minority children are placed in special education. Yet, an emerging strand of literature has suggested that based on their developmental profile and risk factors, minority children may be underserved by the special education system (Morgan, Farkas, Hillemeier, Mattison, Maczuga, Li, & Cook, 2015; Rosenberg, Zhang, & Robinson, 2008). These papers discuss disparities in special

education placement rates for children of different race and ethnicity and how these discrepant rates may be associated with other observable child characteristics.

Third, these essays highlight the challenge of shifting societal norms for what we consider to be a disability for children. When the Education for All Handicapped Children Act was initially passed in the 1970s, 8.3 percent of public school students received special education services. This has increased to over 13 percent in recent years. The types of disabilities for which children receive services are also changing. While more than a quarter of special education students were labeled as intellectually impaired in the 1970s, today it is 6.4 percent. Orthopedic, hearing, and vision impairments have declined substantially. At the same time, the rate of students with specific learning disabilities, autism, and other health impairments<sup>1</sup> have substantially risen (NCES, 2016). The consistent pattern among these changes is that clearly-defined disabilities with relatively objective determination criteria have become less prevalent, while disabilities determined by subjective diagnostic criteria based on behavior and social norms have increased in frequency. This shift in the concept of disability contributes to the issue of individual states and school districts applying their own definitions and assessments in making special education eligibility decisions.

As a public high school teacher, I taught many students with disabilities who received accommodations and other supports in school. I participated in several IEP placement meetings where a team of teachers and specialists made decisions about students' eligibility for services. As a parent, I later gained personal knowledge of the

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<sup>1</sup> Other health impairments include having limited strength, vitality, or alertness due to chronic or acute health problems. This disability category is largely dominated by children diagnosed with attention deficit/hyperactivity disorder (Loe & Feldman, 2007).

special education placement process when my son entered kindergarten with an obvious speech and language delay. Although we visited a private speech therapist who conducted detailed assessments of his speech and language and made recommendations for services, the school insisted on carrying out its own evaluation. Their specialists administered tests of speech and several other developmental domains, only to determine that my son was not eligible for special education services; thus, our family kept him in private speech therapy, which was not covered by our health insurance, and we paid for it out-of-pocket. Two years later, when our son was still struggling in school, his teacher again referred him for a special education evaluation, with the same outcome. Other parents I spoke to told me similar stories of their children not qualifying for school special education services, or schools insisting on making disability determinations that ran contrary to evidence from their doctors or therapists. School special education placement decisions frequently seemed to have a different basis than medical diagnoses, and my experiences with school special education placement indicated that many more factors might come into play in this setting, including the child's overall performance in school, funding constraints, and local nuances. These personal experiences have highlighted the fact that these decisions vary substantially, and emphasized the need for rigorous empirical examination of special education placement practices, which may fundamentally differ from the clinical findings of experts outside the school setting, such as physicians.

These essays make clear that special education is a challenging policy environment. Policy initiatives that would make special education placement a more uniform process risk imposing too rigid of a system on schools that may stymie the

discretion and clinical judgment of expert evaluators and specialists. Policy makers must also consider equity in schools for all students, regardless of their demographic and socioeconomic characteristics. Furthermore, decisions of labeling children as having a disability are sensitive and may be emotionally fraught for parents, as the process certainly was for my husband and I, and thus require careful stewardship. Developing successful policies for educating children with disabilities begins with a clear understanding of current special education placement practices, which is the intent of this dissertation.

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## **CHAPTER 2: FACTORS AND PROCESSES PREDICTING PLACEMENT INTO SPECIAL EDUCATION IN EARLY CHILDHOOD**

### **INTRODUCTION**

The Individuals with Disabilities Education Act (IDEA) tasks the public school system with identifying students with disabilities and providing them with a free appropriate public education. Identification of disabilities requires a multidisciplinary evaluation team which may include classroom teachers, parents, and school psychologists or other specialists selected on the basis of the suspected disability type. The special education system plays a large role in public schools, with 11.7% of public school students receiving special education services or accommodations in 2012 (NCES Digest of Statistics). These supports help make public education accessible to students whose functioning and academic performance in the typical classroom setting would otherwise suffer due to their disabilities.

However, evidence suggests that the incidence of student placement in special education may vary based on individual and family characteristics. It is well-documented that students in special education are disproportionately represented along a number of dimensions, including gender, race, ethnicity, and socioeconomic status (Losen & Orfield, 2002; Shifrer, Muller, & Callahan, 2011). This is a matter of concern if students with disabilities are not correctly being identified, and are going without the support and accommodations they need to be successful in an academic setting. Students with special needs that are not being addressed suffer poorer academic achievement (e.g., Nation Center for Education Statistics, 2013) may have repercussions in their behavior and

social skills. Equally concerning is the possibility some students are being placed in special education without having a true disability. The special education system is a costly component of public education in monetary terms. In federal education funding, each student in special education costs 90 percent more to educate than a student in the general education population (U.S. Department of Education, 2005). The special education system can also impose a psychic cost to individual students who are identified with disabilities. Teachers may hold lower expectations for children labeled with special needs and treat them differently than the general student population (Gillung & Rucker, 1977). The current system of special education thus raises questions of equity and fairness, particularly if certain groups are systematically overidentified or underidentified as having disabilities.

In this study, I examine factors and processes that predict student placement into special education in kindergarten using a nationally representative data set. Much of the previous literature examining placement in special education focuses on disproportionate placement in special education by race/ethnicity, native language, and other demographic factors, and is based on simple comparisons of placement rates for students from different socio-demographic groups. However, these may be proxies for other factors, such as access to health care or high-quality childcare. In this paper, I hope to address the questions using multivariate regression to examine child and family characteristics and access to services that may be linked with special education placement, rather than simple comparisons of placement rates among different groups. Specifically, I seek to examine the processes and services through which children can be identified as having special

needs, including having a regular doctor for medical appointments and participating in a preschool or Head Start program.

In this paper, I first describe special education services and types of disability that qualify children for services. Next, I describe child development trajectories and how developmental patterns outside of normal bounds may result in children acquiring or being identified with a disability. Then I examine trends in childhood disability over the past decade and address disproportionate representation in special education. Next, I examine services that can lead to special education referrals or identification of disabilities in early childhood. Finally, I empirically test whether child, family, development, and early childhood services can predict in children being placed into special education in kindergarten using probit models.

## **IDEA**

Under IDEA, children with disabilities are ensured access to a free appropriate public education by the provision of an Individualized Education Program, or IEP. An IEP is developed by a multi-disciplinary school team and the child's parents to address the specific learning needs of students with disabilities. An IEP documents the student's current level of academic and functional performance, outlines specific measurable educational goals for students with disabilities, and prescribes how these goals will be met. It is a legal document that obligates schools to provide accommodations and services necessary for students with disabilities to have access to education.

Accommodations under an IEP are established to adapt the classroom setting and school work to the child's specific disability. Classroom accommodations may include strategies such as preferred seating, extended time on tests or assignments, or

presentation of class materials in alternative formats. These provisions, based on the individual needs of students with disabilities, help children fully access their education with special learning needs.

In addition to classroom accommodations, IEPs can also prescribe services that children with disabilities must receive in order to have full access to education. These services may arise directly from children's disabilities or consist of related services necessary for children to have full access to education, such as rehabilitation counseling or specialized transportation. Students with disabilities may be placed in a separate classroom for all or part of the school day, or offered therapies from school-based providers, such as speech-language pathologists, occupational therapists, or school psychologists.

In early childhood, the most common type of disability is a speech or language impairment. Estimates suggest that one in twelve children of preschool age has a deficit in speech or language (U.S. Preventative Services Task Force, 2006). Furthermore, untreated speech and language impairments can lead to long-term consequences for students, including reading difficulties, behavior problems, and mental health issues (Boudreau & Hedberg, 1999). The umbrella of speech and language impairment is broad, and includes speech and articulation disorders, expressive language skills, and receptive language. Speech and articulation disorders refer to the impairment of sound production and fluency. Expressive language encompasses vocal expression, including vocabulary, grammar, semantics (the content of language) and pragmatics (the function of language). Receptive language refers to the ability to correctly understand and interpret what is said to the child (ASHA, 1993). In early childhood, a speech or language impairment can

often be identified by children's poor pronunciation, incorrect word and sentence structures, smaller vocabulary than peers, or apparent lack of understanding of instructions and commands (Prelock, 2008).

Among all children in early childhood through high school served by IDEA, the largest proportion, 35%, are eligible in the category of specific learning disability (NCES, 2015). Specific learning disability refers to a deficit in reading or using language or performing mathematics tasks that is significantly below the child's general cognitive aptitude. Specific learning disabilities are not a single disorder, but are highly individual, and may present when students struggle with reading, writing, listening, speaking, or using mathematical reasoning (National Dissemination Center for Children and Youth with Disabilities, 2004). Specific learning disability is made as a diagnosis of exclusion—other disabilities or circumstances, such as cognitive impairment or non-native English proficiency, must not be the cause of the academic impairment (Lyon, 1996).

Children with intellectual or cognitive impairment make up about 7% of all students served by IDEA (NCES, 2015). Intellectual impairment refers to below-average intelligence and lack of skills necessary for functioning in day-to-day living. It is characterized by difficulty in memory, language, problem-solving, and self-help skills. People with intellectual disabilities can learn new information and skills, but learning occurs more slowly than with the general population. Intellectual impairment varies in severity from mild to profound, and most individuals with this disability, 85%, are considered to be mildly disabled (King, Toth, Hodap, and Dykens, 2009). Intellectual disability may be caused by genetic conditions, such as Down Syndrome or Fragile X Syndrome, complications during the mother's pregnancy or birth, exposure to toxins, or

nutritional deficiency (Shapiro & Batshaw, 2011). Among children with intellectual disability, the cause of the impairment is unknown in 30 to 50 percent of cases (Daily, Ardinger, & Holmes, 2000).

Children with autism comprise 7.8 percent of the population served under IDEA (NCES, 2015). Autism is a neurodevelopmental disorder that impacts children's communication, social interaction, and behavior. The etiology of autism is not well understood, but it is believed to be caused by both environmental and genetic factors. (Hallmayer, Cleveland, Torres, Phillips, Cohen, Torigoe, & Lotspeich, 2011; Deth, Muratore, Benzecry, Power-Charnitsky, & Waly, 2008) Emotional and behavioral disturbance makes up 5.6 percent of children served by IDEA (NCES, 2015). This category of disability includes mental health disorders such as anxiety disorders, bipolar disorder, and obsessive-compulsive disorder that interfere significantly with the child's ability to function in the school setting. These mental health conditions can affect students' behavior and ability to learn in school. Other less-common types of disabilities include physical handicaps such as visual impairment, hearing impairment, deaf-blindness, orthopedic impairment, multiple disabilities, traumatic brain injury, or other health impairment. Collectively, these disabilities comprise about 17 percent of children served under IDEA (NCES, 2015).

In this study, I attempt to examine factors that predict student placement into special education in kindergarten using a nationally representative data set. Much of the previous literature on examining student placement into special education provides evidence of disproportionate representation by race/ethnicity, native language, and other demographic factors based on simple comparisons of placement rates for students. Here, I

approach the placement of students into special education by controlling for household characteristics and developmental differences to examining the use of services that may allow for early identification of childhood disabilities. I address the following research question: Does preschool attendance or consistent health care in early childhood result in children being identified as having disabilities that qualify them for special education in kindergarten?

### **CHILD DEVELOPMENT TRAJECTORIES**

Family and household characteristics are well-documented as influences on children's developmental trajectories. Socioeconomic status is highly predictive of children's cognitive and academic performance throughout childhood, and these differences emerge very early in life. Children from low socioeconomic status households begin kindergarten with poorer pre-reading skills and number sense, a gap which persists throughout the school years (Lee & Burkam, 2002). Low-income children are more likely to have poor social development and exhibit problem behaviors (Campbell, Shaw, & Gilliom, 2000). These findings may result from high levels of household stress in low-income families, in which parents are focused on meeting the material needs of the family members with limited resources, and have little opportunity to devote resources to child development and enrichment activities. Low socioeconomic status is associated with greater likelihood of children suffering physical and health consequences due to poorer housing, neighborhoods, and limited access to medical care (Currie, 2008). Children from poor families have an increased risk of being born at a low birth weight (less than 2,500 grams), which is associated with higher incidence of neurodevelopmental

problems, cognitive impairment, and problems with attention (Hack, Klein, & Taylor, 1995).

Parents' educational attainment is another factor that is highly predictive of children's developmental trajectory. Parent education is predictive of children's cognitive and academic trajectories for several reasons. Parent education is associated with household income, discussed above. Highly educated parents are more likely to exhibit a warm parenting style and foster a positive social climate in the home (Klebanov et al., 1994, Lareau, 2003). Children with highly-educated parents enjoy academic benefits due to their parents' beliefs and behaviors that affect parenting practices, such as engaging children in learning activities during leisure time (Davis-Kean, 2005).

Household composition affects children's developmental trajectories. Dissolution of parents' marriage inflicts stress on children, resulting in their poorer academic performance both before and after divorce (Sun & Li, 2001). Children from divorced households also require psychological interventions during childhood and adolescence at higher rates than children of married parents (Zill, Morrison, & Coiro, 1993). Sibling relationships also affect children's academic and social development. Interactions with an older sibling have been shown to boost children's cognitive and language development, as well as enhancing social and emotional development (Brody, 2004). However, additional children in the household can divide parents' income, time, and attention, which could also have negative developmental consequence as resources are diluted (Downey, 2001).

Children's developmental trajectories can determine whether children develop or acquire disabilities that may affect their academic progress and make them eligible for

special education services. Medical events such as serious illness, injury, or chronic condition may result in an impairment that can be characterized as a disability. However, childhood disabilities that qualify children for services with an IEP in early childhood are often more subtle, such as speech and language impairment, specific learning disability, or emotional disturbance. These conditions could be described as a developmental profile that falls outside the norms of typical child development. Thus, children's social, behavioral, language, and cognitive development are important to consider when examining disabilities that qualify children for special education services.

### **CHILDHOOD DISABILITY TRENDS**

Among the thirteen categories of disability type under IDEA, the incidence of different types of disability has changed over the past several decades. Specific learning disorder has become less prevalent, decreasing from 46 percent of students with IEPs in 2000 to the current level of 35% (NCES, 2015). Due to changes in IDEA in 2004 and 2006, states were required to develop new eligibility criteria for identifying learning disability. Previously, this disability tended to be identified by an ability versus achievement model, meaning that the student's achievement in a particular subject area was significantly lower than his or her overall cognitive ability. Now, states have developed a variety of ways to identify learning disability, many include the use of Response to Intervention (RTI), which might result in struggling students receiving early interventions that reduce the need for special education classification.

During the same time frame, autism has been growing in prevalence, increasing from 1 in 150 in 2002 to 1 in 68 by 2012 (CDC, 2012). In 2010, the number of students receiving special education services under the diagnostic category of autism was three

times as high as in 2000, but the majority of that increase could be due to a reduction of children classified with intellectual disability (Polyak, Kubina, & Girirajan, 2015).

## **DISPROPORTIONATE REPRESENTATION**

A number of social science scholars have examined the extent to which certain groups of students are disproportionately represented in special education. That is, black and Hispanic students, particularly boys, are over-represented in special education compared to their relative size in the general student population (Losen & Orfield, 2002). The patterns of disproportionality have remained relatively stable at the national level for the past 40 years (Chinn & Hughes, 1987; Donovan & Cross, 2002; Finn, 1982; Hosp & Reschly, 2004; MacMillan & Reschly, 1998; Oswald, Coutinho, Best, & Singh, 1999). Disproportionate representation appears particularly severe in certain categories of IDEA eligibility. For the category of cognitive or intellectual impairment, black students are overrepresented in thirty-eight states, and every racial minority group is over-represented in one or more states (Parrish, 2002). In six of the twelve states for which black students are not over-represented in the cognitive impairment category, they are over-represented in other categories of emotional and behavioral disturbance (EBD) and specific learning disability (LD). These categories of IDEA eligibility are considered “soft” disability categories for which identification of students with disabilities is somewhat subjective and depends on instruments such as behavior rating scales, rather than medical determinations.

Emotional disturbance, for example, typically relies on teacher observations and referral for initial placement in special education. Students who are referred for emotional

disturbance are assessed using testing instruments that rely on social and cultural norms, which may be inappropriate for racial and ethnic minorities (Reynolds, Lowe, & Saenz, 1999). Evidence suggests that while black students are overidentified with emotional disturbance in comparison to white students, schools are also failing to provide adequate support and services for students with emotional disturbance (Osher, Woodruff, & Sims, 2002). Independently of black students' overrepresentation for emotional disturbance, black students are more likely than white students to face disciplinary penalties such as suspension and expulsion for similar offenses (Skiba, Michael, Nardo, & Peterson, 2002).

Disproportionate representation by race or ethnicity may be due to differences in socioeconomic status or other demographic characteristics. When conditioning on demographic and family characteristics, research suggests that males and non-native English speakers remain overrepresented in special education placement, but differences in placement rates by race/ethnicity disappear (Shifrer, Muller, & Callahan, 2011). Other studies find that students may have different trajectories in the education system as a result of their demographic characteristics. For example, Samson and Laseaux (2008) found that non-native English speakers have lower placement rates in special education than native English speakers in the early primary school years, but are overrepresented by third grade.

However, other empirical studies suggest that minority students may be underserved in the special education system. In early childhood, evidence has suggested that the majority of children with developmental delays are not receiving early intervention services under Part C of IDEA, and black children are the least likely of any racial or ethnic group to receive services (Rosenberg et al., 2008). Among elementary

school-age children, research has suggested that a student's relative position among his peers, academically and behaviorally, was much more predictive of special education placement than a criterion-referenced system of eligibility determination. That is, students were much more likely to be placed in special education when they notably stood out from their fellow students and were far below the school's average performance levels (Hibel, Farkas, & Morgan, 2010).

Boys also tend to be placed in special education at higher rates than girls. Through all levels of public schooling, boys make up 65 to 70 percent of the special education population (Skarbrevik, 2002). Boys are especially likely to be identified as having reading and writing disabilities, social problems, and attention deficit hyperactivity disorder. However, in the younger years, the higher placement rates for boys may be due to differences in natural maturation patterns.

#### **SERVICES THAT CAN IDENTIFY CHILDREN WITH DISABILITIES IN EARLY CHILDHOOD**

In early childhood, children can be referred by several sources for evaluation to determine if they are eligible for special education placement, including referral by a parent, pediatrician, child care provider, or preschool teacher. Doctor's visits may be an important factor in identifying children with disabilities in early childhood, particularly physical or genetic impairments with clear-cut diagnostic criteria. Well-child visits are an important mechanism for identification of disability, as these appointments focus on children's normal development and achievement of milestones. There are established guidelines for well-child pediatrician visits to detect disability and developmental delay/disorder. However, developmental assessment is far from universal, and detection

of delay/disability is difficult (Halfon, Regalado, Sareen, Inkelas, Reuland, Glascoe, & Olson, 2004). Many parents do not follow the recommended schedule of well-child visits for their children (King & Glascoe, 2003). The biggest predictors of lack of well-child visits include the delay or lack of prenatal care by mothers and lack of insurance for children (Freed, Clark, Pathman, & Schectman, 1999). A medical home is a key link between pediatricians and early-intervention services for children with special needs (Medical Home Initiatives for Children With Special Needs Project Advisory Committee 2002).

Pediatricians detect physical conditions, such as chromosomal abnormalities, heart defects, and fetal alcohol syndrome (a common cause of cognitive/intellectual disability), cerebral palsy, epilepsy, vision and hearing problems (Moeschler, & Shevell, 2006; O'Leary, 2004; Ashwal et al, 2004). These conditions are well-defined and have clear-cut diagnostic criteria. Hearing impairments, although clearly defined, can be missed by regular health care visits, and might go undiagnosed in children, especially in early childhood (Coplan, 1987). Hearing loss, which is a disability itself, is also associated with delay or impairment in speech development (Kennedy et al, 2006).

Pediatricians detect autism, which may be able to be identified as early as 12-15 months of age (Dietz, Swinkels, van Daalen, van Engeland, & Buitelaar, 2006). Early diagnosis of autism is considered important for providing early intervention. However, universal autism screening may not be possible or desirable due to lack of specificity (Al-Qabandi, Gorter, & Rosenbaum, 2011). Pediatricians also detect ADHD, emotional, social skills, and behavioral problems (Stein, 2004; Glascoe, 2000). However,

pediatricians' misdiagnoses can occur for these disorders, which depend on testing instruments such as behavior rating scales (Webb, 2005; Connor, 2002).

Another setting in which children's disabilities can be identified is in a preschool or child care setting. Head Start, in particular, takes a comprehensive approach to address the needs of the whole child and family, beyond just academics and school readiness (Irish, Schumacher, & Lombardi, 2004). There are a number of well-validated and supported developmental instruments that can be applied in a preschool setting, and these can result in children receiving referrals for special education placement (Scott, & Delgado, 2003). Identification of disabilities can also occur more informally through teacher observations in the course of typical learning and play activities in the preschool setting, which include drawing and writing, running, jumping, and other play that involves motor skills. Preschool settings can play a role in identifying ADHD, emotional, and behavioral problems, those these may be underreported in at-risk populations of preschoolers (Fantuzzo et al., 1999). Autism diagnoses also depend on observations and assessments of child behavior, so preschool centers can play a role in diagnosing this condition. Economic, racial/ethnic, language, or educational disadvantages reduce the likelihood of referral and diagnosis of autism spectrum disorders (Valicenti-McDermott, Hottinger, Seijo, & Shulman, 2012).

Evidence suggests that pediatrician well-visits and preschool centers can identify medical conditions or atypical development that may cause children to struggle in school. However, these services have not been closely examined as a means for identifying childhood disabilities that result in placement in special education services through a child's getting an IEP. Thus, this project will fill this gap in the literature and provide a

better understanding of the processes through which children are placed in special education in the early childhood years.

## **DATA AND METHOD**

The Early Childhood Longitudinal Study—Birth Cohort (ECLS-B) is a nationally representative longitudinal survey of children, their parents, caregivers, and school teachers and administrators. The data are maintained by the U.S. Department of Education National Center for Education Statistics (NCES). The ECLS-B data set follows children born in the United States in 2001 through several waves of data collection, concluding when children entered kindergarten in either 2006 or 2007. The survey began when children were approximately nine months of age (wave 1), then collected observations at age two years (wave 2), preschool age, or about four years of age (wave 3), and kindergarten entry (waves 4 and 5). Also included are a number of variables from administrative birth certificate data. Detailed surveys and interviews were collected about child and family characteristics, health and developmental history, health care visits, and child care and early childhood education.

A strength of the ECLS-B data is that its longitudinal data collection allows for following the target children over time through several waves of data collection. Children are observed at multiple points in time, allowing for prediction of placement in special education to examine factors from birth certificate administrative data, infancy, and throughout the early childhood years. Attrition and missing data did occur throughout the ECLS-B survey period, so that of the original 10,700 children studied in the base year, about 5,750 first-time kindergarteners were observed with all the variables of interest for

the present study. I use the child panel weights included in the ECLS-B data set for all analyses to adjust for survey nonresponse and unequal selection probabilities. Of the 10,700 observations in the ECLS-B data set, 7,000 are observed at kindergarten entry. Of these children, 6,600 are first-time kindergarteners who are observed with full information about demographic characteristics. From these observations, we observe all family and household characteristics for 6,450 children. Finally, developmental characteristics, information about health care, and preschool attendance are observed in 5,750, which forms the analytic sample.

The outcome variable of interest is an indicator for whether the child was placed in special education; it was estimated using a dichotomous variable coded 1 if a student had an Individualized Education Program (IEP) at the time of data collection in the kindergarten school year in 2006 or 2007, and 0 otherwise. As shown in Table I, about 6.9 percent of students in the overall sample received special education services in kindergarten.

The key predictor variables are measures of children's use of services (health care and preschool) that may provide a means of identification of a disability that qualifies a child for special education services. Health care is measured by an indicator for whether the child reports having a regular doctor that sees him or her for well-child visits observed at all waves of data collection. Among kindergarten children, 76.5 percent reported having a regular doctor in wave 3, while 59.3 percent had a regular doctor at all points from waves 1 through 3, and this indicator is used to measure a child's having a regular health care provider throughout early childhood. Access to health care is controlled for by an indicator for whether the child had health insurance coverage

throughout early childhood. Preschool attendance is measured by an indicator of whether the child attends a center-based preschool or Head Start program at wave 3 (approximately 48 months of age). In this sample, 62.4 percent of children attended a Head Start or preschool center, while the rest of the sample was cared for by a parent, relative, or home-based caregiver.

Controls for individual, family, and development characteristics were also included. Student gender and race were indicated by composite variables in the ECLS-B data. Gender is given by the variable *female*, coded 1 for girls and 0 for boys. The sample is 49.5 percent female. Five racial/ethnic groups are included: non-Hispanic white, black, Hispanic (of any race), Asian, or a group labeled as “other ethnicity,” which is composed of Native Hawaiians and Pacific Islanders, American Indians, Alaskan Natives, and multi-racial children who are not Hispanic. Non-Hispanic White students comprise the largest racial/ethnic group in the kindergarten sample (41.9 percent), followed by Hispanic of any race (18.4 percent), Non-Hispanic black (16.2 percent), non-Hispanic of other race (12.0 percent), and non-Hispanic Asian (11.5 percent). The ECLS-B survey over-sampled certain race/ethnic groups to allow large enough sample sizes for reliable statistical analysis, which is later corrected for by applying survey sampling weights (Bethel, Green, Nord, Kalton, & West, 2005).

Family characteristics included maternal variables collected from the child’s birth certificate and parent interviews. These include mother’s age at the time of the child’s birth and educational attainment, and marital status. In the full kindergarten sample, the average age of mothers at the time of the child’s birth was 27.8 years. The most common maternal education level was a college degree (30.7 percent). The next most common

education level was a high school diploma (30.0 percent), followed by some college (22.0 percent) and less than a high school diploma (17.3 percent). The majority of mothers (67.8 percent) were married.

Variables from the parent survey in the preschool (wave 3) data collection include the child's number of siblings. On average, children in this sample had about 1.4 siblings. Home language was observed in the parent interview, and was recorded as an indicator variable coded 1 for English-speaking households and 0 otherwise. In this sample, 80.8 percent of children came from an English-speaking household. Household income was asked in the parent interview, and is measured in thousands of dollars. The average household income for this sample was \$64,115.

Other variables of interest include measures of the child's health and developmental profile. Physical disability is indicated by interview responses in the preschool wave for parents reporting that the child has epilepsy, a heart condition, or a condition that decreased his/her mobility. In the kindergarten sample, 3.3 percent of children reported a physical disability. Cognitive impairment is an indicator from the preschool wave parent survey for whether the child has an intellectual or cognitive impairment, which comprises 0.2 percent of observations in this sample. An indicator variable for low birth weight was created from birth certificate data, coded 1 for children who were born weighing less than 2,500 grams, or 5 lb 8 oz. Children of low birth weight were oversampled in the ECLS-B study, similarly to some of the race categories described above. In this sample, 24.6 percent of children were low birth weight.

Speech development is measured by two variables from the parent survey in the preschool wave (wave 3). These include dichotomous measures indicating whether the

child speaks clearly enough to be understood by strangers, and whether the child uses correct pronouns, which are considered age-appropriate speech and language developmental milestones (ASHA, 1993). In this sample, 79.3 percent of children had clear speech, and 78.1 percent used correct pronouns. Behavioral development is measured by indicators of parent responses to questions about whether the child pays attention well, has impulsive behavior, and whether the child acts aggressively towards other children or adults. In this sample, 8.0 percent of children were reported to have aggressive behavior, 4.8 percent were reported as having trouble paying attention, and 9.9 percent were reported as having impulsive behavior patterns.

Finally, variables were included to measure children's academic performance at preschool age in reading and mathematics. The preschool reading assessment was developed to measure children's basic phonological awareness, letter knowledge, knowledge of print conventions, and sight words at an age-appropriate level. The preschool math assessment measures children's number sense, counting, operations, geometry, and understanding of patterns. (Najarian, Snow, Lennon, Kinsey, and Mulligan, 2010). Scale scores were computed using item response theory (IRT) measures. IRT uses a child's pattern of correct, incorrect, and omitted responses to estimate the test-taker's true ability in each domain. IRT scoring, for example, can compensate for a low-ability child (indicated by incorrectly answering items of low difficulty) correctly guessing on items of high difficulty, and will produce a more accurate estimate of cognitive skills. For this analysis, I constructed standardized scores across all individuals in the ECLS-B data to a mean of zero and standard deviation of one.

**Table 1. Summary statistics**

	<b>Mean</b>	<b>Std dev</b>	<b>Min</b>	<b>Max</b>
Kindergarten IEP	0.069	0.253	0	1
Preschool or head start	0.624	0.484	0	1
Regular doctor	0.593	0.491	0	1
Insurance	0.939	0.240	0	1
Child characteristics				
White	0.419	0.493	0	1
Black	0.162	0.369	0	1
Hispanic	0.184	0.388	0	1
Asian	0.115	0.319	0	1
Other race	0.120	0.324	0	1
Female	0.495	0.500	0	1
Age, months	68.143	4.283	57.2	84.5
Family and household characteristics				
Mother's age at birth of child	27.777	6.357	15	50
Mother less than high school	0.173	0.378	0	1
Mother high school graduate	0.300	0.458	0	1
Mother some college	0.220	0.414	0	1
Mother college	0.307	0.461	0	1
Mother married	0.678	0.467	0	1
Number of siblings	1.439	1.120	0	8
Home language English	0.808	0.394	0	1
Household income, thousands	64.115	56.425	2.5	250
Child health characteristics				
Low birth weight	0.246	0.431	0	1
Physical impairment	0.033	0.179	0	1
Cognitive impairment	0.002	0.044	0	1
Speech milestones				
Uses pronouns correctly	0.781	0.414	0	1
Speaks clearly	0.793	0.405	0	1
Behavior development				
Aggressive	0.080	0.271	0	1
Impulsive	0.099	0.298	0	1
Not pay attention	0.048	0.213	0	1
Wave 3 scores				
Mathematics	0.029	0.999	-1.948	3.635
Reading	0.017	1.005	-1.315	5.221

Notes: (1) Sample N is 5750, rounded to the nearest 50 in compliance with NCES guidelines for restricted data analysis.

To address my research question, I used individual-level variables collected during early childhood to predict the outcome of special education placement in kindergarten with models of the following form:

$$IEP_t = \beta_0 + Services_{t-1} \beta_1 + Child_{t-1} \beta_2 + Family_{t-1} \beta_3 + Development_{t-1} \beta_4 + \varepsilon$$

where *Child*, *Family*, and *Development* represent vectors of variables for each type of characteristic. Probit regression is appropriate for modeling a student's likelihood of placement into special education and estimating the magnitudes of prediction variables. Estimates were computed using the survey sampling probability weights WRK0, which should be employed when analyzing children at the time they enter kindergarten for the first time. The majority of children, about 75%, entered kindergarten in the 2006-2007 school year, and the remainder began kindergarten in the 2007-2008 academic year.

Probit regression models were fitted predicting special education placement in kindergarten. In the first column, results are present for a Model (1), a baseline model including only testing the effects of the child demographic characteristics of race/ethnicity, gender, and age on kindergarten special education placement. Model (2) adds in family and household characteristics. Models (3) and (4) include (respectively) indicators for health care access and use, and preschool or Head Start attendance. Model (5) includes both the health care and preschool variables. Finally, Model (6) adds in state fixed effects.

## RESULTS

Table 2 presents the marginal effects of probit regression models predicting special education placement in kindergarten. In the first column, results are present for a Model

(1), a baseline model that including only race/ethnicity, gender, and age coefficients. Coefficients are presented as marginal effects from the probit regression, and can be interpreted as a change in percent likelihood of special education placement in kindergarten, holding all else constant.

Disproportionate representation of racial/ethnic minorities in special education has been well-documented since the special education system was developed in the 1970s. One focus of the data in these studies has been special education placement for populations disaggregated by various student characteristics (e.g., sex, race/ethnicity, receipt of free/reduced price lunch, language proficiency). However, the results here do not provide evidence supporting disproportionate representation by race/ethnicity, at least when children are observed in kindergarten. When controlling for race/ethnicity, gender, and child's age in months, black and Hispanic children are not statistically more likely to have an IEP in kindergarten than white children, the reference group. Asian children are 3.7 percentage points less likely, holding all else equal. Female is also associated with a lower likelihood of IEP placement.

After controlling for family and household characteristics in Model (2), black children are statistically less likely to have an IEP in kindergarten due to more precise estimation of coefficients with the additional covariates. The other coefficients and their significance remains largely unchanged from the sparse model, with Asian children being about 1.8 percentage points less likely to be placed in special education, and females about 1 percentage point less likely, *ceteris paribus*.

In Model (3), I test whether having a regular doctor is associated with a greater likelihood of special education placement, while controlling for having consistent access

**Table 2. Marginal effects of predictors on special education placement in kindergarten**

	(1)	(2)	(3)	(4)	(5)	(6)
Regular doctor	----	----	-0.011 *	----	-0.011 *	-0.010 *
			(0.006)		(0.006)	(0.006)
Insurance	----	----	0.005	----	0.004	0.003
			(0.009)		(0.009)	(0.008)
Preschool or head start	----	----	----	0.012 **	0.012 **	0.010 **
				(0.005)	(0.005)	(0.004)
Child characteristics						
Black	-0.012	-0.014 **	-0.015 **	-0.015 **	-0.015 **	-0.013 **
	(0.009)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Hispanic	-0.013	-0.006	-0.006	-0.007	-0.007	-0.002
	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Asian	-0.037 ***	-0.018 *	-0.017 *	-0.017 *	-0.016 *	-0.014 *
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
Other race	0.008	-0.005	-0.006	-0.006	-0.007	-0.007
	(0.017)	(0.008)	(0.008)	(0.008)	(0.008)	(0.006)
Female	-0.032 ***	-0.010 *	-0.010 **	-0.010 *	-0.010 *	-0.009 *
	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Age, months	0.002 **	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Family and household characteristics		X	X	X	X	X
Child development characteristics		X	X	X	X	X
Wave 3 math and reading scores		X	X	X	X	X
State Fixed Effects						X

Notes: (1) Sample Ns are: 5750 in models 1 through 5; 5700 in model (6). (2) Model (6) includes state fixed effects. (3) Data are weighted and clustered using weight W1C0. (4) Sample sizes are rounded to the nearest 50 in accordance with NCES restricted data guidelines.

to health care, operationalized as health insurance coverage. All other control variables are included, and their magnitude and significance stay essentially the same as in the baseline model (1). My key variables here are indicators for whether a child has a *regular doctor* and has some type of *health insurance* plan coverage throughout waves 1 through 3. This will test whether having a regular doctor for routine health care and well-visits is associated with a different likelihood of being placed into special education, as opposed to accessing health care through a walk-in clinic, health department, hospital emergency room, or other setting. To control for the issue of limited access to health care, which may differentially impact both students' likelihood of having a regular doctor and being identified with a disability, I control for children's health insurance status. While insurance is not statistically significant, having a regular doctor is a significant predictor of kindergarten IEP, though the sign is negative, indicating that having a regular doctor is associated with a lower likelihood of being placed into special education.

In Model (4), I include the Preschool or Head Start indicator variable to test whether preschool attendance may be a setting in which children are identified as having disabilities that qualify them for special education placement. Again, the control variables for child, family, and developmental characteristics stay overall unchanged from the baseline model (1). When the indicator for preschool or Head Start is included, I find that preschool attendance is associated with a 1.3 percentage point higher likelihood of special education placement in kindergarten. This suggests that preschool attendance does allow children to be identified with disabilities in early childhood and placed into special education.

In Model (5), I estimate a full model that includes variables for both preschool and health care. Here, results closely match the findings in models (2) and (3) that preschool attendance is associated with a 1.2 percentage point higher likelihood of special education placement, while having a regular doctor is associated with a 1.1 percentage point lower likelihood. Again, the control variables from the baseline model (1) do not change substantially in magnitude or statistical significance.

Finally, the same probit analyses were conducted with controls for the state in which a child lives. Due to different state policies for special education evaluations and placement, the state where a child resides may affect his/her probability of having an IEP in kindergarten. Thus, including state fixed effects should eliminate any state-specific differences in placement rates when fitting these models. This analysis, presented as Model (6), provides evidence that the health care and preschool findings are robust. While the magnitudes of these coefficients are very slightly attenuated for *regular doctor*, *insurance*, and *preschool*, the marginal effects remain statistically significant. This substantiates the evidence that preschool attendance and having a regular doctor are significant predictors of special education placement, irrespective of state-level policies or effects.

## **DISCUSSION**

In this project, I use nationally representative data to test whether preschool attendance or having a regular doctor in early childhood was associated with special education placement in kindergarten, controlling for child and family characteristics and developmental profile. I estimate this using indicators for preschool and regular doctor

each separately and together to compute a full model. My analyses of special education placement find that preschool is associated with a higher likelihood of special education placement, controlling for child, family, and developmental characteristics. This provides evidence to support my hypothesis that preschool may be a setting in which children can be identified as having disabilities that may impact their school performance and qualify them to receive special education services.

Preschools are often the earliest setting in which a young child spends a significant amount of time outside the home and away from family members. In preschool, a child may be regularly interacting with peers and adults for several hours each day and engaging in play, learning, and activities of daily life. This provides preschool teachers and directors with an opportunity to informally observe young children and compare them with their same-age peers, which may permit observation of atypical child development. This allows for the opportunity to make referrals to early childhood intervention services if developmental delays or anomalies are observed. This may be especially true for high-quality preschools and Head Start centers, which maintain a focus on the whole child and his/her needs, beyond just developing school readiness and academic skills. In addition, preschools allow parents themselves to observe their children playing and interacting with peers and unrelated adults during drop-off and pick-up times and during events attended by family members. When parents themselves notice their children having difficulty or trouble adapting, they may self-refer for special education evaluation services. Thus, it is a natural and expected consequence that children who are in preschool may be more readily identified with having disabilities that qualify them for special education placement.

However, my findings do not provide evidence that having a regular doctor makes a child more likely to be placed into special education. In fact, these results suggest that the opposite is true, or that having a regular doctor throughout early childhood prior to entering kindergarten makes children less likely to be placed in special education in kindergarten. This may indicate that having regular health care from a consistent doctor is a protective factor that prevents children from developing disabilities. Because doctors are likely to treat physical and medical conditions or impairments, they may help families develop adaptive strategies for these types of conditions, eliminating the need for school supports. A regular primary care physician can refer families to private specialists or therapists that can correct temporary developmental issues that would have otherwise made children eligible for special education placement when they entered kindergarten.

Alternatively, the fact that a family has a regular doctor for their children may indicate an overall higher level of health in the household, making disability less likely. Parents who maintain health insurance coverage and take their children to a regular doctor for primary care may foster a healthier household through wholesome behavior and habits for all family members.

Results for my control variables may expand upon previous findings about disproportionate representation testing differences in special education placement rates in early childhood. Much of the previous literature examining disproportionate representation consider all students in kindergarten (or pre-kindergarten) through 12<sup>th</sup> grade. This study specifically examines children in early childhood and kindergarten, which may exhibit different patterns of special education placement than the overall public education system. In early childhood, special education evaluation and placement

is a more parent-driven process than in children's elementary and secondary years.

Parents may view interventions at this age as a source of extra help that could provide an advantage to their children, rather than a remedial intrusion meant to correct a child's developmental deficiency or impairment. Thus, early childhood special education services may be sought out by children from particularly knowledgeable or savvy families who are seeking out extra services. This may be very different from the special education placement process in elementary or secondary school, in which children are more likely to be referred for services when they are falling behind academically or struggling to function well in school.

My findings of lower likelihood of special education placement for black children are consistent with Hibel, Morgan, & Farkas (2010), who find that minority students may be under-identified as having disabilities. In the present study, black students are less likely to be placed into special education in kindergarten than other race/ethnic groups after extensive statistical controls for other child and family characteristics are included. This suggests that minority children with disabilities may not be receiving interventions in school that they need to be successful.

The explanations for why we observe differential placement rates for students based on race/ethnicity, even after controlling for other child and family characteristics, are unclear. One possible explanation is that teachers and caregivers are attentive to the issue of minority overrepresentation in special education, and do not want to exacerbate this issue. Minority overrepresentation in special education has been a hotly investigated and debated issue in the public education system. Teachers or caregivers may be acutely sensitive to this issue, and wish to avoid the appearance of discriminatory practices by

limiting special education referrals for racial or language minority students (Skiba, Simmons, Ritter, Kohler, Henderson, & Wu, 2006).

These results provide evidence of another important function of early childhood education, beyond building children's school readiness or social skills. Preschool may also serve as a means for children struggling with developmental challenges or impairments to be identified for placement into the special education system. For many childhood disabilities, early intervention and remediation is important for helping students appropriately access education and receive necessary accommodations or therapies. Preschool may be a crucial setting in which struggling students can be identified and helped, before their K-12 educational trajectory is harmed by a limiting disability or developmental delay.

This analysis may help to clarify the mechanisms through which students are identified for special education placement and resulting academic outcomes for children in kindergarten. However, some limitations should be noted. Student attendance at preschool and health care access and use are not randomly assigned, and it has been well-documented that children in preschools and children who have a regular doctor may differ systematically in terms of family characteristics (Flores, Olson, Tomany-Korman, 2005, Miller, 2000). While attention has been paid to controlling for a wide range of individual and family variables and specifying different models to test for the robustness of these findings, the possibility of omitted variable bias cannot be ruled out, which could result in biased estimates of coefficients.

One concern for including child developmental characteristics is the potential for bias due to endogeneity between these measures of development and my key predictors

of interest for regular doctor and preschool attendance. That is, parent reports of their child's development may not be independent of whether the child has a regular doctor or goes to preschool. During well-child visits, doctors help educate parents about typical child development and milestones that children should be reaching at each age. This may help provide parents with the knowledge they need to accurately assess and report their child's speech, behavior, and overall development. This may also spur parents who have concerns about their child's development to seek out a referral for special education services. Similarly, preschool and Head Start provide parents with child development knowledge and a basis for comparison with other children of a similar age. This may alert parents who would otherwise be unaware to potential concerns about children's developmental progress and eligibility for special education. Endogeneity concerns could also run in the opposite direction. Parents who have concerns about a child's development or the potential of having a disability may actively seek out services that they believe would be helpful for their child. Parents may make a point of finding a regular doctor or enrolling their child in preschool if their child has developmental or health issues that could qualify for special education services. In either case, we would have concerns about omitted variable bias from an unobservable "parent knowledge" parameter that influences reports of child development, receipt of services, and placement in special education.

A final limitation worth discussing involves the observable data about children's specific type of disability. Children may be placed into special education for any of the thirteen categories of disability, discussed above, which include a wide range of impairments from hearing and vision impairment to speech delay to emotional or

behavioral disturbance. Preschool centers or pediatrician's offices may differ substantially in their propensity to refer children for special education evaluation or placement based on the type of disability or impairment suffered. That is, it is highly plausible that preschools are likely to identify children who struggle with behavior issues, while physicians are likely to identify children with vision or mobility impairments. However, due to data limitations in ECLS-B, I cannot observe the category under which children are eligible for an IEP in order to test this hypothesis. Future studies of the processes through which children are identified with disabilities are clearly called for.

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## **CHAPTER 3: PREDICTING SPECIAL EDUCATION DECLASSIFICATION IN ELEMENTARY AND MIDDLE SCHOOL**

### **INTRODUCTION**

Special education in K-12 schools, as mandated by the Individuals with Disabilities Education Act (IDEA), provides accommodations and supports for students identified with disabilities in order to help them function in public school settings and fully access education. Students with disabilities are identified by evaluation teams consisting of classroom teachers, specialists, and parents. A sizable literature has described disproportionate representation in special education by race and ethnicity, with children belonging to racial/ethnic minority groups being placed in special education at higher rates than white children. Evaluation decisions must be reviewed at least every three years, at which point students may be declassified from special education placement if they no longer require additional services and supports. Although special education has been criticized as a “one-way street” in which “it’s relatively easy to send children... but they rarely return,” (Finn, Rotherham, & Hokanson, 2001), many students do become declassified from special education each year, and little attention has been paid to factors that lead to declassification.

The special education system is costly, and per-pupil spending for students receiving services and accommodations under IDEA is roughly twice as much as spending for students in the general education population. With students receiving special services placing high demands on school finance, it is critical that appropriate placement decisions are made and students are declassified from special education when they no longer require extra services. At the same time, compliance with IDEA requires that

students with disabilities who require extra services not be removed from special education placement due to resource constraints.

In this study, I examine individual and teacher characteristics that predict the likelihood of students with special needs being declassified from special education placement at different grade levels in the elementary and middle school years using a nationally representative data set. In the paper, I first describe the provisions of the Individuals with Disabilities Education Act (IDEA) and discuss the typical processes through which disabilities may be remediated and children declassified from special education placement. Then I empirically estimate the association between cognitive and social skills, individual and family characteristics, and school-level characteristics on the outcome of special education declassification at several elementary and middle school grade levels.

## **INDIVIDUALS WITH DISABILITIES EDUCATION ACT**

Under the Individuals with Disabilities Education Act or IDEA (P.L. 108-446), children with disabilities are ensured access to a free appropriate public education, which has helped ensure that children are correctly identified as needed special education services. Under IDEA, children with disabilities that requires additional services in school are eligible to have an Individualized Education Program, or IEP. An IEP is developed by a multi-disciplinary school team and the child's parents to address the specific learning needs of students with disabilities. An IEP documents the student's current level of academic and functional performance, outlines specific measurable educational goals for students with disabilities, and prescribes how these goals will be

met. It is a legal document that obligates schools to provide accommodations and services necessary for students with disabilities to have access to education.

Accommodations under an IEP are established to adapt the classroom setting and school work to the child's specific disability. Classroom accommodations may include strategies such as preferred seating, extended time on tests or assignments, or presentation of class materials in alternative formats. These provisions, based on the individual needs of students with disabilities, help children fully access their education with special learning needs. In addition to classroom accommodations, IEPs can also prescribe services that children with disabilities must receive in order to have full access to education. These services may arise directly from children's disabilities or consist of related services necessary for children to have full access to education. Students with disabilities may be placed in a separate classroom for all or part of the school day, or offered therapies from school-based providers, such as speech-language pathologists, occupational therapists, or school psychologists.

The 2004 reauthorization of IDEA establishes provisions for evaluating children to determine if they qualify for special education services. Identification of disabilities requires a multidisciplinary evaluation team which may include classroom teachers, parents, and school psychologists or other specialists selected on the basis of the suspected disability type. The law also states provisions for reevaluating students who have IEPs to determine whether special education services are still necessary. Other than for students who are graduating from high school or are no longer age-eligible for public K-12 education, schools must conduct a reevaluation before determining that the child is no longer eligible for special education services. Prior to 2004, these reevaluations were

mandatory every three years, but with the 2004 legislation, a reevaluation may be foregone if “the parent and the public agency agree that a reevaluation is unnecessary.” This change in the law may result in declassification decisions being made more readily with this lower level of administrative burden after 2004.

Special education can potentially help children with disabilities access education that would otherwise be inaccessible. With the supports of extra services for disability remediation and accommodations to ensure that children are receiving an appropriate education, students may ultimately graduate out of needing these services. In this paper, I will examine the flow of students out of special education in the elementary and middle school years. I will address the following research questions: (1) To what extent do student race/ethnicity and observable teacher characteristics predict special education declassification in elementary and middle school, conditional on children’s level of functioning and academic performance in school? (2) Do these predictors have differential effects on special education placement at different grade levels?

## **SPECIAL EDUCATION PLACEMENT**

Child and family demographic characteristics may influence the likelihood of special education placement. Differences in special education placement rates by race/ethnicity and gender have been well-documented. Children belonging to racial minority groups, especially black or African-American, are overrepresented in special education placement compared to their overall proportion of the K-12 student population (e.g., Losen & Orfield, 2002; Harry & Klingner, 2014). Disproportionate representation by race or ethnicity may be due to differences in socioeconomic status or other

demographic characteristics. When controlling for household characteristics, research suggests that males and non-native English speakers remain overrepresented in special education placement, but differences in placement rates by race/ethnicity are fully mediated (Shifrer, Muller, & Callahan, 2011). That is, household differences in socioeconomic status fully account for African-American and Hispanic disproportionality. This research highlights the importance of controlling for household characteristics such as income in any analysis of special education placements because unobserved differences will amplify race/ethnicity effects.

Other research, however, suggests that minority students may receive inadequate support through the special education or other intervention services. In early childhood, evidence has suggested that the majority of children with developmental delays are not receiving early intervention services under Part C of IDEA, and black children are the least likely of any racial or ethnic group to receive services (Rosenberg et al., 2008). This may be due to current de-facto school segregation in which disadvantaged students are highly concentrated in low-performing and under-resourced school districts and buildings. Among elementary school-age children, students' relative academic and behavioral performances are much more predictive of special education placement than a criterion-referenced system of eligibility determination. Students were much more likely to be placed in special education when they markedly stood out from their fellow students and fell noticeably below the school's average performance levels (Hibel, Farkas, & Morgan, 2010). In this analysis, the authors found that household-level income or socioeconomic status was very weakly predictive of special education placement. However, the school-wide level of academic performance and behavior problems did

explain a great deal of the variation in individual special education placement rates. This research highlights the importance of school and classroom factors in IEP placements. Thus, we may expect that teacher characteristics play a role in the IEP placement and declassification process.

In addition to race/ethnicity and household income, other demographic characteristics are predictive of IEP placements. Boys tend to be placed in special education at higher rates than girls. Through all levels of public schooling, boys make up 65 to 70 percent of the special education population (Skarbrevik, 2002; NCES, 2012). Boys are especially likely to be identified as having reading and writing disabilities, social problems, and attention deficit hyperactivity disorder (Shaywitz, Shaywitz, Fletcher, & Escobar, 1990; Johnson & Breslau, 2000; Bauermeister, ShROUT, Chavez, Rubio-Stipec, Ramirez, Padilla, & Canino, 2007). However, in the younger years, the higher placement rates for boys may be due to differences in natural maturation patterns, particularly in terms of verbal skills (Galsworthy, Dionn, Dale, & Plomin, 2000). This research suggests that gender may be an important predictor of IEP placements or declassification, and that its predictive potential may be different at different grade levels.

## **DISABILITY REMEDIATION**

The most prevalent reason for special education declassification is that students no longer need services (Holden-Pitt, 2005). Children may stop receiving special education services if their impairment becomes remedied and they no longer meet eligibility criteria for special education placement. Remediation of disabilities and impairment can occur among many of the thirteen disability classifications recognized by

IDEA. In early childhood, the most common type of disability is a speech or language impairment. Estimates suggest that one in twelve children of preschool age has a deficit in speech or language (U.S. Preventative Services Task Force, 2006). The umbrella of speech and language impairment is broad, and includes speech and articulation disorders, expressive language skills, and receptive language. Speech and articulation disorders refer to the impairment of sound production and fluency. Expressive language encompasses vocal expression, including vocabulary, grammar, semantics (the content of language) and pragmatics (the function of language). Receptive language refers to the ability to correctly understand and interpret what is said to the child (ASHA, 1993). In early childhood, a speech or language impairment can often be identified by children's poor pronunciation, incorrect word and sentence structures, smaller vocabulary than peers, or apparent lack of understanding of instructions and commands (Prelock, 2008).

Speech and language impairments can be successfully treated and often remediated with speech and language therapy, although considerable variation exists in the persistence of these impairments. In early childhood, speech/language intervention can produce significant improvement in three-quarters of children (Jacoby, Lee, Kummer, Levin, & Creaghead, 2002). The magnitude of improvement depends on the type and severity of the speech or language impairment, with children who exhibit lower functional levels of language expression and comprehension requiring a more intense intervention (Jacoby et al, 2002). Children with more severe language delays or with associated medical factors showed smaller improvement and/or required more therapy sessions to generate improvement.

Specific learning disability refers to a deficit in reading or using language or performing mathematics tasks that is significantly below the child's general cognitive aptitude. Among all children in early childhood through high school served by IDEA, the largest proportion, 35%, are eligible in the category of specific learning disability (NCES, 2015). Specific learning disabilities are not a single disorder, but are highly individual, and may be identified when students struggle with reading, writing, listening, speaking, or using mathematical reasoning (National Dissemination Center for Children and Youth with Disabilities, 2004). Specific learning disability is made as a diagnosis of exclusion—other disabilities or circumstances, such as cognitive impairment or non-native English proficiency, must not be the cause of the academic impairment (Lyon, 1996).

Remediation of specific learning disability can occur through various interventions.

Children with reading impairments, even severe impairments, can see large improvement in reading fluency and comprehension through intensive instruction, which may result in these children no longer requiring special education services (Torgesen et al., 2001).

Similarly, children with learning disabilities in mathematics can demonstrate significant gains through interventions that target their deficiencies (Maccini, Mulcahy, & Wilson, 2007). Emotional or behavioral disturbance describes a pattern of inappropriate behavior, emotional symptoms, or inability to maintain interpersonal relationships that adversely affects a child's educational performance (IDEA). Remediation of emotional/behavioral disturbance in school can be accomplished by through multicomponent interventions, especially those which involve the child's parents (Musser, Bray, Kehle, & Jenson, 2001).

These empirical studies suggest that high-quality and correctly targeted interventions can bring about marked improvement in children's levels of functioning that may be impaired by disability. Disability remediation should lead to special education declassification. The text of the Individuals with Disabilities Education Act defines eligibility for special services based on children's disability status that necessitates special education and related services. Thus, if children are no longer limited by a disability, the terms of IDEA will require that they are declassified from special education. This has been confirmed by empirical studies, which have suggested that effective interventions can remediate disabilities and successfully return children to the general education setting for learning disabilities (Torgesen, Alexander, Wagner, Rashotte, Voeller, & Conway, 2001); emotional disturbance, intellectual disability, and speech and hearing disorders (Carlson & Reavey, 2000).

#### **SPECIAL EDUCATION DECLASSIFICATION**

Although a sizable body of literature exists to examine differences in special education placement rates for different student populations, comparatively little empirical research has explored parallel questions about declassification. Previous research examining special education declassification, which has relied on national surveys and large state or school district samples, can help establish descriptive data trends about the prevalence of declassification. Observable child characteristics may help explain the propensity for declassification. Among students with IEPs, declassification rates vary by grade level. For preschool and elementary aged children students receiving special services, about 15% to 17% are declassified from special education each year (Carlson et

al., 2009; Daley & Carlson, 2009; Holden-Pitt, 2005). Among students in secondary school, special education placement appears to be more stable over time, with fewer students being declassified each year. In the secondary school grade levels, declassification rates have been documented at 5% to 6% of students with IEPs each year (Carlson, 1997; Wagner, Newman, Cameto, Levine, & Marder, 2003).

The severity of a student's disability, which may be inferred from the disability type and IEP placement setting, also affects the likelihood of declassification. Students whose placement is in a general classroom, rather than pull-out instruction with a separate special education teacher, are more likely to be declassified. Only 2% to 3% of students who receive some portion of instruction in a self-contained special education classroom are declassified each year. However, all declassified students had at least part of their instruction in a general classroom setting (Holden-Pitt, 2005).

Demographic differences exist in declassification rates, with girls having a greater likelihood than boys for declassification (Daley & Carlson, 2009). Research suggests that black children in certain disability categories are less likely to be declassified than other racial/ethnic groups (Walker et al., 1988). Family socioeconomic status appears to be associated with IEP declassification as well, with children from higher-income households having a greater likelihood of exiting special education (Carlson, 1997; Holden-Pitt, 2005).

## **ACADEMIC ACHIEVEMENT AND SOCIAL SKILLS**

A child's performance on academic work and social skills or behavior in the classroom may provide parents and educators an indication of the current level of

functioning in school. Students in special education have lower overall academic achievement than their peers in the regular education setting (Bielinski & Ysseldyke, 2000; Thurlow et al., 2000; Trimble, 1998; Hanushek, Kain, & Rivkin, 2002). Teachers making referrals for special education services cite academic difficulties in about two-thirds of cases (Lloyd, Kauffman, Landrum, & Roe, 1991). In using assessments to measure academic deficits for children with disabilities, a majority of researchers use grade-level normed academic assessments (Reid, Gonzalez, Nordness, Trout, & Epstein, 2003). Students with disabilities score more poorly than their peers on measures of mathematics and reading achievement, indicating that academic assessments do provide a measure of academic difficulties for these students (Nelson, Benner, Lane, & Smith, 2004; Epstein & Cullinan, 1983). Causal evaluations of special education services suggest that students with disabilities can realize significant improvements in academic by receiving extra services or accommodations under an IEP (Hanushek, Kain, & Rivkin, 2002). Thus, mathematics and reading scores may serve as a key indicator of academic achievement for students with disabilities.

Non-cognitive indicators may also be indicative of a child's level of functioning in school, including children with disabilities. Social and behavioral deficits may lead to children receiving IEP placements or may co-exist with other disability classifications. A sizeable proportion of student receiving special education services have disabilities that affect their social or emotional adjustment (NCES, 2015). Among teacher referrals for special education, about a quarter were due to teachers' observations of poor behavior or psycho-social adjustment (Lloyd et al., 1991). In addition, academic difficulties can affect children's behavior and lead to disruptive behavior, although the direction of

causality is unclear (Morgan, Farkas, Tufis, & Sperling, 2008; Algozzine, Wang, & Violette, 2010). Among students who are declassified from special services, the majority are rated by teachers as being equally or more well-adjusted than their peers from the general education setting (Carlson & Parshall, 1996).

### **SCHOOL FOCUS AT DIFFERENT GRADE LEVELS**

Factors that affect a child's propensity for special education declassification may differ by grade level. In kindergarten and the early primary grades, school curricula place a greater emphasis on socioemotional skills and learning how to function in the school settings. Effective kindergarten standards include the development of pre-literacy and numeracy awareness, social functioning and conflict resolution, and functioning in small and large group settings (Cooper, Allen, Patall, & Dent, 2010). In the early primary grade levels, students are learning early reading and numeracy skills, but mandatory standardized testing does not begin until third grade. Because students are not systematically assessed on mathematics and reading yet in the early primary grades, this may mean that academic assessment scores are not strongly considered as indicators of school functioning prior to third grade.

By the middle and upper elementary grades, schooling focuses more on academic achievement. In third grade, mandatory high-stakes testing begins for all students in reading and mathematics (NCLB, 2001). A student's high performance on this state testing can serve as an indication that he or she no longer requires extra supports to be successful in school. Conversely, low performance in math and reading provide evidence that a child still belongs in a special education placement.

After the elementary school years, students commonly attend a middle school housing grades 6-8, 5-8, or a similar configuration. Middle schools were popularized in the 20<sup>th</sup> century to address the unique needs of early adolescents, who are undergoing rapid development along many dimensions, including physical, emotional, cognitive, and social development. Students' academic performance in middle school has been well-documented to show a marked decline, with both reading and mathematics scores exhibiting a downward trend of about 0.15 standard deviations (Alspaugh, 1998; Byrnes & Ruby, 2007; Rockoff & Lockwood, 2010). In these grades, schools place more emphasis on students' differentiated academic abilities. Academic tracking and different course-taking patterns become prevalent, particularly in mathematics, when students may be placed into pre-algebra or algebra (Hoffer, 1992; William & Bartholomew, 2004). In addition to changes in academic performance, students entering the middle school grades also exhibit lower self-esteem, poor motivation, and an increase in behaviors leading to discipline offenses (Eccles, Midgley, & Adler, 1984; Cook, MacCoun, Muschkin, & Vigdor, 2008). These developmental patterns, both in terms of cognitive and social-behavioral indicators, may mean that special education decision-making teams have less reliable evidence to make determinations of whether students should be removed from special education placement. As a possible consequence, we may expect that socio-emotional indicators have a less significant relationship to declassification in the middle or junior high school years than they do in the early elementary grade levels.

#### **TEACHER CHARACTERISTICS**

Teacher characteristics may influence a child's likelihood of being declassified from special education. Teacher quality, broadly defined, should affect a teacher's ability

to both effectively instruct students in special education, and to make correct declassification decisions. Teacher quality, as defined by a teacher's contribution to student achievement, is not strongly correlated with observable measures such as pre-service training or college entrance exam scores. However, one consistent correlate of teacher quality is the number of years of teaching experience (Harris & Sass, 2011). To effectively respond to the special needs of students in special education, special education coursework is important in training pre-service teachers (Brownell, Ross, Colon, & McCallum, 2005).

In the education policy sphere, research has examined the scarcity of teachers from racial/ethnic minority backgrounds, and their value to minority students. Minority students could benefit from assignment to teachers from the same racial/ethnic group (Clotfelter, Ladd, & Vigdor, 2007). Minority students may see teachers from the same background as role models and mentors (Pitts, 2007; Graham, 1987). Students who are taught by teachers from the same race/ethnicity do enjoy significant improvements to their academic achievement (Dee, 2004). There may be similar implications for school performance for students in special education who have a classroom teacher from their own race/ethnicity. Children with IEPs whose teacher is a race match may experience academic and social gains that could lead to better school performance and disability remediation due to the psychic boost from having a role model or mentor.

## **DATA AND MEASURES**

Data for this study come from the Early Childhood Longitudinal Study-Kindergarten Class of 1998-99 (ECLS-K). This is a nationally representative longitudinal

survey of children, their parents, caregivers, and school teachers and administrators. The data are maintained by the U.S. Department of Education National Center for Education Statistics (NCES). The ECLS-K data set follows children who entered kindergarten in 1998 through seven waves of data collection. The initial sample was selected to be nationally representative of children in kindergarten in fall of 1998, and collected data in fall and spring of the kindergarten year. The sample was freshened in 1999 to be nationally representative of all first-graders, and data was collected in the fall and spring of first grade. Subsequent waves of data collection took place in children's third, fifth, and eighth grade years. In this analysis, I use observations from the spring data collection of the kindergarten, first, third, fifth, and eighth grade waves.

The initial kindergarten sample consists of about 21,400 children in their kindergarten school year in the fall of 1998. Attrition and missing data are common in longitudinal data sets, particularly in surveys that administer a wide variety of measures across time to multiple respondents (such as children, parents, classroom teachers, and school administrators). The ECLS-K survey did not follow the approximately 8,500 children who changed schools between kindergarten and fifth grade, accounting for much of the attrition (Tourangeau, Nord, Le, Sorongon, and Najarian, 2009). At the eighth grade wave of data collection, which took place in spring 2007, approximately 9,700 children were assessed.

In this study, the analytic sample consists of 2150 observations of children who are ever placed in special education and who are observed in the spring of each year of data collection, namely, in spring of kindergarten, first, third, fifth, and eighth grades. This limitation was imposed to minimize selection bias into the population of special

education students, who do differ from the overall population of children, as discussed below. By limiting the empirical analysis to students who were in special education, I can instead focus on characteristics that predict declassification and examine whether there are differences across grade levels and by child and teacher observable characteristics. Children who were analyzed are descriptively similar to those who were lost due to attrition.

*Special education placement.* Special education placement is measured by a question on the school questionnaire asking whether a child has an Individualized Education Program, or IEP. Observations were coded as “1” for special education placement at an observed grade level if the child was recorded as having an IEP or having a specific disability listed in the follow-up questionnaire, and coded as “0” otherwise. If a student at time  $t-1$  was observed in special education placement, and that student was not in special education at time  $t$ , that student was coded as a special education leaver at time  $t$ . In all analyses, the sample was limited to students who were ever observed as being in a special education placement. This sample limitation was imposed to limit selection bias of students placed in special education and to draw conclusions about the effects of predictor variables on the timing of special education declassification.

*Reading and math assessments.* The reading assessments in each wave of data collection measure children’s ability to read and understand written texts. Items assess children’s basic skills (such as letter or word recognition and phonemic awareness), vocabulary, and reading comprehension (i.e., demonstrating a grasp of the text or drawing inferences). The content of the reading assessments changed over time during

the survey to reflect children's maturity and mastery of reading. For example, in first grade, the assessment consists of 40% basic skills, 10% vocabulary, and 50% reading comprehension components, while in fifth grade, the emphasis shifts to 10%, 10%, and 80%, respectively (Pollack, Atkins-Burnett, Najarian, & Rock, 2005).

Items on the reading assessment were selected by a review panel. Some questions were drawn from published tests, including the Peabody Picture Vocabulary Test and the Woodcock-Johnson Tests of Achievement. Other items were supplied by the Educational Testing Service, classroom teachers, and curriculum coaches. All items were field-tested, and were chosen if they exhibited appropriate item response theory parameters and no differential item functioning by race or gender (NCES, 2004).

The mathematics assessment tests children's conceptual knowledge, procedural knowledge, and problem-solving skills within specific mathematics content strands, which include number sense, properties and operations, geometry and spatial sense, and data analysis. Items were selected based on grade-level standards from the National Council of Teachers of Mathematics to correspond to strands of mathematics concepts. Items were field-tested and compared to the Woodcock-McGrew-Werder Mini-Battery of Achievement to ensure their reliability and validity (Pollack et al, 2005).

The reading and mathematics direct assessments were administered using a two-stage individual assessment. In the first stage, children were given a short routing test in each subject area that routed them to different levels of difficulty within each assessment domain. In the second stage, children completed a test form based on the difficulty routing system. Assessors were trained to administer the one-on-one untimed test, and

were certified based on their ability to accurately score children's responses and use appropriate testing procedures when working with children (Pollack et al, 2005).

The cognitive assessments were scored using an item response theory (IRT) approach. IRT uses a child's pattern of correct, incorrect, and omitted responses to estimate the test-taker's true ability in each domain. IRT scoring, for example, can compensate for a low-ability child (indicated by incorrectly answering items of low difficulty) correctly guessing on items of high difficulty, and will produce a more accurate estimate of cognitive skills.

A Bayesian shrinkage procedure was applied to re-estimate direct cognitive assessment scores when later waves of data were collected. This approach incorporates prior information about ability distribution into later IRT estimates to correct for floor or ceiling effects or other measurement errors, which is particularly important for gauging change in longitudinal studies. Updating the assessment scores using prior information helps correct measurement error and provide a truer picture of children's ability in reading and mathematics (NCES, 2004). In all analyses, measures of reading and math are standardized across subject-grade level to a mean of zero and standard deviation of one (z-scores). Coefficients can be interpreted as effect sizes, which allows for clear comparisons among different grade levels or scale score systems (Cohen, 1975)<sup>2</sup>.

*Teacher social rating scales.* The ECLS-K uses a modified version of the Social Skills Rating System (Gresham & Elliott, 1990). The Social Skills Rating System (SSRS) is a behavior rating scale designed to measure children's social behaviors and assess

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<sup>2</sup> Effect size or z-score quantifies the discrepancy between two groups or between an observation and the average of a normal distribution, taking into account the spread of scores. It is calculated as  $\frac{x_i - \mu}{\sigma}$ , where  $x_i$  represents the score of individual  $i$ ,  $\mu$  is the population mean, and  $\sigma$  is the population standard deviation.

problem behaviors. The NCES modified the SSRS for use in the ECLS-K survey.

Changes to the original rating forms included the following: (1) inclusion of additional items to measure children's classroom engagement, (2) expanding the response options to include an option for "not observed", and (3) changing the wording on some items to reduce the risk of cultural bias (Meisels, Atkins-Burnett, and Nicholson, 1996).

The Teacher Social Rating Scale administered as part of the ECLS-K includes five subscales: (1) Approaches to Learning, (2) Self-Control, (3) Interpersonal Skills, (4) Externalizing Problem Behaviors, and (5) Internalizing Problem Behaviors (NCES, 2004). Each of these subscales was validated using confirmatory and exploratory factor analysis (Pollack, Atkins-Burnett, Najarian, 2005). Teachers rate children using a frequency scale to describe how often they observe the child exhibiting a skill or behavior, ranging from 1=never to 4=very often. The Approaches to Learning scale measures behaviors that describe children's engagement in classroom learning activities (e.g., attentiveness, task persistence, eagerness to learn). The Self-Control scale measures a child's ability to exert socially appropriate self-control (e.g., respecting other's property, controlling his or her temper, and responding acceptably to peer pressure). The scale for Interpersonal Skills assesses children's ability to initiate and keep peer relationships (e.g., comfort or help peers, get along with others who are different from oneself). The Externalizing Problem Behavior scale evaluates negative behaviors directed towards the child's external environment, such as arguing, fighting, or disrupting the classroom. The Internalizing Problem Behavior rating scale measures negative behaviors directed inwardly, such as displaying anxiety, loneliness, or sadness. In all analyses, each subscore of the SRS is standardized to a mean of zero and standard deviation of one (z-

scores) (see, e.g., Morgan, Farkas, Hillemeier, Mattison, Maczuga, Li, & Cook, 2015). This allows for simple comparisons and clearly-understood effect sizes among different sections of the behavior rating scale and different grade levels.

*Child and family characteristics.* The analysis includes many child and family characteristics that may impact placement in or declassification from special education. Indicators for child gender and race are included among the demographic controls. I also include antecedent household variables that might act as potential confounds. These variables include indicators for mother's education level, parents' marital status, number of siblings, and household income.

*Teacher characteristics.* The analysis also controls for lagged teacher characteristics which might act as potential confounds for the likelihood of special education declassification. I control for teacher race/ethnicity, years of experience, an indicator variable for whether the teacher and student are from the same race/ethnicity, and an indicator of whether the teacher has taken at least one course focusing on special education. Due to small teacher sample sizes of ethnicities other than white non-Hispanic, all ethnicities other than white are combined to a single nonwhite category which includes black or African-American, Hispanic, Asian/Pacific Islander, and American Indian/Alaskan Native.

Table 1 below display summary statistics for children observed at first, third, fifth, and eighth grades for students who were observed to have an IEP at the preceding grade level, and were thus eligible to be declassified from special education at that point in time. The teacher characteristics and student academic achievement and social skills are lagged characteristics that were observed at the preceding grade level. The population

of children receiving special education services had teachers with eight to nine years of teaching experience on average across all grade levels, and about three-quarters had teachers who had taken at least one special education class during their training. Seventy to eighty percent of student observations had teachers belonging to the same race/ethnicity, and this was driven largely by white students with white teachers, given the relatively low (below 10%) of students with a non-white classroom teacher. The profile of students with IEPs at all grade levels suggests that about two-thirds of these children are white. Children identified as black and as Hispanic each make up about ten to fifteen percent of the IEP population, with smaller percentages from Asian or “other race” categories. About two-thirds of students with IEPs are boys, and on average, children in special education are about one to two months older than the full population of grade-level peers. These demographic characteristics are consistent with other documented profiles of students in special education (NCES, 2015).

**Table 1 Descriptive statistics for students with IEPs**

	<u>1st</u>		<u>3rd</u>		<u>5th</u>		<u>8th</u>	
	<u>Mean</u>	<u>Std Dev</u>	<u>Mean</u>	<u>Std Dev</u>	<u>Mean</u>	<u>Std Dev</u>	<u>Mean</u>	<u>Std Dev</u>
<b>Lagged teacher characteristics</b>								
Years experience	9.831	(7.67)	8.814	(8.16)	8.217	(7.51)	8.513	(7.80)
Special education courses	74.4%	(0.44)	74.7%	(0.44)	69.1%	(0.46)	75.5%	(0.43)
Race match with child	70.1%	(0.46)	71.7%	(0.45)	73.6%	(0.44)	81.2%	(0.39)
Nonwhite	5.5%	(0.23)	4.8%	(0.21)	5.9%	(0.24)	9.1%	(0.29)
<b>Child demographic</b>								
White	69.5%	(0.46)	70.9%	(0.45)	69.5%	(0.46)	67.8%	(0.47)
Black	12.1%	(0.33)	11.2%	(0.32)	9.9%	(0.30)	11.7%	(0.32)
Hispanic	10.8%	(0.31)	9.6%	(0.30)	14.4%	(0.35)	13.4%	(0.34)
Asian	1.4%	(0.12)	2.6%	(0.16)	2.0%	(0.14)	2.2%	(0.15)
Other race	6.3%	(0.24)	5.6%	(0.23)	4.3%	(0.20)	4.8%	(0.21)
Female	35.0%	(0.48)	36.5%	(0.48)	34.3%	(0.48)	37.1%	(0.48)
Age, mean-centered, months	1.432	(5.25)	1.678	(5.20)	1.119	(5.05)	1.082	(5.24)
<b>Other household characteristics</b>								
Household income, thousands	47.696	(47.59)	52.952	(46.60)	59.040	(49.24)	64.280	(54.89)
Mother less than high school	16.4%	(0.37)	11.6%	(0.32)	12.6%	(0.33)	9.8%	(0.30)
Mother high school	35.2%	(0.48)	34.5%	(0.48)	30.7%	(0.46)	28.0%	(0.45)
Mother some college	32.9%	(0.47)	31.7%	(0.47)	33.9%	(0.47)	36.3%	(0.48)
Mother college degree	15.5%	(0.36)	22.1%	(0.42)	22.8%	(0.42)	25.9%	(0.44)
Parents never married	14.9%	(0.36)	8.8%	(0.28)	8.8%	(0.28)	9.9%	(0.30)
Parents previously married	15.9%	(0.37)	15.7%	(0.36)	19.4%	(0.40)	20.6%	(0.41)
Parents married	69.3%	(0.46)	75.5%	(0.43)	71.8%	(0.45)	69.4%	(0.46)
Number of siblings	1.566	(1.10)	1.620	(1.08)	1.654	(1.22)	1.541	(1.17)
<b>Lagged standardized child performance</b>								
Reading	-0.503	(1.12)	-0.429	(1.08)	-0.608	(1.11)	-0.649	(1.11)
Math	-0.425	(1.14)	-0.378	(1.15)	-0.404	(1.07)	-0.472	(1.15)
Approaches to learning	-0.484	(1.04)	-0.526	(1.05)	-0.576	(0.95)	-0.478	(0.99)
Self-control	-0.219	(1.04)	-0.186	(1.03)	-0.224	(1.04)	-0.299	(1.06)
Interpersonal skills	-0.284	(1.06)	-0.271	(1.04)	-0.335	(1.00)	-0.333	(1.05)
Internalizing problem behavior	0.341	(1.09)	0.357	(1.06)	0.417	(1.12)	0.452	(1.12)
Externalizing problem behavior	0.187	(1.08)	0.204	(1.10)	0.236	(1.06)	0.312	(1.11)

Notes: n=500 in first grade; n=500 in third grade; n=550 in fifth grade; n=600 in eighth grade

In terms of academic and social skills measures, children in special education perform more poorly than the overall population, which can be seen in the lagged performance indicators, which were standardized across the full population of children at each grade level. In reading, children with IEPs perform about 0.4 to 0.6 standard deviations worse than the average. Math scores are similar but slightly higher. All measures of social and behavioral skills for children with IEPs are below average. In the

measure for Approaches to Learning, students in special education score about half a standard deviation below average at all grade levels. Self-Control and Interpersonal Skills were comparatively higher, about 0.2 standard deviations below the overall population average. Internalizing Problem Behavior and Externalizing Problem Behavior are reverse coded from the other three social skills indicators, and averages of both of these measures suggest that students in special education are displaying more problem behaviors than the overall student population. Internalizing Problem Behaviors are about 0.35 to 0.45 standard deviations above the mean, and Externalizing Problem Behaviors are about 0.2 to 0.3 standard deviations higher than the overall student population. This is suggestive that students who receive special education services are performing more poorly than their peers in the general education setting, both in terms of academics and in social and behavioral functioning.

## **METHOD**

I use individual- and teacher-level variables to predict a student's likelihood of exiting special education at each of the grade levels that has a preceding grade level observed (namely, first, third, fifth, and eighth grades). Lagged cognitive measures, social skills, and teacher characteristics help avoid endogeneity problems inherent in using contemporaneous measurement of these predictors, where the assessment of current skills might be influenced by the child's placement in special education. By using lagged measures, I can better control for cognitive and social skills on students' propensity to be declassified from special education.

Probit regression is appropriate for modeling the dichotomous outcome of a child's being declassified from special education and estimating the magnitudes of predictors. However, basic probit regression cannot fully account for survey sampling procedures that sample multiple children from selected schools. To accommodate the survey design, I used weighted probit regressions with sampling weights for each wave of data collection, and clustered standard errors at the school level. Doing so should result in more accurate estimation of student-level effects while accounting for the correct error structure for students who attend the same school.

I estimate the association of special education declassification with lagged measures of cognitive and social skills, child and family demographic characteristics, and school characteristics in probit models of the following form for the pooled sample of children in first, third, fifth, and eighth grades:

$$\begin{aligned}
 SPED\_LEAVER_{it} & \\
 &= \beta_0 + Teacher_{it-1}\beta_1 + Child\_Demographic_i\beta_2 \\
 &+ Family_{it-1}\beta_3 + Academic\_Social_{it-1}\beta_4 + \varepsilon_{it}
 \end{aligned}$$

Here, I estimate the likelihood of special education declassification for individual student  $i$  at time  $t$  as a function of lagged teacher characteristics and child demographic, controlling for other household characteristics and lagged cognitive and social skill indicators observed at the preceding time  $t-1$ , which addresses research question (1). In Table 2 below, I report average partial effects for each predictor on the outcome. The average partial effect describes the partial effect of each explanatory variable averaged across the population distribution (Wooldridge, 2005). Due to the small number of observations of children with IEPs within each school, I was unable to include school

fixed effects, which would control for time-invariant school characteristics affecting the likelihood of declassification and would produce estimates of the within-school effect of the explanatory variables. I also estimated separate models for each of the four observed grade levels to determine whether predictors of special education classification may differ by grade level to address research question (2). The average partial effects from these four grade level models are shown below in Table 3.

## **RESULTS**

Table 2 presents the marginal effects of probit regression models predicting special education declassification predicted by cognitive and social skills in the pooled sample of students from grades one, three, five, and eight in the ECLS-K survey. In these models, standard errors were clustered by school, correcting for the ECLS-K's clustered sampling design, which would otherwise produce attenuated standard errors that might overstate statistical significance. Marginal effects presented in these results are calculated as average partial effects by averaging the individual partial effects across observations observed in the sample. The average partial effect describes the partial effect of each variable averaged across the population distribution. In a probit model with many dichotomous explanatory variables, this is more appropriate than presenting partial effects at the average, where many variables will take on average values not actually observed within the data.

**Table 2. Estimated marginal effects of teacher characteristics, demographic and household characteristics, and school performance on special education declassification**

	<u>Pooled grade levels</u>
<b>Lagged teacher characteristics</b>	
Years experience	0.000 (0.001)
Special education courses	-0.008 (0.013)
Race match with child	0.020 (0.023)
Nonwhite	0.076 *** (0.022)
<b>Child demographic</b>	
Black	0.108 *** (0.028)
Hispanic	0.106 *** (0.028)
Asian	0.048 (0.045)
Other race	0.064 (0.041)
Female	0.014 (0.013)
Age, months	-0.011 *** (0.001)
<b>Other household characteristics</b>	
Household income, thousands	0.000 (0.000)
Mother less than high school	0.066 *** (0.024)
Mother high school	0.046 ** (0.019)
Mother some college	0.030 * (0.017)
Parents never married	0.009 (0.016)
Parents previously married	0.062 *** (0.020)
Number of siblings	-0.006 (0.005)
<b>Lagged child performance</b>	
Reading	0.090 *** (0.009)
Math	0.029 *** (0.008)
Approaches to learning	-0.001 (0.009)
Self-control	-0.013 (0.011)
Interpersonal skills	0.014 (0.010)
Internalizing problem behavior	-0.010 * (0.006)
Externalizing problem behavior	-0.028 *** (0.008)

Notes: (1) legend: \* p<.1; \*\* p<.05; \*\*\* p<.01  
(2) n=2150

In Table 2, the model uses lagged (i.e., measured in spring of the previous observed school year) teacher characteristics, child demographic and household characteristics, and lagged academic and social skills measures to predict children's likelihood of being declassified from special education by spring of the observed school year. Among the observable teacher characteristics, the only significant finding was for the indicator for "nonwhite." A child who was taught by a nonwhite classroom teacher in the preceding grade level was about 7.6 percentage points more likely to be declassified from special education, holding all else equal.

Among the child demographic characteristics, the indicators for "black" and "Hispanic" were both statistically and substantively significant, with children from these race/ethnicity groups being about 10 percentage points more likely than white children to be declassified, holding all else constant. The other racial/ethnic groups were not statistically different, nor was "female" relative to male. Mean-centered age, in months, was a significant predictor of declassification, with an increase of one month in age associated with about a 1.1 percentage point lower likelihood of declassification.

Among the household variables, lower levels of maternal education were associated with greater rates of special education declassification relative to mothers with a college degree, holding all else equal. In terms of parent marital status, "previously married" was associated with about a 6.2 percentage point greater likelihood of declassification relative to the omitted reference group, married parents. Children of parents who were never married did not show a statistical association with the probability of declassification.

Math and reading scores are associated with a higher probability of special education declassification. A one standard-deviation increase in reading scores is associated with 9.0 percentage point higher likelihood of special education declassification. For math scores, a one standard-deviation increase is associated with a 2.9 percentage point higher likelihood of declassification. For social-emotional ratings, results were mixed. Three of the social skills ratings—Approaches to Learning, Self-Control, and Interpersonal Skills—did not show a significant relationship with the outcome of special education declassification. However, the measures of problem behavior were significantly related to special education declassification. For Internalizing Problem Behavior, a one standard-deviation increase in reported behavior was associated with a 1 percentage point lower likelihood of IEP declassification, which was marginally significant. The relationship was stronger for Externalizing Problem Behavior, for which a one standard-deviation increase in reported behavior was associated with a 2.8 percentage point lower likelihood of declassification. These results suggest that children's performance and functioning in school, both academic and in terms of social-emotional adjustment, are related to special education placement decisions.

To examine whether prediction of special education declassification differed by grade level, I ran models separately for children in special education in first, third, fifth, and eighth grades. These results are presented below in Table 3. In the separate grade level models, lagged teacher characteristics are significant predictors of special education declassification. Years of experience are positively associated with declassification for students in third and fifth grade, with each additional year of teacher experience predicting 0.04 higher likelihood of declassification for third graders and 0.03 higher in

fifth grade, holding all else constant. In first and eighth grades, years of teacher experience is not statistically significant. A teacher's special education course-taking history is predictive of declassification in fifth grade and eighth grade. Fifth-grade students whose previous teacher who had taken at least one special education course were 8.3 percentage points more likely to be declassified, holding all else constant. In eighth grade, the magnitude was similar, but with the sign reverse, with a student whose previous teacher had taken a special education course being about 9 percentage points less likely to be declassified, holding all else equal.

A student who has a teacher of the same race/ethnicity has a differential likelihood of declassification in third, fifth, and eighth grades. Note that this term can be thought of as an interaction between child race and teacher race, and coefficients are presented as interaction effects, rather than as linear combinations of the base effect and moderating effect. Children in special education whose teacher is of the same race/ethnicity are 21 percentage points more likely to be declassified in third grade and 14 percentage points more likely in eighth grade, holding all else equal. The coefficient for the race match indicator is negative and weakly significant in fifth grade, with students being 6.5 percentage points less likely to be declassified, *ceteris paribus*. In first grade, this coefficient is not statistically different from zero.

**Table 3. Estimated marginal effects of teacher characteristics, demographic and household characteristics, and school performance on special education declassification, by grade levels**

	<u>1st</u>	<u>3rd</u>	<u>5th</u>	<u>8th</u>
<b>Lagged teacher characteristics</b>				
Years experience	0.000 (0.002)	0.004 ** (0.002)	0.003 ** (0.001)	-0.001 (0.001)
Special education courses	-0.037 (0.024)	-0.025 (0.025)	0.083 *** (0.020)	-0.090 *** (0.024)
Race match with child	-0.032 (0.055)	0.212 *** (0.076)	-0.065 ** (0.030)	0.135 *** (0.042)
Nonwhite	0.262 *** (0.075)	-0.255 *** (0.051)	0.104 *** (0.029)	0.026 (0.039)
<b>Child demographic</b>				
Black	-0.028 (0.056)	0.278 *** (0.064)	0.028 (0.037)	0.217 *** (0.049)
Hispanic	-0.042 (0.061)	0.325 *** (0.061)	-0.002 (0.036)	0.218 *** (0.048)
Asian	-0.079 (0.078)	0.354 *** (0.066)	-0.226 *** (0.047)	0.212 *** (0.073)
Other race	-0.077 (0.054)	0.286 *** (0.079)	0.104 ** (0.051)	0.122 * (0.065)
Female	-0.077 *** (0.021)	0.020 (0.023)	-0.007 (0.019)	0.073 *** (0.025)
Age, months	-0.005 * (0.003)	-0.010 *** (0.002)	-0.012 *** (0.002)	-0.012 *** (0.002)
<b>Other household characteristics</b>				
Household income, thousands	(0.000) (0.000)	(0.000) (0.000)	0.000 (0.000)	(0.000) (0.000)
Mother less than high school	-0.067 (0.041)	0.150 *** (0.045)	0.326 *** (0.028)	-0.077 * (0.046)
Mother high school	0.152 ** (0.060)	0.096 *** (0.033)	0.116 *** (0.028)	-0.033 (0.036)
Mother some college	0.129 ** (0.053)	0.046 (0.033)	0.089 *** (0.026)	-0.015 (0.031)
Parents never married	0.088 * (0.049)	0.145 *** (0.041)	-0.013 (0.033)	0.124 *** (0.038)
Parents previously married	0.117 *** (0.041)	-0.047 (0.033)	-0.038 (0.025)	-0.012 (0.028)
Number of siblings	-0.005 (0.011)	0.002 (0.011)	-0.025 *** (0.008)	0.007 (0.009)
<b>Lagged child performance</b>				
Reading	0.069 *** (0.020)	0.070 *** (0.017)	0.143 *** (0.012)	0.083 *** (0.015)
Math	-0.053 ** (0.021)	0.055 *** (0.015)	0.029 ** (0.013)	0.055 *** (0.017)
Approaches to learning	0.001 (0.019)	0.035 ** (0.015)	-0.023 * (0.014)	0.006 (0.018)
Self-control	-0.017 (0.026)	-0.054 ** (0.023)	-0.033 ** (0.017)	0.022 (0.019)
Interpersonal skills	-0.006 (0.021)	0.012 (0.019)	0.045 *** (0.016)	0.018 (0.019)
Internalizing problem behavior	0.032 ** (0.014)	0.029 ** (0.012)	-0.041 *** (0.008)	-0.032 *** (0.011)
Externalizing problem behavior	-0.062 *** (0.020)	-0.019 (0.016)	-0.030 ** (0.012)	-0.010 (0.014)

Notes: (1) legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

(2) n=500 in first grade; n=500 in third grade; n=550 in fifth grade; n=600 in eighth grade

Students with nonwhite teachers have different likelihood of special education declassification in first, third, and fifth grade. For first graders, a student whose previous teacher was non-white were 26.2 percentage points more likely to be declassified, holding all else equal. Among third grade students, the effect of a nonwhite teacher was the opposite, with these students being 25.5 percentage points less likely to be declassified. In fifth grade, the results were again positive but smaller in magnitude, with students of nonwhite teachers being about 10.4 percentage points more likely to be declassified, *ceteris paribus*. Results in eighth grade were statistically not different from zero.

Turning to child demographic characteristics, race/ethnicity was predictive of special education declassification in third, fifth, and eighth grade. Black students are over 20 percentage points more likely than white students (the omitted reference group) to be declassified in third and fifth grade, with coefficients in the other grade levels statistically insignificant. Results are similar for Hispanic students, whose likelihood of declassification is 32.5 percentage points higher in third grade and 21.8 points higher in eighth grade. For Asian students, results are mixed. Asian students are significantly more likely to be declassified in third and eighth grades, by 35.4 and 21.2 percentage points, respectively, but the coefficient reverses sign to -22.6 percentage points in fifth grade. I also examine whether gender or age are predictive of special education declassification. In terms of gender, *female* is associated with 7.7 percentage points lower likelihood of special education declassification for first graders. The coefficient is insignificant for third and fifth grades. Among eighth graders, girls are 7.3 percentage points more likely to be declassified. Students' age (in months) is predictive of declassification at all

observed grade levels, with each additional month of age associated with a lower likelihood of declassification.

Among the household control variables, lower levels of maternal education are associated with greater likelihood of special education declassification at all grade levels. Unmarried marital statuses are associated with greater probability of declassification in all grade levels other than fifth grade. The number of siblings is statistically insignificant except for an isolated negative coefficient in fifth grade.

When we examine the separate grade level results for academic indicators, the findings are consistent with the pooled grade level model. Overall, better performance on math and reading assessments is associated with a greater likelihood of special education declassification, with a standard deviation increase in each scores predicting a 5 to 10 percent higher probability of declassification at all observed grade levels other than first grade. The social skills indicators do not show a consistent pattern of association with declassification, however. Approaches to Learning is significantly associated with declassification in third and fifth grade, though with opposite signs in these grade levels, and is insignificant at first and eighth grades. Self-Control shows a significant and negative coefficient at third and fifth grade. Interpersonal Skills are insignificant at all but fifth grade. The coefficients for Internalizing Problem Behavior are positive in first and third grades, indicating that higher reports of these behavior are associated with a greater likelihood of declassification, but this reverses in fifth and eighth grades. For Externalizing Problem Behavior, results suggest that children who display more of these behaviors are marginally less likely to be declassified, though the coefficients are significant only in first and fifth grades.

Finally, I test for differences in model coefficients between grade levels. Results for pairwise differences between adjacent grade levels are displayed below in Table 4. These findings suggest that having a nonwhite teacher produces statistically different likelihoods of special education declassification between first and third grade and between third and fifth. However, the estimates are not statistically different between fifth and eighth grade. Children who have teachers from the same race/ethnic group have different likelihoods of declassification between fifth grade and the adjacent observed grade levels. Coefficients are also statistically different between fifth and eighth grades for the teacher special education course indicator. Teacher years of experience do not have differential effects at any observed grade levels.

For child demographic characteristics, there are no statistically different results between grade levels for declassification likelihood for black students, relative to white students. The different likelihood for Hispanic students, who are more likely to be declassified in third and eighth grade, are statistically significant, as are differences for Asian children. Girls have a lower likelihood of declassification in first grade, which is statistically different from the estimate in third grade, but the differences between fifth and eighth grades are not statistically different. Children's age in months is associated with a lower likelihood of IEP declassification consistently at all grade levels, and these coefficients are not statistically different from each other.

**Table 4 Tests for differences in grade-level coefficients**

	<u>1st to 3rd</u>	<u>3rd to 5th</u>	<u>5th to 8th</u>
	<u>Chi-sq</u>	<u>Chi-sq</u>	<u>Chi-sq</u>
<b>Lagged teacher characteristics</b>			
Years experience	0.39	0.01	0.88
Special education courses	0.14	2.41	7.12 ***
Race match with child	1.72	2.71 *	4.18 **
Nonwhite	9.60 ***	6.32 **	0.67
<b>Child demographic</b>			
Black	2.32	1.92	2.37
Hispanic	2.93 *	3.14 *	3.35 *
Asian	2.44	7.17 ***	5.51 **
Other race	2.64	0.68	0.01
Female	3.29 *	0.18	1.67
Age, mean-centered, months	0.11	0.13	0.00
<b>Other household characteristics</b>			
Household income, thousands	0.18	0.18	0.21
Mother less than high school	2.58	2.54	12.82 ***
Mother high school	0.53	0.07	2.77 *
Mother some college	0.94	0.26	1.74
Parents never married	0.06	1.69	1.89
Parents previously married	3.88 **	0.01	0.13
Number of siblings	0.09	1.16	1.90
<b>Lagged standardized child performance</b>			
Reading	0.29	3.03 *	2.26
Math	4.93 **	0.30	0.38
Approaches to learning	0.38	1.74	0.44
Self-control	0.14	0.10	1.19
Interpersonal skills	0.10	0.44	0.30
Internalizing problem behavior	0.16	5.60 **	0.13
Externalizing problem behavior	1.53	0.09	0.28

Notes: n=500 in first grade; n=500 in third grade; n=550 in fifth grade; n=600 in eighth grade; \* p<.1; \*\* p<.05; \*\*\* p<.01

In terms of child performance, we see a difference in coefficients between third and fifth grade, when reading scores have higher predictive associations with special education declassification. For math scores, the negative coefficient in first grade is statistically different from the positive estimate in third grade. The coefficients in third,

fifth, and eighth are not statistically different from each other. The only other performance indicator that shows different effects at different grade levels is internalizing problem behavior. The coefficient changes sign from positive in the early elementary grades to negative in fifth and eighth grade, and this difference is statistically significant.

## **DISCUSSION**

In this paper, I use nationally-representative data to identify the marginal associations of teacher characteristics and child demographic characteristics on special education declassification, while controlling for family characteristics and child performance in school. I estimate the average partial effects of each predictor to examine whether prior academic achievement and social skills, individual and family characteristics, and school characteristics can predict a student's likelihood of exiting special education placement in a pooled grade level model. Because disabilities may have different developmental timing in their remediation, and because teachers and parents may be responding to different signals of academic or social competence based on a child's grade level, I also estimate models separately by grade level. In all analyses, I limit the sample to students who were observed to be placed in special education in the preceding observed grade level. This sample includes about 500 students in first and third grades, 550 in fifth grade, and 600 in eighth grade.

My analyses indicate that lagged measures of teacher characteristics and student demographics are significant predictors of special education declassification, although the magnitude and directions of these explanatory variables differs by grade level. In the pooled grade level model, students who had a nonwhite teacher in the preceding grade

level were associated with a higher likelihood of declassification. In the separate grade level models, we see that this finding is driven by results for first graders and fifth graders. The teacher-student race congruence indicator is positive and significant in third and eighth grades, meaning that a child who is taught by a teacher of the same race is more likely to be declassified, but this coefficient is negative and significant in fifth grade. In interpreting these grade level differences, we must also take into consideration the average trends for students and teachers at each grade level. In eighth grade, a comparatively high proportion of children with IEPs had a nonwhite teacher and had a teacher race match in the preceding time period. This may mean that the higher likelihood of having nonwhite teachers in the middle school grades is a driver for the positive coefficient on race match in eighth grade. The net effect is that students of nonwhite teachers who are of the same race/ethnicity as their teacher are more likely to be declassified, holding all else constant, at all observed grade levels.

Previous research has suggested that minority teachers are uniquely situated to improve the performance of minority students by serving as role models and advocates, and there are indeed positive and significant effects on student achievement for minority students with race-congruent teachers (Pitts, 2007; Dee, 2004; Egalite, Kisida, & Winters, 2015). This phenomenon may extend into the special education setting, with minority teachers serving as advocates for minority students and nudging them out of the special education system. This seems to have particular significance during early childhood and when children are entering or close to entering middle school, which are both periods of school transition for students. These liminal periods may present critical opportunities when teacher characteristics are especially significant for students.

A child's performance on academic work and social skills or behavior in the classroom may provide parents and educators with indications that the student no longer needs the extra supports provided by special education to be successful in school. Students in special education have lower overall academic achievement than their peers in the regular education setting (Bielinski & Ysseldyke, 2000; Thurlow et al., 2000; Trimble, 1998; Hanushek, Kain, & Rivkin, 2002). Thus, academic achievement is likely to serve as a key indicator for the need for special education placement. Non-cognitive indicators, such as measures of social skills and behavior, may also provide a signal to parents or educators of the need for special education services. A sizeable proportion of student receiving special education services have disabilities that affect their social or emotional adjustment, and this is a common reason cited for special education referrals (NCES, 2015; Lloyd et al., 1991). Academic difficulties can affect children's behavior and lead to disruptive behavior, although the direction of causality is unclear (Morgan, Farkas, Tufis, & Sperling, 2008; Algozzine, Wang, & Violette, 2010). Thus, measures of social skills and behavior also likely serve as a signal to parents and educators for the need for special education services.

The pooled grade level model masks the differential associations between teacher experience and special education coursework that appear at various grade levels. I find that additional years of teaching experience is predictive of declassification for third graders and fifth graders, but not the other grade levels observed. In a similar mixed finding, students whose teachers who had taken special education courses were more likely to be declassified in fifth grade, but less likely in eighth grade. We may expect that years of experience and special education coursework can serve as indicators of teacher

quality, which should be associated with correct decision-making on questions of special education placement. No clear pattern emerges about the effects of these teacher characteristics on student declassification decisions.

Black and Hispanic students are more likely than white students, the reference group, to be declassified. Black students do not have a differential likelihood of declassification at different grade levels. In the separate grade level models, the result for Hispanic students seems to be driven by results at third and eighth grade. Asian students are more likely to be declassified in third and eighth grade, though that is offset by the negative results in fifth grade to the extent that this is insignificant in the pooled grades model. Similarly, “other race” students are more likely than white students to be declassified in third, fifth, and eighth grades, but this is sufficiently offset by the first grade null finding to make the overall result null in the pooled grades model. On balance, nonwhite students seem to be more likely to be declassified than white students. This finding adds to the growing body of special education literature which is increasingly suggesting that minority students are less likely than white student to be in special education placements, after controlling for other demographic and student achievement characteristics (Morgan et al., 2015; Morgan & Farkas, 2016). While previous research has found disproportionate special education placement rates by race/ethnicity, my findings suggest that part of the disparity in placement may be coming from declassification decisions, with minority students more likely to exit the special education system.

## **CONCLUSION**

This paper examines the associations between teacher characteristics and student demographic characteristics on special education declassification at several time points during the elementary and middle school years. Teacher race/ethnicity and race congruence with students appear to be predictive of declassification decisions, while indicators of teacher quality are not found to be significant. In terms of student race/ethnicity, black and Hispanic students are either more likely to be declassified from special education. Other racial minorities show a greater likelihood than white students at certain grade levels, but are not significant across the span of grade levels observed.

A sizable body of literature exists discussing student placement in special education, with a focus on disproportionate representation by race/ethnicity. Although a sizable portion of students with IEPs are ultimately returned to the general education setting, very little empirical work has examined the dynamics or predictors of declassification. This study seeks to fill this void in the literature by examining how cognitive and non-cognitive skills and race/ethnicity affect declassification decisions. These results may clarify how teachers or decision-makers consider different aspects of child development as indicators of disability or disability remediation, and how these differ throughout the course of elementary and middle school. Results do not provide support that racial/ethnic minorities are being excluded from the general education setting under “racial segregation under the guise of ‘disability’.” (Ferri & Connor, 2005).

This study has several limitations. First, analyses are based on a limited number of observations throughout the course of the elementary and middle school years, and the sample is limited to children who did not move out-of-district during the course of the longitudinal study. I cannot observe full information about the point in time at which

students are declassified, simply that a student was in a special education placement at one point in time, then was no longer in special education at the subsequent observation. This may introduce limitations when interpreting teacher effects on declassification. I cannot observe with certainty whether the student's preceding teacher played a role in the declassification process. Due to the lengthy nature of the special education placement and declassification processes, it may be a reasonable assumption that the time-lagged teacher did affect the decision process. However, this assumption becomes more tenuous when considering the fifth to eighth grade transition, in which the observed grade levels are separated by three years. Thus, we should be cautious when interpreting the predictive power of teacher characteristics in the eighth-grade model.

A second limitation is that these analyses do not employ a hypothesized causal agent. The population of special education students is by definition different from the overall student population in some significant respects, and vary widely in terms of their own performance in school and developmental trajectory. This makes any causal effects difficult to isolate for special education students. For example, the ECLS-K data does not allow me to observe information about school funding or other resource allocations. Explicit measures of per-pupil expenditures predicting special education placement decisions may contribute to understanding the factors that are associated with declassification decisions.

This study has theoretical and practical implications for educators and policy-makers. While a sizeable body of literature exists that examines differences in special education placement rates among different socio-demographic groups, relatively research has examined predictors of special education declassification. These results highlight the

need for further study into the factors that inform special education declassification decisions, and how children's cognitive, social, and emotional development might play into this. These results also suggest that emphasis on different aspects of academic curricula at different grade levels may be influencing special education placement and declassification decisions. This points to the need for a closer examination of how declassification decisions are made.

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## **CHAPTER 4: SPECIAL EDUCATION PLACEMENT RATES, EDUCATION FUNDING, AND POPULATION CHARACTERISTICS**

### **INTRODUCTION**

The special education system is a crucial component of public K-12 instruction because it addresses the needs of students with disabilities that have an adverse effect on their education. Special education programs are designed for students with physical, mental, or socio-emotional impairments whose needs cannot be met within the traditional classroom environment. Special education provides extra services and adapted instruction at no cost to parents to meet the unique needs of children with disabilities. This may include individually planned and monitored arrangements of teaching practices and adaptive learning materials. These interventions help make education accessible to students whose academic performance and classroom functioning would otherwise suffer due to their disabilities.

The extra supports and services provided through special education can be costly for public schools. Interventions for students with disabilities may require specialized equipment, facilities, and extra personnel in schools, including classroom teachers, aides, and specialists or therapists. As a result of these supports, students receiving special education services cost more to educate than general education students. According to the National Education Association, students in special education cost on average about \$9000 more to educate than general education students in 2015. To offset these costs, funding is provided by federal, state, and local sources in most jurisdictions.

The number of children identified as eligible for special education services increased substantially after these services became mandatory in the 1970s, though the percentage of students receiving special education has leveled off in the past decade or so. Part of federal special education policy includes a mandate for school districts to identify children who have disabilities. As a result, there are procedural safeguards in place that require schools to conduct assessments for children who are suspected of having disabilities or who are referred by parents for evaluation.

There are several possible explanations for the increase in disability rates. The education funding and policy environment may serve as an incentive for disability identification. Although states use slightly different funding mechanisms, students with disabilities generally are allotted more per-pupil spending than students in the general education setting. School districts may seek to label more students as having disabilities to gain additional funding. States have designed school finance formulas to incentivize schools to locate and provide assistance to students with disabilities (Cullen, 2003). These funding schemes may be inducing schools to place additional students into special education who would not have received extra services a few decades ago.

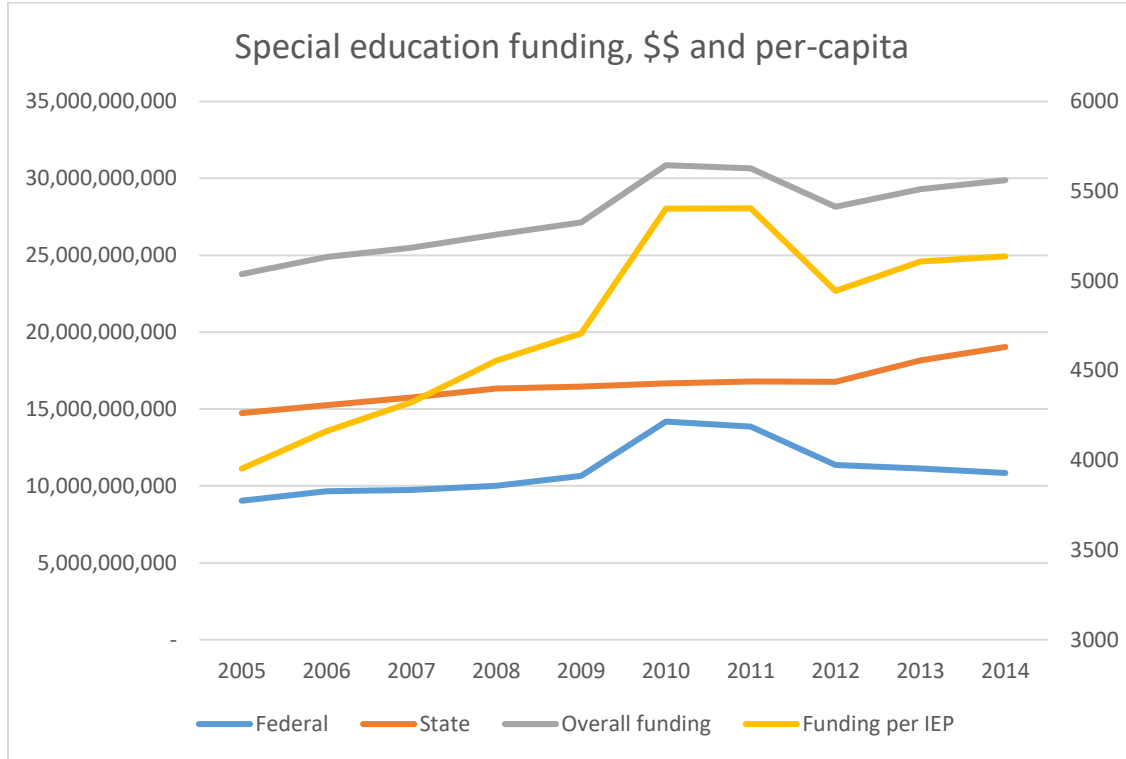
However, such placement practices would come at a cost to schools, who may then be required to provide extra services for the children placed in special education. Depending on the specific details of children's assessed disabilities, they may receive supplementary aids and services that increase their access to learning and participation in school activities. These extra services can include instruction by special education teachers or paraprofessionals, tutors, therapeutic services from speech pathologists, psychologists, or other specialists, and adaptive technology. However, students with mild

disabilities would likely require only low-cost interventions such as preferential seating arrangements, extended test-taking time, or alternative formats for tests and assignments. Thus, we may expect that any funding-induced special education placements would be for children who only marginally met eligibility criteria and did not require intensive special services.

Another mechanism that could influence special education placement rates is the funding structure under current federal education legislation. Under No Child Left Behind and Race to the Top and the 2004 re-authorization of special education legislation, new school district accountability measures affecting children with disabilities could also serve as either an incentive to label students as having a disability. Standardized test results for students placed in special education are required to be reported as a subgroup for Adequate Yearly Progress, but these students may be permitted to receive testing accommodations that could improve their scores.

In examining special education funding from 2005 through 2014, trends indicate that funding levels have generally increased over this time period, as shown in Figure 1. This is true both in terms of overall funding dollar amounts, as well as dollar amounts per student in special education. Overall special education funding has increased from about \$23B in 2005 to \$29B in 2014 (author's calculation from Census Annual Survey of School System Finances). There was a bump in 2010 and 2011 in federal special education funding as part of the American Recovery and Reinvestment Act, which is reflected in overall funding and per-student trends.

Figure 1: Special education funding trends



Data source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Population trends during this time period may act as confounders for the association between education funding and IEP cases. Childhood poverty is a critical risk factor for many mental, emotional, physical, and behavioral disorders in children and youth that may create disabilities (National Research Council & Institute of Medicine, 2009). Childhood poverty increased in recent years from 17.1% in 2005 to 21.5% in 2010, though rates have declined to 20.7% in 2014 as macroeconomic conditions in the United States have improved (DeNavas-Walt, Proctor, & Smith, 2015). Poverty in childhood has pervasive consequences for physical and psychological health, which may result from the physiological effects of chronic household stress that accompany financial

and material hardship (Kim, Evans, Angstadt, Ho, Sripada, Swain, & Phan, 2013). Children from poor families are almost twice as likely to have physical and activity limitations as their affluent peers (Halfon, Houtrow, Larson, & Newacheck, 2012).

In addition, disability in childhood is highly associated with race and ethnicity, which have been changing rapidly in the United States in recent years as minority populations grow among school-aged children. The number of white children in public schools has declined by 15% between the late 1990s and 2014, while the populations of Hispanic and Asian children in school are growing rapidly. In the fall of 2014, the number of non-white students enrolled in public K-12 schools outnumbered white students for the first time (Hussar & Bailey, 2014). Non-white students are disproportionately represented when comparing their overall proportion in the student population to their special education placement rates, although this is largely mediated by socioeconomic status and academic achievement (Losen & Orfield, 2002; Harry & Klingner, 2014; Morgan, Farkas, Hillemeier, Mattison, Maczuga, Li, & Cook, 2015).

In this paper, I examine factors that determine the number of students in K-12 education who are placed in special education due to having a disability that adversely affects their school performance, measured by having an Individualized Education Program (IEP). I seek to answer the following research questions: (1) To what extent does education funding explain the number of students placed in special education, controlling for population characteristics including family composition, race/ethnicity, and household socioeconomic status? (2) Do these explanatory factors differ by disability designation and/or race/ethnicity of students with IEPs?

## **INDIVIDUALS WITH DISABILITIES EDUCATION ACT (IDEA)**

Under the Individuals with Disabilities Education Act or IDEA (P.L. 108-446), children with disabilities are ensured access to a free appropriate public education. This law and its implementation by states and school districts has helped ensure that children are correctly identified as needing special education services. This process begins with students receiving a referral for a suspected disability by parents or teachers to the school. Experts, such as school psychologists and diagnosticians, administer a battery of assessments or observations to determine whether and what type of disability the student has. If the child is determined to have a disability, he or she will receive additional services in school through an Individualized Education Program, or IEP. An IEP is developed by a multi-disciplinary school team and the child's parents to address the specific learning needs of students with disabilities. An IEP documents the student's current level of academic and functional performance, outlines specific measurable educational goals for students with disabilities, and prescribes how these goals will be met. It is a legal document that obligates schools to provide accommodations and services necessary for students with disabilities to have access to education.

Accommodations under an IEP are established to adapt the classroom setting and school work to the child's specific disability. Classroom accommodations may include strategies such as preferred seating, extended time on tests or assignments, or presentation of class materials in alternative formats. These provisions, based on the individual needs of students with disabilities, help children fully access their education with special learning needs. In addition to classroom accommodations, IEPs can also prescribe services that children with disabilities must receive in order to have full access

to education. These services may arise directly from children's disabilities or consist of related services necessary for children to have full access to education. Students with disabilities may be placed in a separate classroom for all or part of the school day, or offered therapies from school-based providers, such as speech-language pathologists, occupational therapists, or school psychologists.

There are thirteen federally-recognized categories of disability that qualify students to receive special services. Every student with an IEP has a primary disability designation under which special education services are received. The thirteen types of disability include the following: intellectual disability, speech/language impairment, emotional or behavioral disturbance, specific learning impairment, autism, multiple disabilities, traumatic brain injury, hearing impairment, visual impairment, deaf-blind, orthopedic disability, other health impairment, and developmental delay.

IDEA imposes strict procedural regulations upon school districts in making eligibility determinations that children have a disability qualifying them to receive special education services. Procedural safeguards for families include timelines for each step the eligibility process, parental rights to examine their child's educational records and disagree or seek out independent evaluations, and dispute resolution mechanisms. However, states and school districts are granted a high degree of discretion in making determinations that a child has a disability. States are allowed to set their own criteria for benchmarks that define each of the thirteen disability types, and school districts have a great deal of discretion in the specific battery of tests that students are given.

Special education is funded through several sources. State and local funding, which provides the bulk of public K-12 education funding, contribute to dedicated

funding for special education programs. However, majority of special education funding is federally-provided. IDEA requires that federal funds provide 40% of the average per-pupil expenditures in extra funding to go toward special education funding, even though actual spending on students in special education is far higher than this (National Council of State Legislatures). For this reason, special education under IDEA is commonly referred to as an unfunded mandate.

### **PAST RESEARCH ON IEP CASELOADS**

There is not an extensive literature on special education participation that examines population characteristics or funding mechanisms associated with the number of children with IEPs. Previous research examining IEP placements has focused heavily on race and ethnicity as a determinant for special education determinations. This research has found that black and Hispanic students, particularly boys, are over-represented in special education compared to their relative size in the general student population (Losen & Orfield, 2002; Coutinho & Oswald, 2000; Harry & Klingner, 2014). Disproportionate representation appears particularly severe in certain categories of IDEA eligibility. For the category of intellectual impairment, for example, black students are overrepresented in thirty-eight states, and every racial minority group is over-represented in one or more states (Parrish, 2002). These studies of IEP placement rates among different demographic groups have focused primarily on comparisons of a group's prevalence in the overall population versus their share among the special education population, without considering broader socioeconomic or policy considerations.

Certain disability designations have determination criteria that are less objective than others. This may introduce more room for states to impose their own discretion or preferences. According to NCES statistics, the disabilities for which cases have been the most dynamic since 2005 include the six most prevalent disability types, which are listed in Figure 2: intellectual disability, speech/language impairment, emotional/behavioral disturbance, other health impairment, specific learning disability, and autism. Several of these disabilities are defined in ambiguous terms that may allow states to strategically change their IEP caseloads.

Intellectual disability is defined by IDEA as significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance. Intellectual disability is typically diagnosed through IQ tests that determine that students have low levels of cognitive ability. There has been a secular trend of decline in the prevalence of IEPs for intellectual disabilities in children (NCES, 2015). However, this trend runs contrary to evidence that suggests an upward trend in the number of children who have an intellectual disability (Houtrow, Larson, Olson, Newacheck, & Halfon, 2014). This suggests that the disability designation for IEPs may not be following actual population trends in the prevalence of specific disabilities. Evidence has suggested that changing definitions that are being applied for IEP placements may be responsible for this decline in intellectual disability IEPs (Polyak, Kubina, & Girirajan, 2015).

Speech and language impairments are defined in IDEA to mean the following: "a communication disorder such as stuttering, impaired articulation, a language impairment,

or a voice impairment that adversely affects a child's educational performance." Speech and language impairments are among the most common developmental disorders of childhood, affecting about 5% to 8% of young children (Prelock, Hutchins, & Glascoe, 2008). Speech and language disorders are difficult to distinguish from typical variation in communication development patterns. There is a high degree of co-morbidity between speech or language impairments and other conditions, such as attention-deficit hyperactivity disorder (ADHD) or psychiatric conditions. Diagnostic criteria for some language or communication disorders, such as pragmatic language impairment, overlap substantially with criteria for autism. According to the fourth edition of the Diagnostic and Statistical Manual (DSM-IV), the edition which was current during the time period covered in this study, one criterion for a diagnosis of autism is a qualitative impairment in communication, which may be manifested in a speech delay or impairment in an individual's ability to initiate or sustain a conversation with others. Thus, school IEP placement teams must exercise their discretion as to which is the correct designation for a child.

Emotional and behavioral disturbance is defined in the text of IDEA by the following characteristics: "(a) an inability to learn that cannot be explained by intellectual, sensory, or health factors; (b) an inability to build or maintain satisfactory interpersonal relationships with peers or teachers; (c) inappropriate types of behaviors or feelings under normal circumstances; (d) a general pervasive mood of unhappiness or depression; and (e) a tendency to develop physical symptoms or fears associated with personal or school problems." This definition, which has not changed since the original version of IDEA was implemented, is ambiguous enough that it could apply to a variety

of actual conditions. Part (a) could describe to children with specific learning disability. The second criterion seems to describe deficits in social skills and peer and adult relationships. Criteria (c), (d), and (e) describe symptoms associated with internalizing disorders, such as depression and anxiety (Gresham, 2005). Because of the limitations and confusion surrounding this definition, states and school districts have engaged in unsystematic decision-making processes in determining which students qualify for special education services under the category of emotional and behavioral disturbance (Gresham, 2007).

Other health impairment, under IDEA, refers to a chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome which adversely affects a child's school performance. This is the typical disability designation for students who receive special education services for attention deficit hyperactivity disorder (ADHD). The incidence of ADHD in children has been well-publicized to have increased dramatically since the 1990s, especially for boys (Boyle, Boulet, Scieve, Cohen, Blumberg, Yeargin-Allson, & Kogan, 2011). Trends in ADHD prevalence also suggest that racial and ethnic minorities are less likely than whites to be diagnosed, a trend which persists at least between kindergarten and eighth grade (Morgan, Staff, Hillemeier, Farkas, & Maczuga, 2013). Health care providers, parents, and educators have expressed fears that ADHD is over-diagnosed and treated in children with mild or subclinical symptoms, particularly with stimulant medications that may have side effects (Schwarz & Cohen, 2013).

Specific learning disability is defined under IDEA as: “disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.” This definition has been described as nebulous and imprecise, and does not offer much specificity about the types of medical or neurological conditions that may result in a child’s being designated as having a specific learning disability (Kavale, Spaulding, & Beam, 2009). Furthermore, brain injury is one of the conditions listed as potentially qualifying a child to receive special education services with a learning disability, but this is defined as a separate designation that qualifies students for an IEP.

Learning disability has historically been diagnosed when students show average or above-average intelligence, but have a discrepancy in their school performance in a specific subject area, such as mathematics or reading. The discrepancy model relies on accurate measurement of students’ IQ and academic performance. However, disadvantaged students are likely to score well below their true intelligence or potential on traditional IQ tests (cite). The net effect of this identification model is that disadvantaged students are over-represented in intellectual disability IEPs, and under-represented in specific learning disability placements (Harry & Klingner, 2007). The 2004 re-authorization of IDEA attempted to add clarity to IEP placement criteria for specific learning impairments. This version of the law prescribes an alternative model for identifying students with learning disabilities, known as Response To Intervention (RTI).

Under the RTI model, students who are struggling in a school subject are offered successively more intense interventions to attempt to improve their academic performance. If students do not respond to intensive individual subject-matter learning interventions, then the model specifies that special education placement appropriate (Ardoin, Witt, Connell, & Koenig, 2005).

Autism is defined in IDEA as follows: “a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects educational performance. Characteristics often associated with autism are engaging in repetitive activities and stereotyped movements, resistance to changes in daily routines or the environment, and unusual responses to sensory experiences.” The substantial secular increase in autism cases in recent years is well-documented. According to the Centers for Disease Control and Prevention’s monitoring program, the rate of autism spectrum disorders in American children has risen from 1 in 150 in 2000 to 1 in 68 in 2012 (Christensen, Baio, Braun, 2012). IEPs under an autism diagnosis have more than doubled between 2005 and 2014. However, empirical studies have cast doubt on whether the exponential rise of autism IEPs provides an accurate portrayal of changes in population characteristics. Under the 2004 re-authorization of IDEA, autism is defined as follows: “Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child’s educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.” This definition

is broader than the psychological definition given in the Diagnostic and Statistical Manual, and the patterns of grade levels at which new autism IEPs occur do not correspond to well-validated clinical standards for diagnosis (Laidler, 2005). The prevalence of autism IEPs has been documented to rise around age 12, which is significantly higher than the age at which children typically receive an autism diagnosis from a developmental pediatrician or other medical specialist. This suggests that schools may be identifying children as having autism in a way that contradicts medical standards.

#### **PAST RESEARCH ON IEP PLACEMENT CRITERIA**

Prior research has suggested that special education placement decisions do not follow strictly from evidence provided by evaluations. In field tests, Mellard (1983) has found that IEP placements sometimes run contrary to child assessment results. Although data gathered from child evaluations are intended to be objective measures of child functioning, assessors may selectively administer specific tests to confirm their hypotheses about children's suspected disabilities (Mellard, 1985). School districts and individual school personnel appear to play a significant role in whether children are classified as having a disability and, if so, what type. Students with the same disability designation living in different school districts have different levels of academic and adaptive functioning, particularly in the disability category of intellectual disability (Singer, Palfrey, Butler, & Walker, 1989).

Due to the ambiguities in disability designation criteria, special education placement decisions involve discretion of the school personnel taking part in IEP placement decisions. Evidence suggests that these decisions may be influenced by

financial considerations. Special education students are more expensive to education than students in general education because they may require additional instruction, separate classrooms, and treatment with therapists and specialists. Federal, state, and local sources provide additional funding for students placed in special education to offset these costs.

Qualitative research has suggested that this responsiveness can work to either increase or decrease the number of students placed in special education, depending on the funding and policy environment. Special education administrators in school districts have documented being asked by superintendents to increase the number of students with IEPs in Oregon following a state increase in special education funding (Montgomery, 1995). In Vermont, the number of IEPs fell after the state shifted to a different funding structure that added administrative burdens to special education funding (Kane & Johnson, 1993). Cullen (2003) has estimated that school funding parameters in Texas explain a large portion of the growth in IEP cases. Schools can gain additional funding under the Texas funding mechanism by placing more students in special education, although this institutional response varies by district size and fiscal constraints.

School accountability measures mandated by the No Child Left Behind act may have induced new trends for labelling children as having disabilities by school districts. Students with accommodations under an IEP are permitted to take high-stakes standardized tests under those accommodations. This may have prompted school districts to label more students as having a disability in order to benefit from testing accommodations. Testing accommodations can include extended time for testing, the child's use of a reader or scribe, and other techniques that could boost scores for children regardless of disability status. However, another measure under No Child Left Behind

require schools to report exam scores disaggregated by several student subgroups, including students with IEPs. Public reporting of student performance disaggregated by subgroup was intended to highlight achievement gaps and motivate school districts to focus resources on closing those gaps. If the number of students in a subgroup were below a certain threshold, which was determined by states in order to both yield statistically reliable information and to protect student confidentiality in small subgroups, districts could suppress this information. The minimum number of students in a subgroup that could be reported varied from 3 to 40, with 10 being the most common threshold. This could serve as an incentive for schools to limit the size of their student population with an IEP.

There is a body of research that has examined family, personal, and program financial characteristics on individual participation in other public programs, including cash assistance programs such as Aid to Families with Dependent Children (AFDC) or Temporary Assistance for Needy Families (TANF). This strand of literature may provide a framework for conducting similar research to examine the special education program. These studies indicate that demographic, economic, and policy changes explain a great deal of the variation in welfare caseloads. Many of these studies use state panel data to model caseloads. This research has suggested that public assistance caseloads are predicted by socio-demographic characteristics, such as nonmarital births or income and education levels, macroeconomic variables, and state-level policy changes, such as federal waivers (Council of Economic Advisers, 1997; Figlio & Ziliak, 1999; Blank, 2001).

This paper fills several gaps in the existing special education literature. First, I estimate the association between child population characteristics and special education cases, which has not been examined extensively by previous research. Second, I update previous findings on the responsiveness of special education placement decisions to funding levels in the school accountability era of the 2000s and 2010s. Third, this study expands upon the previous literature examining special education placement decisions as a response to fiscal incentives by estimating on national data, rather than on data from a single state, which may not be generalizable due to state-specific eligibility criteria for special education placement.

## **DATA**

I use data on the number of children from kindergarten through high school age who have an IEP in each state from 2005 to 2014. For my outcome measures in this study, I use annual counts of students with IEPs, which are collected and reported by each state and the District of Columbia to the Office of Special Education Programs (OSEP) within the federal Department of Education. In addition, states must report IEP counts by disability type and by child race or ethnicity. To accommodate for state differences in reporting, I collapse race/ethnicity categories into the following four groups: white non-Hispanic, black non-Hispanic, Hispanic of any race, and other race or ethnicity.

A number of state-by-year variables were collected from several publicly available sources to capture demographic and socio-economic indicators, and school funding statistics during the time period of this study. The American Community Survey

(ACS) produces annual statistics on the characteristics of children in each state. This allowed me to observe state-level variables for the number of children living in married or single-parent-headed households, the number of children by race or ethnicity, the median household income of families with children, and the number of children who lived in household receiving any public assistance (including Supplemental Security Income or SSI, cash public assistance, or food stamps)<sup>3</sup>. Additionally, and importantly for the analysis at hand, the ACS data reports the number of children under age 18 living in households who do not yet have a high school diploma or equivalent, and who have a disability. Disability under the ACS definition includes individuals “having vision, hearing, cognitive, ambulatory, self-care, or independent living difficulty.” (Brault, 2011). The ACS measure of children with disabilities does not identify children who qualify for or receive services under IDEA, but is useful for understanding the population of children for whom these services are necessary (Brault, 2011).

I use these ACS data to calculate a variety of demographic variables by state and year: the share of households headed by a single woman; the share of children by race and ethnicity, including white non-Hispanic, black non-Hispanic, Hispanic or Latino of any race, and other race or ethnicity; the percent of children in households who receive public assistance; and the percent of children who have a disability, as defined above. These data also allow me to calculate median log wage levels for households with children, adjusted to real 2014 dollars, a functional form which is appropriate due to the right-skewed distribution of household income. These variables were included to control

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<sup>3</sup> Author’s calculations from American Community Survey Table S0901: Children’s Characteristics, 5-year estimates. Accessed at <https://factfinder.census.gov>

for demographic and household changes in states over this time period so that the association between funding and IEP cases could be isolated. There is a well-documented association between children's race/ethnicity and special education placement, which may confound the relationship between funding and IEP cases (see, e.g., Harry & Klingner, 2014; Losen & Orfield, 2002; Morgan et al., 2015). Similarly, household socioeconomic status is highly associated with receipt of special education services, which could also be a confounding factor for the relationship between school funding and IEP numbers (Shifrer, Muller, & Callahan, 2011). I also have information from the Annual Social and Economic Supplement of the Current Population Survey (CPS) for years 2005 through 2012 and from the ACS for years 2013 and 2014 on the number of children by state who have some type of health insurance coverage, including private health insurance, Medicaid, or Medicare<sup>4</sup>. This allows me to investigate the extent to which health insurance coverage may serve as a substitute to school-based services for children with disabilities.

In addition, I have information from two sources regarding the funding levels and formulas for overall school finance and for special education specifically. The U.S. Census Bureau administers Census of Government and the Annual Surveys of State and Local Government Finances, as authorized by Title 13 USC § 161, 182. These data contain state-level observations for the amount of funding from federal, state, and local sources for special education services, and the amount of funding for schools overall. I

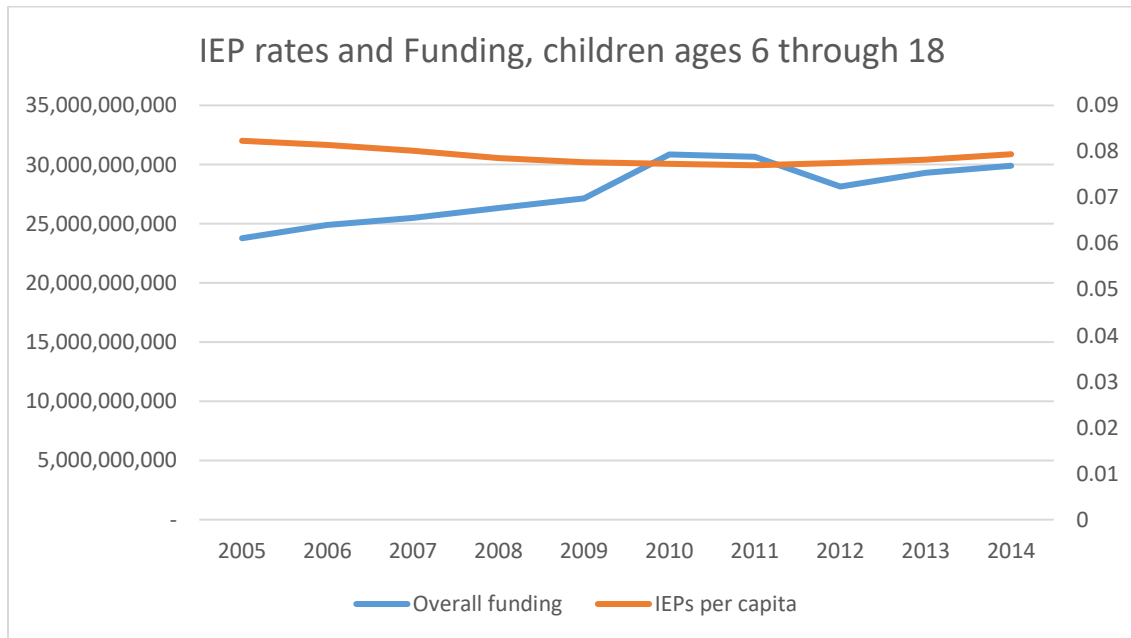
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<sup>4</sup> Author's calculations from Table HI-05, accessed at <https://www.census.gov/data/tables/time-series/demo/health-insurance/acs-hi.html> and <https://www.census.gov/data/tables/time-series/demo/income-poverty/cps-hi/hi-05.html>.

use these data to construct state-level log per-student funding amounts for overall school spending and for special education services.

In Figure 2, I display the number of IEPs in the fifty states and the District of Columbia, as documented in the U.S. Department of Education’s administrative data. I also display in Figure 2 the number of IEPs in the six largest disability categories: intellectual disability, speech/language impairment, emotional and behavioral disturbance, other health impairment, specific learning impairment, and autism. Although the total number of IEPs among kindergarten through high school aged children has remained fairly stable over this time period, just below 6 million for most of the observed years, the share of IEPs for different disability types has been quite dynamic.

Figure 2: IEPs for children aged 6 through 18 per-capita



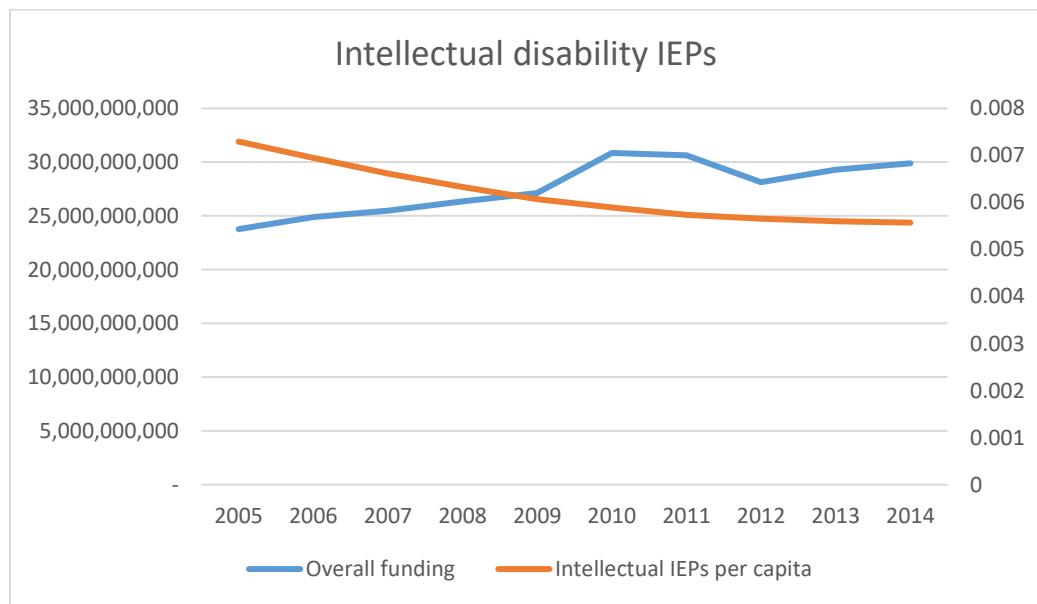
Source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

The number of students with an IEP for intellectual disability, for example, decreased steadily from about 530,000 in 2005 to 410,000 by 2014, as shown in Figure 3 below. This is consistent with trends in caseloads for Medicaid and Supplemental Security Income (SSI) for children with intellectual disability, which have been decreasing during this time period (National Academies of Science, Engineering, & Medicine, 2015). Similarly, the number of emotional or behavioral IEPs decreased from about 470,000 in 2005 to 340,000 in 2014, shown in Figure 4. At the same time, the number IEPs for other disability types were growing rapidly. The number of IEPs for autism nearly tripled during the time frame for this study, from about 190,000 in 2005 to about 550,000 in 2014, shown in Figure Y. Students with an IEP for “other health impairment” grew from about 560,000 to 890,000, shown below in Figure 5. These trends are consistent with findings from other agencies that track the incidence of disabilities. The CDC has noted the dramatic increase in autism among children, as well as an increase in attention deficit/hyperactivity disorder (ADHD), a condition for which many children receive special services under the “other health impairment” category (Boyle et al., 2011).

Summary statistics of the data are presented below in Table 1. There are 51 potential “states” in this data set, including the District of Columbia. Kansas and Kentucky have reporting protocols that do not disaggregate federal education funding by program, and were excluded from analysis. Due to reporting anomalies, several states did not report valid IEP counts each year or did not provide full information on school funding. As a result, these analyses excluded six years of observations from Georgia, five years from West Virginia, four years each from the District of Columbia and North

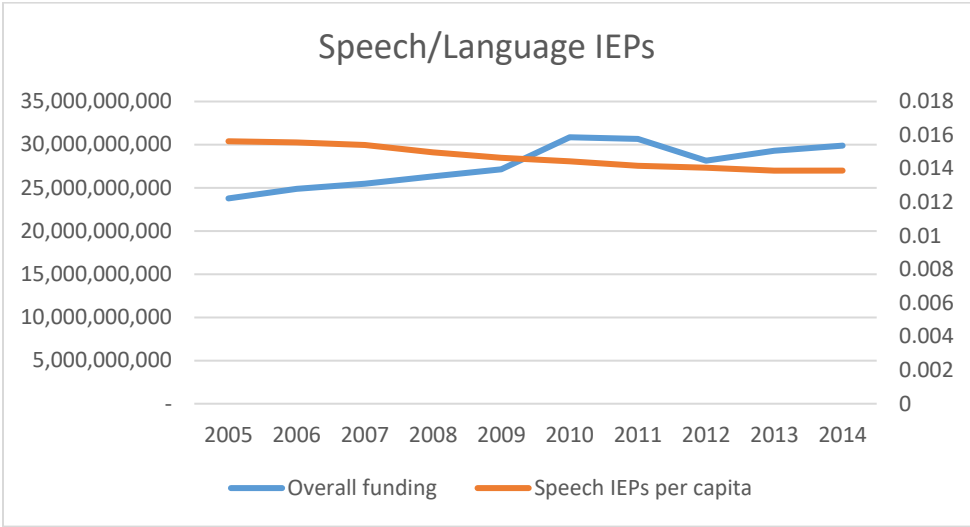
Carolina, two years from Vermont, and one year from Wyoming. A total of 42 state-year observations (out of 510) are dropped from the analysis, yielding a final analytic data set of 468 state-year observations (or 91.8% of the original sample), detailed below in Table 1. Columns 2 and 3 of this table show the mean and standard deviation from 2005 to 2014 in annual IEP counts and in the control variables available at the state level.

Figure 3: IEPs for Intellectual Disability



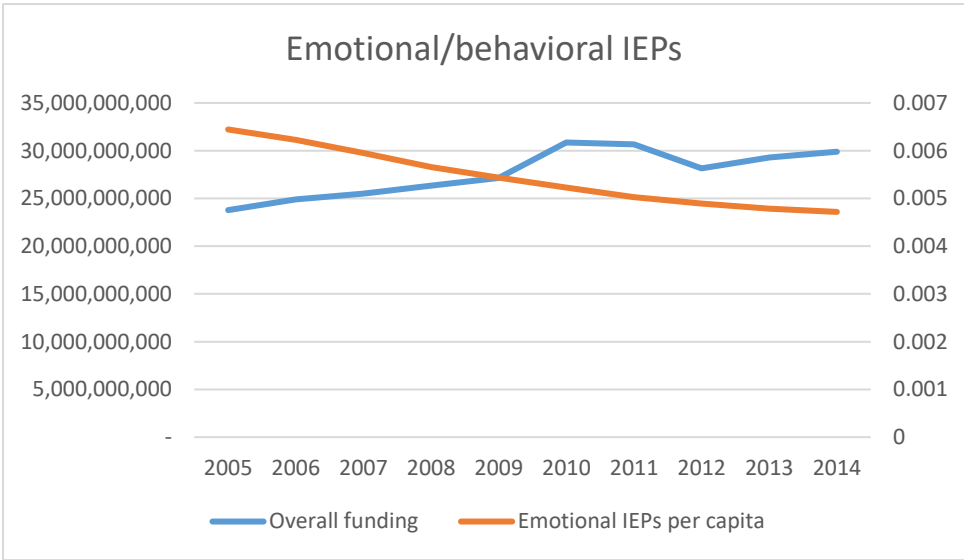
Source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Figure 4: IEPs for Speech/Language Impairment



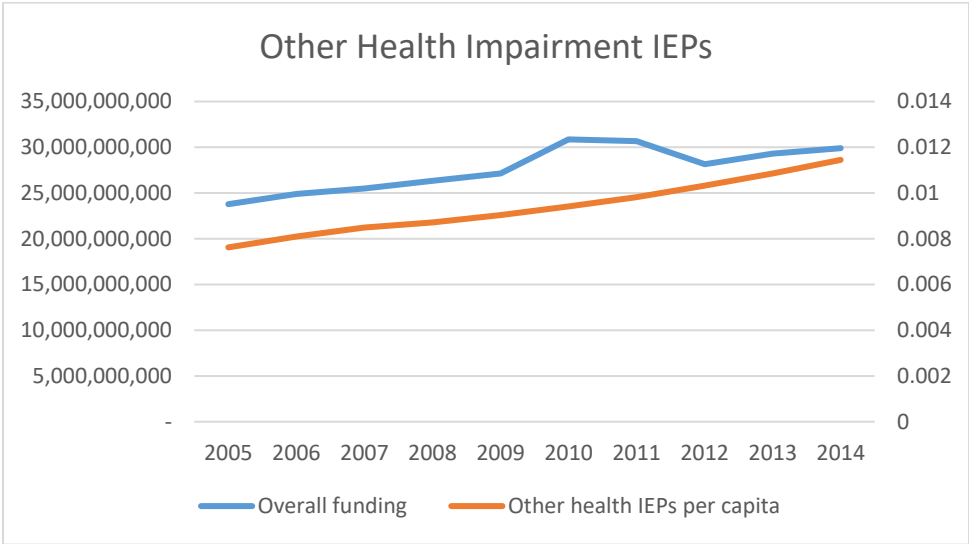
Source: Data source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Figure 5: IEPs for Emotional/Behavioral Disturbance



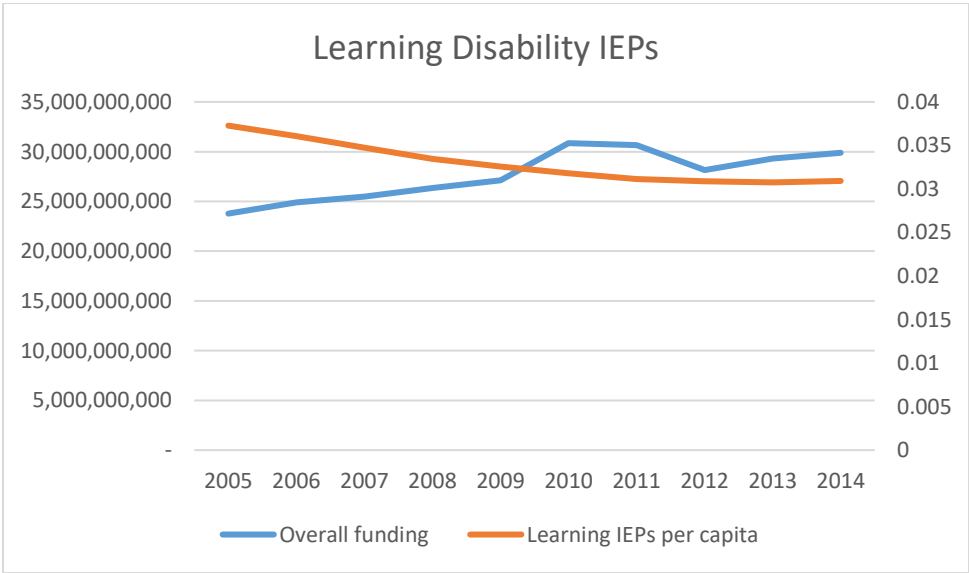
Source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Figure 6: IEPs for Other Health Impairment



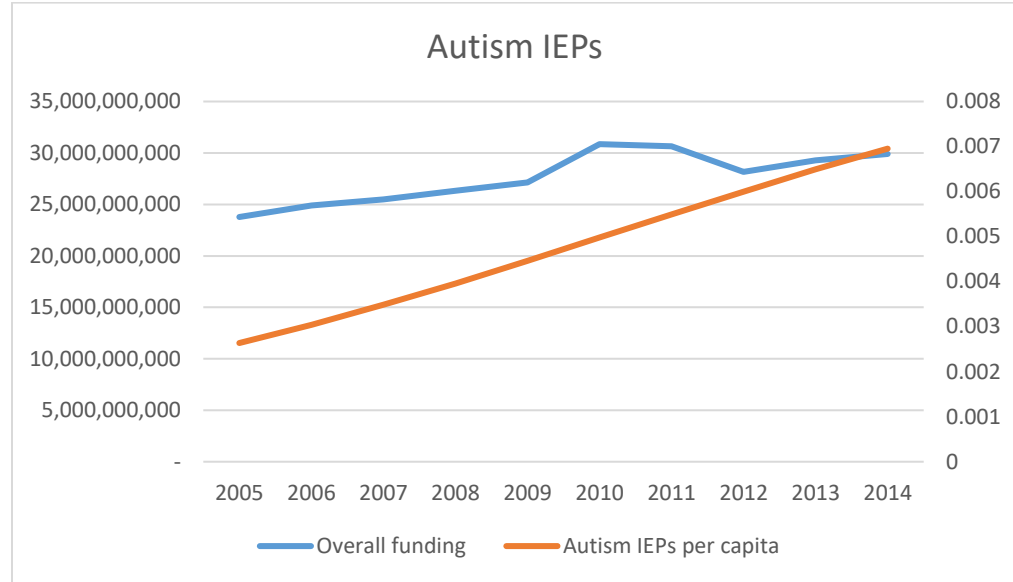
Source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Figure 7: IEPs for Specific Learning Impairment



Source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Figure 8: IEPs for Autism



Source: Author’s calculations from IDEA Section 618 Data Products, State-level data files, accessed at <https://www2.ed.gov/programs/osepidea/618-data/state-level-data-files/index.html>, and Census Annual Survey of School System Finances, accessed at <https://www.census.gov/programs-surveys/school-finances.html>

Table 1: Summary statistics for state-year observations

	No. of observations	Mean	Std Deviation
Pct children with IEP	468	8.197	1.346
Pct children in single female households	468	24.808	5.653
Pct black children	468	12.752	12.523
Pct Hispanic children	468	15.110	13.049
Pct other race children	468	9.919	10.109
Pct children with disability	468	4.916	1.522
Pct children with insurance	468	91.631	3.681
Median income of HH with children	468	64750.280	11593.370
Pct children in HH receiving welfare	468	23.634	7.150
Per-student special ed funding	468	393.169	319.261
Per-student education funding	468	8649.358	2195.784

## PANEL DATA ANALYSIS OF PREDICTORS OF IEPs

I estimate a series of annual state panel data models of the following form:

$$(1) \text{ IEP}_{ts} = \gamma_1 D_{ts} + \gamma_2 F_{ts} + v_t + \rho_s + \varepsilon_{ts}$$

where  $\text{IEP}_{ts}$  can be one of a number of dependent variables measuring the number of IEPs or IEPs of a specific disability types,  $D$  is a vector of state-level demographic characteristics for the population of children, and  $F$  is a vector of school and special education funding parameters. The subscript  $t$  denotes year and  $s$  represents state. The outcome variables are specified as the log of IEP placement rates among the population of school-aged children in each state. A logarithm functional form is appropriate in this model because this transformation corrects for the right-skewed distribution of IEP placement rates to better approximate a normal distribution. Logged caseload rates are standard in analyses of this type (see, e.g., Cullen, 2003; Blank, 2001). The term  $v$  represents a vector of year fixed effects, and  $\rho$  stands for state fixed effects. State fixed effects are appropriate for this analysis because they control for unobserved state-level characteristics that affect special education placement. While the federal IDEA legislation mandates the types of disabilities that grant students eligibility for special services, states are allowed discretion in setting their own criteria for what qualifies under each type of disability. States also have their own reimbursement schemes to provide special education funding, which may also affect placement rates. State fixed effects will control for these characteristics and allow for within-state estimation of the association between funding and demographic characteristics and special education placement rates. Year fixed effects are appropriate in this model to minimize bias from time trends of special education caseloads and isolate the association between funding and caseloads.

The term  $\varepsilon$  represents a random error term. With the inclusion of state and year fixed effects, a variable can influence IEP cases only through its effect within a state over time. Factors that remain relatively constant over time will have little effect, since their effect is subsumed within the state fixed effect.

Table 2: Predictors of Total State IEPs. Dependent variable=log(IEPs/total students)

	All IEPs	Intellectual	Speech/lang
Pct children in single female households	-0.933 ** (0.366)	-0.084 (0.787)	-2.410 *** (0.654)
Pct black children	0.002 (0.005)	-0.006 (0.011)	0.007 (0.009)
Pct Hispanic children	-0.013 *** (0.004)	0.015 * (0.008)	-0.001 (0.007)
Pct other race children	0.016 *** (0.005)	-0.018 * (0.010)	-0.006 (0.008)
Pct children with disability	0.030 *** (0.007)	0.072 *** (0.015)	0.002 (0.012)
Pct children with insurance	-0.002 (0.001)	0.011 *** (0.003)	0.002 (0.002)
Log median income of HH with children	-0.327 *** (0.099)	0.921 *** (0.213)	-0.188 (0.177)
Pct children in HH receiving welfare	0.004 ** (0.002)	0.002 (0.003)	0.010 *** (0.003)
Log per-student special ed funding	0.029 *** (0.009)	0.021 (0.020)	0.029 * (0.017)
Log per-student education funding	0.158 *** (0.041)	-0.042 (0.087)	0.209 *** (0.073)
State fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adjusted r-squared	0.9513	0.9685	0.9641
Root mean squared error	0.0367	0.0821	0.0786
Number of observations	468	468	468

Notes: \* p<.1; \*\* p<.05; \*\*\* p<.01  
Standard errors are in parentheses

Table 2 (continued)

	Emotional dist	Other health	Learning	Autism
Pct children in single femal	-0.214 (0.838)	-0.422 (2.212)	-0.742 (0.625)	0.719 (0.813)
Pct black children	0.030 *** (0.011)	-0.069 ** (0.030)	0.007 (0.008)	-0.039 *** (0.011)
Pct Hispanic children	-0.033 *** (0.009)	-0.025 (0.024)	-0.014 ** (0.007)	0.018 ** (0.009)
Pct other race children	0.027 ** (0.010)	0.021 (0.027)	0.031 *** (0.008)	-0.028 *** (0.010)
Pct children with disability	0.031 ** (0.016)	0.072 * (0.042)	0.036 *** (0.012)	-0.002 (0.015)
Pct children with insurance	-0.003 (0.003)	-0.018 ** (0.008)	-0.003 (0.002)	0.010 *** (0.003)
Log median income of HH	-0.271 (0.227)	-0.448 (0.595)	-0.634 *** (0.169)	-0.191 (0.220)
Pct children in HH receivin	-0.001 (0.004)	0.014 (0.010)	0.003 (0.003)	0.000 (0.004)
Log per-student special ed	0.019 (0.021)	-0.021 (0.056)	0.043 *** (0.016)	0.008 (0.021)
Log per-student education	0.220 ** (0.093)	-0.106 (0.244)	0.162 ** (0.069)	-0.163 * (0.090)
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted r-squared	0.9648	0.8804	0.8964	0.9443
Root mean squared error	0.1056	0.2656	0.0734	0.1190
Number of observations	468	461	468	468

Notes: \* p<.1; \*\* p<.05; \*\*\* p<.01  
Standard errors are in parentheses

Equation (1) is estimated on annual data from 2005 through 2014 for the 50 states and the District of Columbia. The models are estimated with a weighted OLS procedure, with weights based on the state population of children below age 18. Results are displayed below in Table 2. In Column 1, the outcome variable is the total number of IEPs in all disability categories for children aged 6 through 18. The percent of children in single female headed households has a negative association with the portion of students with IEPs. The percent of children who are black is not associated with IEP cases, but the

other race/ethnicity categories are. An additional percentage point of Hispanic children in the state is associated with a lower IEP caseload, and an additional percentage point of “other race” children is associated with a higher IEP caseload.

The percent of children reported as having a disability in the ACS data is highly predictive of IEP caseloads, with a one percentage point increase in disabled children associated with a 3.0% higher rate of IEPs in the state. The percent of children with health insurance coverage may be associated with special education services, if we expect that access to health care and school-based disability services can serve as substitutes for each other. However, this does not appear to be the case for the overall IEP caseload, which produces a statistically insignificant coefficient on the health insurance coverage variable. Variables that measure household socioeconomic status are strongly associated with the prevalence of IEPs. Higher median income in households with children is strongly correlated with a lower portion of children receiving special education services, while a higher percentage of children living in households that receive welfare benefits is correlated with higher numbers of IEPs.

The education funding variables are also highly correlated with the number of children with IEPs. The special education per-student coefficient allows us to estimate the elasticity of student disability identification rates and funding generosity. This coefficient suggests that a one-percent increase in special education funding is associated with a 0.029% higher IEP caseload. I also estimate the elasticity of disability placement with respect to overall per-pupil education funding. Results suggest that states with more generous school funding also have a higher portion of students in special education, with

a one-unit increase in overall school funding associated with a 0.16% higher special education placement rate.

In Columns (2) through (7), models are estimated with IEPs for six specific disability categories as the outcome variables. This disaggregation allows us to examine which of the most prevalent disability types may be driving the overall results in Column (1), and I will highlight results which are consistent or differ from the overall IEP model.

In Column (2), I display regression results modeling IEP caseloads for children with an intellectual disability. Single female headed households do not predict the number of intellectual disability IEPs, nor does the percent of black children. The other race variables have a weak relationship with the outcome. The percent of children reported as having a disability is strongly associated with a greater number of intellectual disability IEPs, and a greater percentage of children having health insurance also predicts more IEPs of this type. The household socioeconomic status indicators show a different trend for intellectual disability cases than in the overall model. Here, higher household incomes are predictive of a greater portion of children with intellectual disabilities. The percent of children living in households receiving welfare benefits is not statistically significant. Finally, in this model, the per-pupil special education funding and overall school funding parameters are not predictive of intellectual disability.

In Column (3), I display results for the outcome of speech or language impairment IEP. The percent of children living in a single mother household is highly correlated with lower rates of speech/language IEP, holding all else constant. Among the other demographic characteristics, race and ethnicity, disability rates and insurance coverage, and household income do not have a significant association with speech or language

IEPs. A higher percent of children living in households that receive welfare benefits does predict higher rates of speech IEPs. The per-pupil funding rates for both special education and overall school spending are associated with higher rates of children with a speech/language IEP.

In Column (4), results are displayed with the outcome of IEPs for emotional or behavioral disturbance. In this model, the rates of children living in single mother households do not predict differences in emotional disturbance IEP rates. However, several of the demographic variables are strongly associated with this outcome measure. Higher state proportion of both black children and “other race” children are associated with higher rates of emotional disturbance IEPs, but the state proportion of Hispanic children has the opposite relationship. Higher rates of children reported as having a disability are predictive of higher emotional disturbance IEP rates. Rates of children covered by health insurance, household income, the portion of children living in households that receive welfare, and the per-pupil special education funding rates do not predict emotional disturbance IEP rates. However, the overall level of school funding per-pupil is associated with emotional disturbance IEPs, with higher funding levels predicting higher rates of this type of IEP.

In Column (5), I display regression results for the outcome of IEP for other health impairment. In this model, the portion of children living in single female headed households does not have a significant association with other health impairment IEPs, holding all else constant. Among the race/ethnicity variables, the only significant finding is that a higher proportion of black children is associated with a lower rate of other health impairment IEPs. The percent of children reported as having a disability is weakly

associated with higher other health impairment IEPs, and insurance coverage predicts lower percentages of this IEP type. Household income, welfare receipt, and school and special education funding do not show a relationship with other health impairment IEPs.

In Column (6), results are displayed from regressions modeling the outcome of specific learning disability IEPs. Here, there is no relationship between single female headed households and this IEP type. Among the race/ethnicity variables, there is no relationship between the proportion of black students and specific learning disability IEPs. A higher proportion of Hispanic children predicts lower rates of this IEP, and other race children are predictive of higher rates of specific learning disability IEPs. The percent of children reported as having a disability predicts higher rates of specific learning IEPs, but there is no relationship with health insurance coverage. Higher household income is associated with lower rates of learning disability IEPs, but the results find no association with welfare benefits. Both funding indicators are predictive of specific learning disability IEPs. Higher levels of per-pupil spending on special education is correlated with higher learning disability IEPs, as are higher overall school funding levels.

Finally, in Column (7), I display results from the model predicting IEPs for autism, which is the fastest-growing disability designation under which students receive IEP services. There is no relationship between single female headed households and the rate of IEPs for this disability type. Among the race/ethnicity variables, the proportion of black children and children of other race are associated with lower rates of autism IEPs, while higher shares of Hispanic children are correlated with higher rates of autism IEPs. The rate of children identified with a disability is not predictive of autism IEPs, but

higher rates of children with health insurance coverage do predict higher rates of autism IEPs. Household socioeconomic status and welfare benefits do not show a relationship with this IEP type, nor do special education funding levels. Per-pupil school funding rates do show a negative relationship with autism IEPs.

## **DISCUSSION**

In this paper, I provide a current estimate of the relationship between the number of school-aged children placed in special education under the Individuals with Disabilities Education Act and population characteristics and school funding parameters from 2005 through 2014. Estimates suggest that relationships do exist between children's demographic characteristics, school and special education funding, and the number of children with IEPs. However, these relationships vary substantially based on the type of disability and by race/ethnicity, which suggests that the overall findings may be driven by specific IDEA eligibility categories or demographic trends.

The overall model, in Column (1) of Table 2 below, suggests that higher percentages of children living in single-female households predicts lower IEP placement rates. When we consider IEPs separately by disability, we see that this result seems to be driven by IEPs for speech and language impairment. This finding may result from the age distribution of children with speech delays and patterns of marriage or relationship dissolution. Speech and language impairment is by far more common in younger age ranges than for older children (Prelock et al., 2008). According to ACS estimates, the proportion of children living in single-mother homes rises from early childhood to middle childhood to the teenage years. Therefore, the correlation here may arise from the fact

that younger children are simultaneously more likely to have a speech/language IEP and more likely to live in a married-parent household.

The racial/ethnic composition of the child population has a significant relationship with special education placements. The percent of black children is not statistically significant as a net predictor of IEPs, which runs contrary to previous findings in the disproportionate representation literature. However, in certain disability designations, higher proportions of black students are statistically predictive of IEP caseloads. This occurs for emotional disturbance IEPs, for which higher proportions of black students predict higher special education placements, and for other health impairment and autism, where higher percentages of black children predict lower IEP caseloads for these disability designations. Although I cannot observe race/ethnicity breakdown of IEP types, these findings suggest that black students may be underrepresented or underidentified for having other health impairment or autism. This is consistent with findings by Morgan et al. (2015), who found that black students were systematically underrepresented in certain disability categories under IDEA after controlling for a suite of potential confounding factors. Black children have been found to be less likely than white children to receive a medical diagnosis of autism (Mandell, Wiggins, Carpenter, Daniels, DiGuseppi, Durkin, & Shattuck, 2009; Kogan, Blumberg, Schieve, Boyle, Perrin, Ghandour, & Van Dyck, 2009).

For other race/ethnic groups, findings are mixed. Higher proportion of Hispanic students is predictive of fewer IEP caseloads overall, while this is reversed for students of “other race.” When we consider IEPs by disability type, a higher proportion of Hispanic children predicts more intellectual disability and autism placements, and fewer IEPs for

learning disability or emotional disturbance. Higher proportion of “other race” students is associated with higher IEP caseloads for emotional disturbance and learning disability, and lower placement rates for intellectual disability and autism. Although I do not observe native language status in my data, it is well-established that Hispanic and Asian children (who would be included among “other race”) are more likely than non-Hispanic black or white children to speak a language other than English (David & Buchanan, 2011). In the disproportionate representation literature, non-native English speakers have higher IEP placement rates than native speakers (De Valenzuela, Copeland, Qi, & Park, 2006). Hispanic and Asian children have lower likelihoods than white children for a medical diagnosis of autism, although this is confounded by intellectual disability status, which may make correct differential diagnoses difficult (Mandell et al., 2009).

Higher proportions of children identified as having a disability in the American Community Survey are associated with higher IEP caseloads. However, when we consider separate IEP designations, this association does not hold for speech and language impairment, nor autism, which both have null estimates. The definition of childhood disability includes children with hearing, vision, cognitive, ambulatory, and self-care difficulties (ACS, 2015). This definition would not likely include children who have difficulty with speech, receptive, or expressive language. While severe autism can manifest in behavioral and adaptive difficulties which may be part of the disability spectrum included in the ACS data, growing openness and acceptance towards children with autism may preclude thinking of this condition as a “disability.” The neurodiversity movement, which has grown immensely in the past decade, seeks to re-conceptualize

conditions such as autism as part of the natural course of human development and variation (Jaarsma & Welin, 2012; Kapp, Gillespie-Lynch, Sherman, & Hutman, 2013).

School funding parameters are predictive of special education placements, with higher levels of both per-pupil special education spending and per-pupil overall education spending associated with higher IEP caseloads. My overall estimate for the elasticity of special education placement rates with respect to special education funding is 0.029, with estimates for specific disability designations ranging from null findings for several categories to 0.043 for specific learning disability. My estimate of elasticity of IEP cases with respect to overall school funding is 0.158, with estimates for specific disability designations ranging from -0.169 for autism to 0.220 for emotional disturbance. These results are similar to those in Cullen (2003), who estimated the elasticity of special education placement with respect to school district revenue gains between 0.044 and 0.212, depending on model specification.

The relationship between education funding and IEP placements could stem from at least two possible explanations. The more optimistic explanation is that school funding and/or special education funding levels are responsive to the needs of students, and policy-makers provide more generous resources to states in which there are more vulnerable students with or at risk of developing disabilities. The other possibility, which was the conclusion reached by Cullen (2003), is that schools strategically respond to fiscal incentive by placing more students in special education. I cannot explicitly test to determine which explanation holds, and results for IEPs by disability types do not show a clear trend that suggests states are strategically responding to fiscal incentives. If school administrators are making strategic decisions to place students in special education in

particular for financial reasons, their optimal response would be to maximize the gain in revenue, while minimizing their own expenses, including facilities and instructional costs for hiring extra teachers or specialists. Research from the Special Education Expenditure Project (SEEP) has found that the most expensive students to educate have IEPs for multiple disabilities, emotional disturbance, autism, and hearing impairments (Chambers, Kidron, & Spain, 2004). Students with these designations are more likely to require expensive equipment to accommodate their disabilities and to be placed in separate classrooms or have aides or paraprofessionals. Thus, we might expect that schools responding to fiscal incentives to avoid placing students into these categories in favor of disability designations that come with a lower price tag. However, the data do not show a definitive trend. Emotional disturbance IEPs have decreased considerably from 2005 to 2014, but autism placements have shown substantial growth during this timeframe. These results suggest that IEP caseload dynamics are driven at least in part by factors other than fiscal incentives for schools, since secular trends reveal that schools may be facing increased expenses due to the relative costs of educating students under the growing disability designations.

## **CONCLUSION AND FUTURE DIRECTIONS**

This paper identifies how special education caseloads are explained by population characteristics of children, as well as by overall school funding and funding directed specifically toward special education services. The number of children with disabilities, defined by having hearing, vision, cognitive, ambulatory, or self-care difficulties, is highly predictive of IEP caseloads. This signals that IEPs cases are indicative of children

with disabilities, as is intended under IDEA. However, when we disaggregate IEP cases by either disability type or by child race/ethnicity, other trends emerge. The number of children with disabilities does not have an association for speech/language IEPs, nor for autism IEPs. This may be due to the ACS definition of disability which does not include speech difficulties, as well as the trend toward acceptance of autism, especially mild cases, as a natural variation in development, rather than as a disability. IEPs for students by race/ethnicity suggest that although disability status correctly explains IEP caseloads for white, black, and Hispanic students, special education funding predicts more IEPs only for white students, even after controlling for overall school spending. These findings may call into question the targeting of the special education program. IEP caseloads are sensitive to educational funding, which may be expected due to the nature of IDEA as an “unfunded mandate.”

Special education funding has greater explanatory power for IEP caseloads in certain disability designations, including speech/language impairment, emotional disturbance, and specific learning disability. Higher per-pupil funding for special education also predicts fewer IEPs for autism. Due to the relative costs of educating students in these disabilities, it is not clear whether funding is responsive to the needs of students, or whether institutions are making strategic special education placement decisions due to fiscal incentives. Further examination is needed to disentangle this relationship and establish the direction of causality. Thus, a priority for future research is to examine special education funding and IEP disability designations in more detail.

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## **CHAPTER 5: CONCLUSION**

In this dissertation, each essay uses national data on children in special education to empirically examine how observable child characteristics are associated with special education placement decisions. Special education placement is defined as a child having an Individualized Education Program, or IEP. These analyses contribute to our understanding of special education placement practices and how these practices may help meet the goals of special education, to provide a free appropriate public education to all children. The first and third essay focus on IEP placements, while the second examines declassification decisions to remove children from special education. Together, these chapters describe how child demographic and household characteristics, child performance in school, and services and resources available can play a role in special education placement.

### **Services and resources**

The goals of special education is to allow all children, regardless of disability status, to receive a free appropriate public education. To serve children with disabilities in school, these children must be identified as having a qualifying disability and be placed in special education where they can gain the benefit of interventions that allow them to learn in school. To reach this goal, the most obvious policy levers would include provision of services and resources that would permit schools to correctly identify and place children with disabilities.

In chapter 2, I examine two services that may lead to special education placement in early childhood: preschool and a consistent physician or other health care provider. I find that these services are independently predictive of special education placement for

kindergarten children. Controlling for a suite of child and household socio-demographic variables and detailed child development characteristics, I estimate that children who attend preschool are about 1.2 percentage points more likely to have an IEP in kindergarten, relative to children who do not attend preschool. Children who have a consistent doctor throughout early childhood are 1.1 percentage points less likely to be placed in special education, relative to children who do not have a regular physician.

School resources, especially dedicated specifically to special education, can also play a role in special education placement decisions. In chapter 4, I examine the association between special education funding and placement rates by analyzing state panel data with controls for a wide range of state-level characteristics. I find that additional special education funding is associated with higher IEP placement rates, after controlling for child demographics, reported disability rates, and socioeconomic indicators. When considering placement rates separately by disability type, additional special education funding was associated with three particular disability designations: speech and language impairment, emotional disturbance, and specific learning disability. When considering placement rates separately by child race/ethnicity, funding was predictive of placement rates only for non-Hispanic white children.

These findings suggest that special education placement does not occur solely due to disability or developmental delay, which were held constant in regression analyses. The resources available to serve these children and the settings in which disabilities are detected also play key roles. Although children may have disabilities or red flags in their developmental trajectory, special education placement requires referral by a parent or other concerned party for a school evaluation. Preschool attendance may play an

important role in this process. Preschool may allow early childhood educators to note developmental concerns for a child, and make referrals for special education evaluation. Preschool may also permit parents to make their own observations of their child's developmental profile in relation to his or her peers, and self-refer.

Doctors are also a potential party who could refer children for extra evaluations for medical or developmental concerns that would culminate in special education eligibility. However, while my expectation was that having a consistent doctor in early childhood would be associated with greater likelihood of special education placement, empirical estimates indicate the opposite. This finding suggests that doctors may be a protective factor against developing a disability, or that health care may serve as a substitute for school-based special education services.

School resources, particularly special education funding, appear to play a role in IEP placement decisions. This is not surprising, given the high cost of providing extra services and supports necessary to educate children with disabilities (Hanushek & Rivkin, 1997). Schools operate under resource constraints and must balance the onus of providing special education services with all their other mandates. Special education funds have also been suggested to serve as an incentive for schools to label more students with disabilities to gain additional funding, especially disabilities associated with low costs for providing interventions. Cullen (2003) has suggested that dedicated special education funding may induce schools to label more students with mild disabilities such as speech delay and specific learning impairment. My findings are largely consistent with her results. However, because of substantive differences in our analyses, I must remain agnostic as to whether this conclusion should be characterized as an incentive to mis-

label students, or as an inducement to correctly label students who might otherwise fall between the cracks of special education placement.

### **Teacher factors**

In addition to monetary resources, special education placement decisions also rely on human resources in the form of teachers. In K-12 education, teachers (rather than parents or doctors) are primarily responsible for special education evaluation referrals. Teachers also place a key role in IEP team meetings in which children's academic and overall school performance is communicated to team members to arrive at decisions to declassify students from special education placement. In chapter 3, I considered several observable teacher characteristics to determine whether these characteristics may be associated with special education declassification for children in elementary and middle school.

In this analysis, I utilized longitudinal data to observe children with IEPs and estimate the association between characteristics of the child's regular classroom teacher and declassification in the subsequent observation. I found that students of nonwhite teachers were significantly more likely to be declassified from special education. Teaching experience, special education training were not significant predictors of declassification. These findings suggest that teachers may indeed play a role in special education declassification processes, but not necessarily in expected ways. Another finding in this chapter was that black and Hispanic students were more likely to be declassified, independent of teacher race, and the interaction effect of teacher-student race congruence had a positive point estimate but was not significant. This finding may mean that nonwhite students in special education do receive educational benefits from

being taught by a nonwhite teacher, which is consistent with findings in the teacher effects literature (Egalite, Kisida, & Winters, 2015). However, my measure of race congruence also included white students of white teachers. The association of race congruence for nonwhite students may not have been estimated precisely enough to reach statistical significance in this analysis.

### **Child development and performance in school**

The text of the Individuals with Disabilities Education Act (IDEA) states that children are eligible for special education services if they have one of thirteen specified conditions that adversely affects their performance in school. A child's performance in school includes academic achievement, but is not strictly limited to academic measures, particularly in early childhood, when the goals of school include social, behavioral, and motor skill development, as well as academic learning. Therefore, I argue that observable measures of a child's development and/or performance in school should be considered when empirically investigating special education placement. I explicitly control for measures of child development and academic achievement in my analyses of student-level records in chapters 2 and 3.

In chapter 2, I observe detailed data about children's developmental profile in the years leading up to kindergarten entry, which are included in the analyses as control variables. I find that the child development domains of physical health, speech and language, behavioral development, and cognitive and academic indicators are predictive of special education placement in the expected ways. This highlights a theme I raised in the introductory chapter of this dissertation, that our social norms of what is considered to

be a disability have evolved over time since the creation of the first version of the Individuals with Disabilities Education Act. While the Act originally served many children with severe conditions such as cognitive impairment, orthopedic and mobility disability, deafness, and blindness, today we have broadened the concept of disability to include those children who have trouble with reading or math or have speech articulation difficulties. This considerably complicates the question of “who has a disability?” and thus introduces a degree of uncertainty about the goals of special education. Special education is meant to allow children with disabilities to access public education, but that goal becomes murkier when we lack simple definitions of what constitutes a disability. The solution of policy makers has been to allow states and school districts, who presumably know their own students’ needs better than centralized bureaucratic policy makers, to exercise considerable discretion in setting their own eligibility criteria for who receives special education services.

However, chapter 3 may help clarify the issues of “what is a disability under special education policy” by considering what observable measures of children’s performance and functioning in school lead to students advancing out of needing special education services. In all empirical analyses of special education declassification in this essay, I controlled for children’s academic achievement and social skill and behavior indicators. In these analyses, higher math and reading achievement were predictive of special education declassification, while more frequent observations of problem behavior were associated with lower likelihood of declassification. These findings should provide some reassurance that special education is targeting students who struggle academically and behavior-wise, indicating that their disability is indeed causing adverse school

performance, and that improved academic performance and behavior are associated with graduating out of the need for services.

Chapter 4 provides further reassurance that special education placement is reaching children with disabilities. In this analysis, which uses state-level panel data, I could not observe child performance in school. However, I do observe state-wide rates of children reported to have a disability in the American Community Survey. This indicator was highly significant in predicting IEP placement rates, suggesting that special education placement is reaching children with disabilities.

### **Child demographic and household characteristics**

One common theme in special education placement literature concerns differential placement rates by child race/ethnicity, and in a related vein, placement rates by socioeconomic status, and this cannot be ignored in any analysis of special education placement. Because race and ethnicity have a very strong association with childhood poverty, differential placement rates along these dimensions should be considered in conjunction with each other. Children from minority ethnic groups have been documented to be placed in special education at higher rates than their white peers (Loser & Orfield, 2002; Harry & Klingner, 2014). A similar trend has emerged for socioeconomic status, with children from disadvantaged backgrounds being placed in special education at higher rates (Shifrer, Muller, & Callahan, 2011). On its face, these disproportionate representation trends may be troubling to educators and policy makers because students in special education face poorer outcomes than their peers in regular education in terms of educational attainment and labor market outcomes (Blackorby & Wagner, 1996). However, poor and minority children have risk factors that may put them

at a higher likelihood of developing a disability. Poor and minority children have poorer overall physical health, higher risk of abuse or other adverse experiences, and greater risks of developmental delays (Brooks-Gunn & Duncan, 1997; Evans & English, 2002). Thus, when considering the association between socio-demographic characteristics and special education placement, I argue that careful empirical analysis requires controlling for observable parameters that may otherwise bias estimates, including the sections above discussing resources and services, teacher factors, and child performance in school or observed disabilities.

After controlling for these potential confounders, each chapter can help us gain a better understanding of whether there exists true disproportionate placement in special education by race and ethnicity. In chapter 2, my findings suggest that black and Asian students are less likely than white students to be placed in special education, holding all else constant. Hispanic children are not statistically different from white children in special education placement likelihood after applying these controls. In chapter 3, my analyses suggest that black and Hispanic children are more likely to be declassified from special education, conditional on other observed characteristics. Chapter 4 finds that additional special education funding is associated with higher IEP caseloads, but when analyses are conducted separately by race/ethnicity, findings are only statistically significant for white children.

When considered together, these analyses provide evidence that minority children are not being placed too readily in special education. Minority children are less likely than their white peers to enter special education, more likely to leave, and increases in special education funding induce higher IEP caseloads among white students. My

findings are suggestive that minority students may be underserved by the special education system. This is consistent with recent research by scholars concluding that minority students are not receiving sufficient support in special education (Morgan, Farkas, Hillemeier, Mattison, Maczuga, Li, & Cook, 2015; Rosenberg, Zhang, & Robinson, 2008).

### **Future research**

These essays help provide a clearer understanding of special education placement practices and the characteristics of children, households, teachers, and policy parameters that are associated with IEP placements. Taken in sum, the findings in this dissertation provide a descriptive portrait of placement practices that may allow policy makers to determine whether special education placement is reaching the intended population. These findings suggest that special education services are reaching students with disabilities that adversely affect their educational performance. However, these analyses raise concerns about educational equity for students from different races or ethnicities. These findings suggest that conditional on school performance, minority students are less likely to enter special education and more likely to leave. This is a concerning conclusion that may imply that disadvantaged students are not receiving the supports they need in school.

However, perhaps an equally important issue for policy makers that is not addressed by these essays is the question of special education effectiveness. More than simply placing students with disabilities into a system, special education is intended to raise students' school performance and academic achievement. This issue has not been

examined in these chapters, and this is a critical direction for future research. It is difficult to draw conclusions about the effectiveness of special education because children who receive special education services are by definition different from the general education population in significant respects that impact their academic achievement. Inferring program effects for special populations is a challenge for any empirical examination of interventions received by disadvantaged populations. By design, these programs are targeted toward individuals that are already experiencing poorer academic outcomes, which complicates empirical studies that seek to draw causal inferences from the intervention.

The question of program effectiveness of special education services is the next obvious frontier of research in this domain that will be relevant to policy makers. While we may be rightfully concerned that the correct population of students is being placed into special education, we also must confront questions of whether special education is raising student achievement, educational attainment, and ultimately, labor market and life outcomes. This should be a focus of future research in special education policy that seeks to meet the needs of all students.

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## **VITA**

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